z/VM

Performance Toolkit Reference

Version 6 Release 3

SC24-6210-03

Note:
Before using this information and the product it supports, read the information in "Notices" on page 1009.

This edition applies to version 6, release 3, modification 0 of IBM z/VM (product number 5741-A07) and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces SC24-6210-02.

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About This Document

This document, in concert with the *z/VM: Performance Toolkit Guide*, contains all information required for using the IBM® zVM® feature Performance Toolkit for VM (previously known as the VM/ESA Full Screen Operator Console and Graphical Real Time Monitor, FCON/ESA, or just FCON).

New users should read the introductory information in the *z/VM: Performance Toolkit Guide* first, then return to this volume for reference information on the specific Perfkit subcommands, screens, and messages.

Intended Audience

This document is intended for use by system programmers and operators for performance analysis and general system operation. People using the document are expected to have a good general knowledge of z/VM.

Where to Find More Information

For more information about z/VM functions, see the documents listed in the "Bibliography" on page 1015.

Other manuals of the z/VM system reference library may be needed, especially for performance monitoring. Please refer to the bibliography of your operating system for locating the appropriate documentation.

Links to Other Documents and Web Sites

The PDF version of this document contains links to other documents and web sites. A link from this document to another document works only when both documents are in the same directory or database, and a link to a web site works only if you have access to the Internet. A document link is to a specific edition. If a new edition of a linked document has been published since the publication of this document, the linked document might not be the latest edition.

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Summary of Changes

This document contains terminology, maintenance, and editorial changes. Technical changes are indicated by a vertical line to the left of the change. Some product changes might be provided through service and might be available for some prior releases.

SC24-6210-03, z/VM Version 6 Release 3

This edition includes changes to support the general availability of z/VM V6.3.

The following performance data screens and/or their associated commands are new for HiperDispatch support:

- "FCX287, System Topology Machine Organization Screen -- TOPOLOG" on page 799
- "FCX298, Logical PU Organization Log – PUORGLOG" on page 816
- "FCX299, Logical PU Configuration Log – PUCFGLOG" on page 818
- "FCX300, Dispatch Vector Configuration Log – DSVCLOG" on page 821
- "FCX301, Dispatch Vector Activity – DSVBKACT" on page 823
- "FCX302, Real CPU Utilization Log – PHYSLOG" on page 825
- "FCX303, DSVBK Steals per Processor Log – DSVSLOG" on page 827
- "FCX304, Processor Log – PRCLOG" on page 829
- "FCX305, Logical Partition Activity Menu – LPARMENU" on page 832
- "FCX306, Logical Partition Share Screen – LSHARACT" on page 833
- "FCX307, Logical Partition Logs Menu – LPARLOGM" on page 835

The following performance data screens and/or their associated commands are new for Memory Scalability support:

- "FCX289, User Paging Menu Screen – UPGMENU" on page 801
- "FCX290, User Page Activity Screen – UPGACT" on page 802
- "FCX291, User Page Activity Log Screen – UPGACTLG" on page 804
- "FCX292, User Page Utilization Data Screen – UPGUTL" on page 805
- "FCX293, User Page Utilization Data Log Screen – UPGUTLLG" on page 807
- "FCX294, Available List Data Below 2G Screen – AVLB2GLG" on page 808
- "FCX295, Available List Data Above 2G Screen – AVLA2GLG" on page 810
- "FCX296, Steal Statistics Screen – STEALLOG" on page 811
- "FCX297, Age List Log Screen – AGELLOG" on page 814

The following performance data screens and/or their associated commands are new for Guest Fibre-Channel eXtensions (FCX) support:

- "FCX282, HPF I/O Device Screen – DEVICE HPF" on page 789
- "FCX283, HPF I/O Device Performance Log Screen – HPFLOG" on page 791
- "FCX284, I/O Device Data Selection Menu – DEVMENU" on page 792

The following performance data screens and/or their associated commands are new for Live Guest Relocation (LGR) support:

- "FCX285, LGR Event Log Screen – LGRELOG" on page 793

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- "FCX286, LGR Data Screen – LGRDATA" on page 796

The following performance data screens and/or their associated commands were updated for HiperDispatch support:

- "FCX100, CPU Load and Transactions Screen – CPU" on page 357
- "FCX112, User Resource Usage Screen – USER" on page 420
- "FCX124, Performance Data Selection Menu – MONITOR, MENU" on page 462
- "FCX126, LPAR Load Screen – LPAR" on page 463
- "FCX154, System Settings Screen – SYSSET" on page 525
- "FCX155, Monitor Data Statistics Screen – MONDATA" on page 529
- "FCX162, User Resource Usage Log Screen – USERLOG" on page 543
- "FCX180, System Configuration Screen – SYSCONF" on page 573
- "FCX202, LPAR Load Log Screen – LPARLOG" on page 630
- "FCX225, System Summary Log Screen – SYSSUMLG" on page 682
- "FCX236, Processor Load and Configuration Logs Menu – PROCMENU" on page 706
- "FCX239, Processor Summary Log Screen – PROCSUM" on page 710

The following performance data screens and/or their associated commands were updated for Memory Scalability support:

- "FCX102, System Counters Screen – SYSTEM" on page 372
- "FCX103, Storage Utilization Screen – STORAGE" on page 381
- "FCX124, Performance Data Selection Menu – MONITOR, MENU" on page 462
- "FCX133, Shared Segments Screen – NSS" on page 479
- "FCX146, Auxiliary Storage Log Screen – AUXLOG" on page 507
- "FCX147, Virtual Disks in Storage Screen – VDISKS" on page 509
- "FCX254, Available List Log Screen – AVAILLOG" on page 735
- "FCX259, Demand Scan Log Screen – DEMNDLOG" on page 744
- "FCX260, Storage Management Logs Menu – STORMENU" on page 747
- "FCX265, Spin Lock Log Screen – LOCKLOG" on page 757

The following performance data screens and/or their associated commands were updated for Guest Fibre-Channel eXtensions (FCX) support:

- "FCX102, System Counters Screen – SYSTEM" on page 372
- "FCX161, LPAR Channel Load Screen – LCHANNEL" on page 541
- "FCX173, Benchmark Log Selection Menu – BENCHMRK" on page 554
- "FCX179, System Facilities Log Screen – SYSLOG" on page 571
- "FCX180, System Configuration Screen – SYSCONF" on page 573
- "FCX185, I/O Configuration Changes Screen – IOCHANGE" on page 582

The following performance data screens and/or their associated commands were updated for HiperSockets Bridge support:

- "FCX155, Monitor Data Statistics Screen – MONDATA" on page 529
- "FCX185, I/O Configuration Changes Screen – IOCHANGE" on page 582
- "FCX251, QDIO Activity Screen – QDIO" on page 729
- "FCX266, General Virtual Switch Description Screen – GVSWITCH" on page 759
- "FCX268, General Virtual Network Device Description Screen – GVNIC" on page 764

- "FCX269, Virtual Network Device Activity Screen – VNIC" on page 766

The following performance data screens and/or their associated commands were updated for Live Guest Relocation (LGR) support:

- "FCX271, SSI Data Menu – SSIMENU" on page 771

Handling of Numeric Fields

The handling of numeric fields by Performance Toolkit has changed. See "Data Field Values" on page 355.

User Class Restructure (UCR) Support Removed

Support for the user class restructure (UCR) function and the OVERRIDE utility have been removed. Privilege classes for CP commands, DIAGNOSE codes, and other CP functions can be redefined by using MODIFY system configuration statements and MODIFY commands.

If any UCR files exist on the system, the contents of those files will not be processed by CP.

The description of Diagnose code X'C4' has been updated for screen FCX104.

Stabilization of z/VM Performance Toolkit rmfpms Support

The Performance Toolkit for VM can process Linux performance data obtained from the Resource Management Facility (RMF™) Linux performance gatherer, rmfpms. z/VM Performance Toolkit support for rmfpms been stabilized and may cease to function as the underlying Linux systems evolve. Support for the Linux rmfpms agent has been withdrawn and no new copies of it are available for installation. If you have rmfpms installed on an existing Linux image, it should continue to run on that image unsupported. There is no guarantee a current rmfpms installation will run on future Linux image installs.

SC24-6210-02, z/VM Version 6 Release 2

This edition includes changes to support the general availability of z/VM V6.2.

The following new performance data screens, and their associated new commands, support the single system image (SSI) function:

- "FCX271, SSI Data Menu – SSIMENU" on page 771
- "FCX272, ISFC End Point Configuration – ISFECONF" on page 772
- "FCX273, ISFC End Point Activity – ISFEACT" on page 775
- "FCX274, ISFC Logical Link Activity – ISFLACT" on page 777
- "FCX275, ISFC Logical Link Configuration – ISFLCONF" on page 779
- "FCX276, SSI Configuration – SSICONF" on page 781
- "FCX277, SSI State Change Synchronization Activity Log – SSISCHLG" on page 783
- "FCX278, SSI State/Mode Information Log – SSISMILG" on page 784

The following changes reflect Performance Toolkit support of SSI and other z/VM V6.2 functions:

- These performance data screens, and their associated commands, are new:
  - "FCX279, ISFC End Point Activity Log – ISFELOG *epoint*" on page 786

  - "FCX280, ISFC Logical Link Activity Log – ISFLLOG *partner*" on page 787
  - "FCX281, ISFC Logical Link Activity By-Time Log – ISFLALOG" on page 788
  - Various other performance data screens have been updated.
- The following commands are new:
  - "FCONTROL EMERGENC" on page 29
  - "FCONTROL DUMPID" on page 28
  - Various other commands have been updated.
- As of z/VM V6.2, the source COPY files defining extended trend record layouts are shipped with the product in FCXGPI MACLIB, and are no longer documented in detail in this book. The list of these records is still found in Appendix E, "Extended Trend File Records," on page 919.
- The following trend records are new: X'FC0C', X'FC0D', X'FC0E', X'FC0F', X'FCB1', and X'FCB2'.

Other changes:

- The following trend records have been updated: X'FC00' and X'FC05.'
- The following appendixes have been updated: Appendix D, "HISTLOG/HISTSUM File Records," on page 917 and Appendix G, "Trend File Variables Selection," on page 923.
- The sample screen for FCX211, TCP/IP TFTP Activity Log Screen – TFTPLOG has been deleted.
- The IOASSIST command and its corresponding performance data screen, FCX159, have been deleted.
- Various messages have been added or updated. See Chapter 3, "Performance Toolkit Messages," on page 837.
- Other minor changes have been made throughout this document.

SC24-6210-01, z/VM Version 6 Release 1 (Updated Edition)

This edition includes changes to support product changes provided or announced after the general availability of z/VM V6.1.

- The following performance data screens and their descriptions have been updated:
  - "FCX103, Storage Utilization Screen – STORAGE" on page 381
  - "FCX115, User Resource Details Screen – USER *userid*" on page 433
  - "FCX126, LPAR Load Screen – LPAR" on page 463
  - "FCX131, I/O Device Configuration Screen – DEVCONF" on page 474
  - "FCX154, System Settings Screen – SYSSET" on page 525
  - "FCX180, System Configuration Screen – SYSCONF" on page 573
  - "FCX226, User Configuration Screen – UCONF" on page 684
  - "FCX251, QDIO Activity Screen – QDIO" on page 729
  - "FCX268, General Virtual Network Device Description Screen – GVNIC" on page 764
  - "FCX269, Virtual Network Device Activity Screen – VNIC" on page 766
- Various messages have been added or updated. See Chapter 3, "Performance Toolkit Messages," on page 837.

SC24-6210-00, z/VM Version 6 Release 1

This edition includes changes or additions to support the general availability of z/VM V6.1.

VMPRF Mode No Longer Supported

VMPRF mode, which provided compatibility with the old z/VM Performance Reporting Facility report file specifications, is no longer supported. The documentation for this mode has been removed, and all reports must now follow the current Performance Toolkit specifications.

Chapter 1. Performance Toolkit Subcommands

There are subcommands which can be entered and executed in basic control mode, re-display mode and performance monitor mode. Some subcommands are meaningful in multiple modes and some are only meaningful in one specific mode.

The subcommands are entered on Performance Toolkit's command line like any CP or CMS command but are not re-displayed in the output area nor are they included in Performance Toolkit's log file.

Be aware that subcommands executed over a remote connection to the PERFSVM machine will be executed on the PERFSVM machine itself and *not* on the remote user's machine.

Entering Performance Toolkit Subcommands from EXECs or CMS Programs

Most Performance Toolkit subcommands can be executed from within CMS programs or EXEC procedures. The interface built into Performance Toolkit for executing commands will trap the CMS command 'FCONCMD' and pass its arguments on for execution by the Performance Toolkit command handling subroutines.

Two methods are supported:

- *Delayed execution* of the Performance Toolkit subcommand: Execution of the command string `FCONCMD FCSTACK subcmd arg1 arg2 arg3 ...`

  will cause the subcommand and its arguments to be stacked in the command queue, and to be executed sequentially (first-in / first-out) like any other command entered from the command line. Execution of stacked commands will start only when the current CMS command or EXEC has ended. Most commands can be submitted and correctly executed in this way.

  Exception: commands which generate GDDM graphics may execute, but the program will require manual intervention (QUIT-function) to end the graphics program.
- *Immediate execution* of the Performance Toolkit subcommand: Execution of the command `FCONCMD subcmd arg1 arg2 arg3 ...`

  will cause immediate execution of the subcommand specified. In many cases this is what is desired (e.g. changing the screen update mode from 'UPDTCMS IMMED' to 'UPDTCMS DELAYED' in a procedure which will use full screen displays). In other cases it will not produce the desired results because:

  1. The corresponding subcommand set a flag which would cause execution of the command (e.g. selection of a specific performance display) when the program is looking for more work, or
  2. Subsequent subcommands entered with the FCONCMD interface may reset such a flag before the previous command has actually been executed.

  Use of the 'FCONCMD FCSTACK' format for delayed execution is the preferred method.

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Return Codes

The return code from the FCONCMD module does ***not*** indicate problems with the actual Performance Toolkit subcommand execution. The possible return codes and their meaning are:

-3 Can indicate either of the following:

- FCONCMD module not found, or
- FCONCMD module called natively, i.e. not running under control of Performance Toolkit, or a mismatch of the FCONCMD and PERFKIT module levels.

  Checking the return code for FCONCMD is a simple way of verifying whether an EXEC procedure does, or does not, run under Performance Toolkit.

0 This is the usual return code you will see when the FCONCMD module is executed under control of Performance Toolkit, regardless of the success of the subcommand execution.

>0 Any positive return code is the number of the PROCESS entry just created by means of an 'FC PROCESS ..' command, i.e. such a return code should never be the result of executing any other subcommand.

You may need the PROCESS entry number when coding automated procedures that have to dynamically define and delete PROCESS entries. This number is required for deleting a specific entry again by means of the 'DELETE' argument of the 'FC PROCESS ..' subcommand.

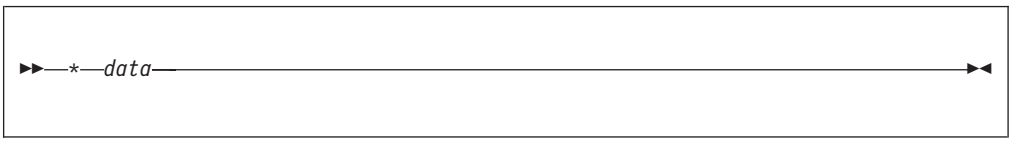
General Subcommands

Asterisk '*'

Purpose

The asterisk indicates that the subcommand entered is to be treated as a comment.

Format



Usage

The 'command' will be passed to CP and included in the basic mode display when entered in either basic mode or redisplay mode; it will simply be ignored when entered in any other mode.

Equal sign '='

Purpose

The 'equal' sign indicates that the last subcommand entered should be re-executed.

Format

Parameters

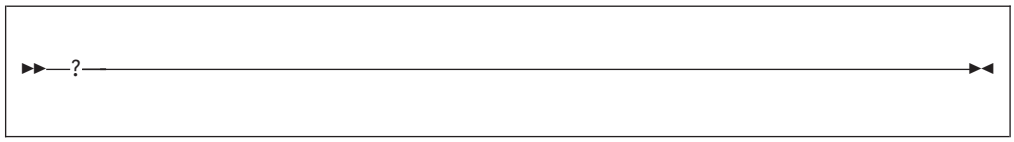
No parameters are allowed or tested for.

Question mark '?'

Purpose

The question mark retrieves the most recently entered subcommands from an internal command buffer where all subcommands entered (except '?' and '=') are stacked. Entering '?' for the first time retrieves the last subcommand entered from the command buffer.

Format



Parameters

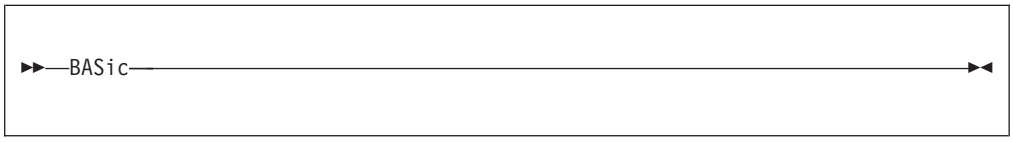
No parameters are allowed or tested for.

BASIC

Purpose

The BASIC subcommand forces an immediate return to Performance Toolkit 'basic' mode, regardless of the current operating mode.

Format



Parameters

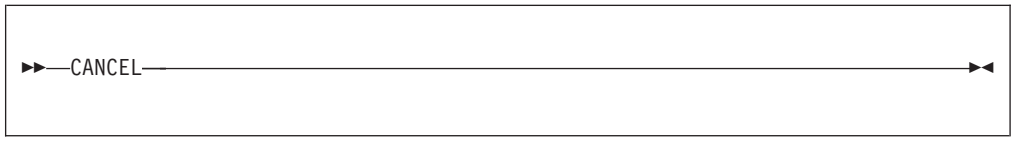
No parameters are allowed or tested for.

CANCEL

Purpose

The CANCEL subcommand forces an immediate exit from Performance Toolkit, regardless of the current operating mode.

Format



Parameters

No parameters are allowed or tested for.

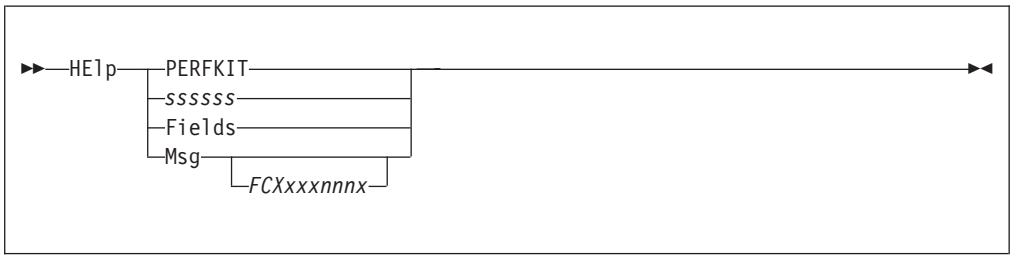
HELP

Purpose

The HELP subcommand activates CMS HELP for the Performance Toolkit. Specific HELP information can be selected by additional arguments.

For calling the general CMS HELP facility, you will have to enter the subcommand 'CMS HELP ....'.

Format



Parameters

PERFKIT
Selects an initial HELP menu for Performance Toolkit. The same information is shown if the command is entered without any additional arguments, or if HELP mode is entered by pressing PF1.

ssssss Is any Performance Toolkit subcommand for which HELP information is displayed. In the case of the subcommand 'FCONTROL' you can enter an additional argument to select the corresponding HELP text.

Example: To display HELP information for the 'FCONTROL PROCESS' subcommand, enter the subcommand:

```
HELP FC PROCESS
```

When different subcommand descriptions are available for different modes, HELP text corresponding to the current Performance Toolkit mode will be shown if available, otherwise the search order

1. Basic mode HELP text
2. Redisplay mode HELP text
3. Performance monitor mode HELP text

will be used for locating the appropriate HELP information.

Fields
Specifies that HELP information for performance monitor fields is to be shown. The information shown depends on the current status of the screen:

- If a performance monitor screen is being displayed for which HELP information is available, the field descriptions for the selected screen will be shown.
- A HELP menu with a selection of all available field descriptions will be shown in all other cases (screen not in performance monitor mode, or no specific HELP information available for the selected performance display).

Msg {FCX*xxxnnnx*}

Specifies that HELP information for a message is to be shown, where *FCXxxxnnnx* is the message prefix. If the message prefix *FCXxxxnnnx* is specified, the corresponding HELP text will be shown. When 'Msg' is selected without a message prefix, the data shown depends on the current status of the screen:

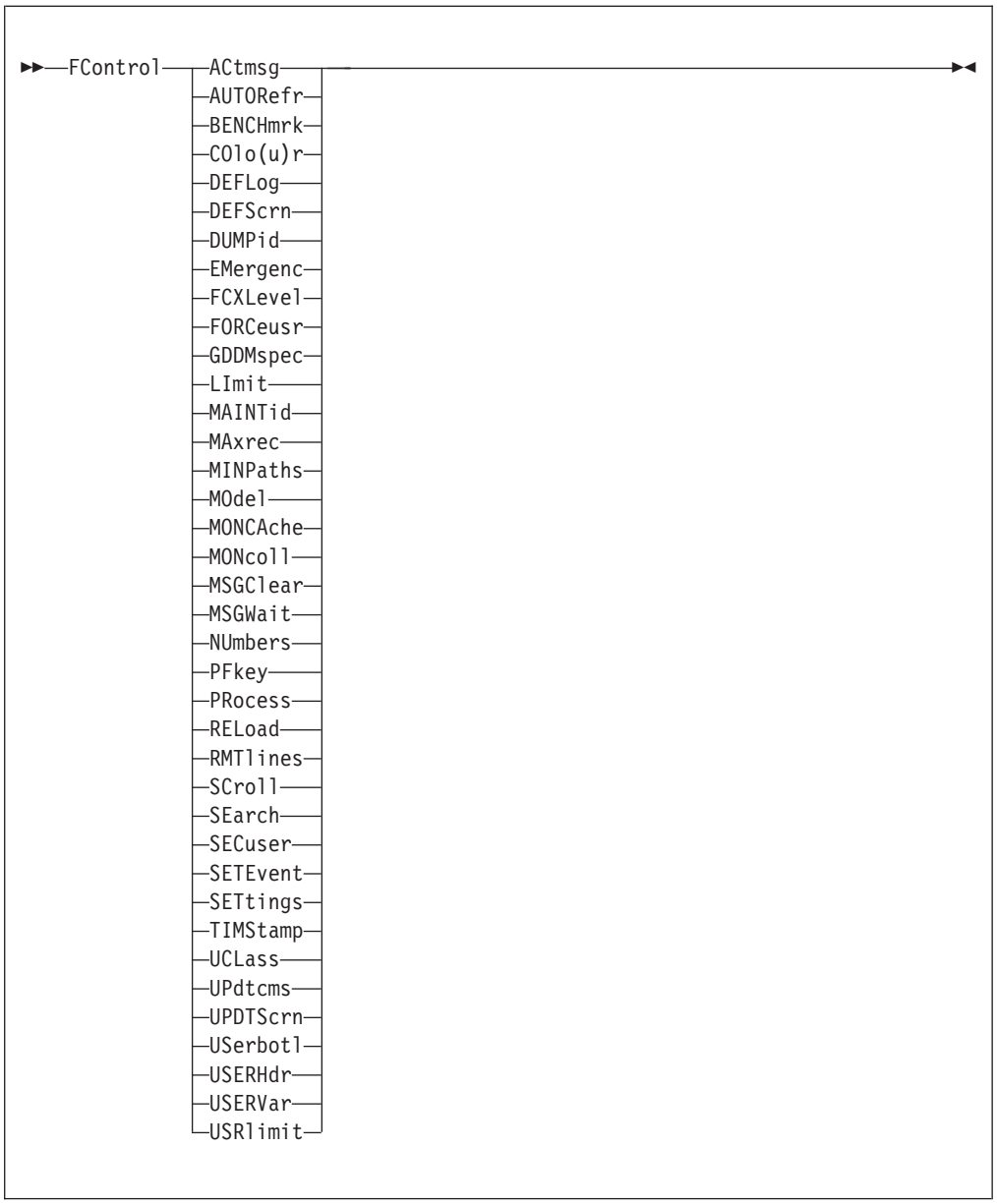
- If a Performance Toolkit message is shown in the message area while the subcommand 'HELP MSG' is entered, HELP information for that message will be selected.
- If the message area is empty, a general instruction will be shown which explains how to select HELP information for a specific message.

FCONTROL

Purpose

The FCONTROL subcommand allows tailoring of many Performance Toolkit functions for specific uses. All remaining general subcommands are different arguments of this command.

Format



Usage

1. Because most of these FCONTROL subcommands have many options, the full command format will be shown only in the detailed description of the subcommand.

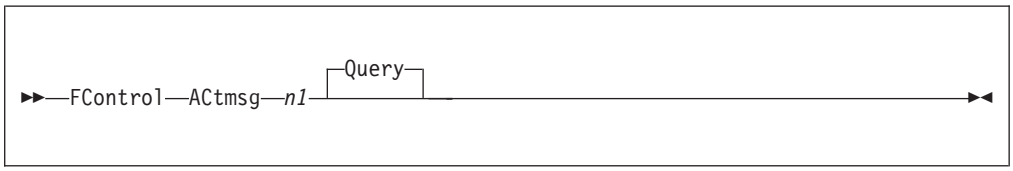
2. Usually you will not see a reply to acknowledge receipt of FCONTROL subcommands (except in the case of QUERY options). The absence of an error message indicates that the command was correct and that it has been executed.

FCONTROL ACTMSG

Purpose

The FCONTROL ACTMSG subcommand specifies the number of action messages (line type CPAMSG) that are to be left pending at the top of the screen while the virtual machine running Performance Toolkit is logged on to a display terminal. Action messages will be scrolled only while their number exceeds the value defined with the ACTMSG subcommand. ACTMSG is initialized to a value of ten.

Format



Parameters

n1 Specifies the number of action messages that are not to be scrolled. Minimum is 0 and the maximum is 99 (will keep *all* action messages on any screen).

Query
Inserts and displays the current value of ACTMSG on the command line. QUERY is the default.

Usage

1. The ACTMSG setting will be ignored while the virtual machine running Performance Toolkit is in disconnected state *if the logical display would otherwise become locked.*

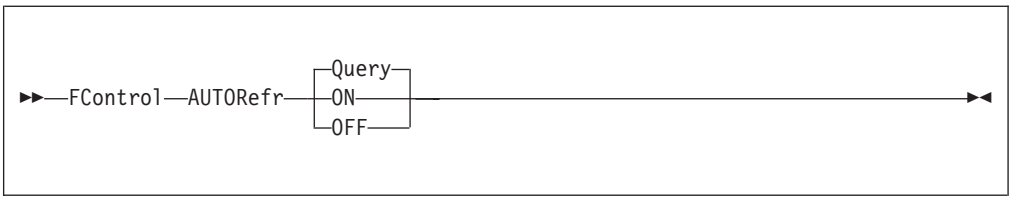
   This change in the scrolling logic is implemented in order to prevent a lock-up of the (disconnected) logical display which could lead to an abend due to storage constraints when none of the new output lines can be unstacked and inserted into the basic mode display.

FCONTROL AUTOREFR

Purpose

The FCONTROL AUTOREFR subcommand specifies whether the display should be updated automatically in an APPC/VM remote performance retrieval session. The initial default operation mode is to *not* refresh the screen automatically.

Format



Parameters

ON Indicates that autorefresh mode is to be activated for this client machine. The refresh interval will automatically be set to the server's data collect interval, i.e. it may vary, depending on the server you connect to.

OFF Indicates that autorefresh mode is to be dectivated.

Query
Inserts and displays the current AUTOREFR setting on the command line. QUERY is the default.

Usage

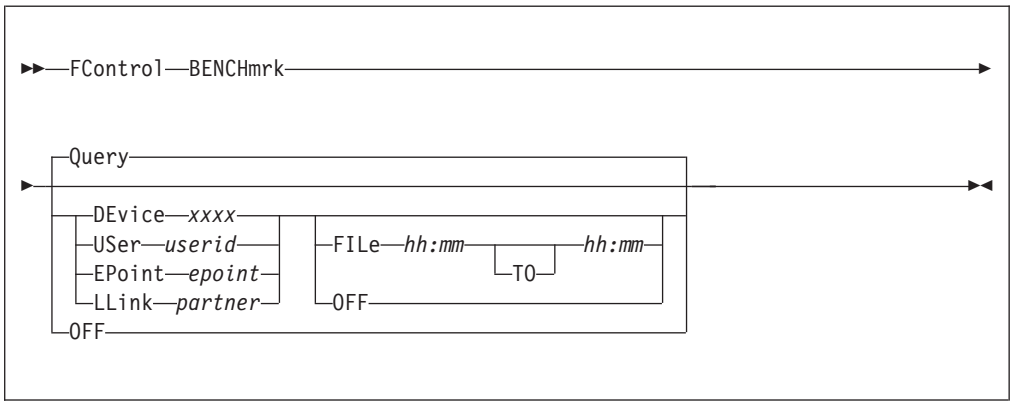
1. The command is to be entered in the *client* virtual machine that wants to activate auto refresh mode.
2. The string `(A)` will be appended to the system identifier in the top right hand corner of remote performance data displays for APPC/VM sessions while autorefresh mode is active.

FCONTROL BENCHMRK

Purpose

The FCONTROL BENCHMRK subcommand defines the I/O device(s), ISFC end point(s), ISFC logical link(s) and/or user(s) which are to be 'benchmarked', i.e. for which individual 'per sample' logs are to be created. Creating such logs will help in the detailed analysis of the behavior of a specific object.

Format



Parameters

Query Displays the list of currently benchmarked objects and their properties. This is the default if no arguments are entered with the subcommand.

DEvice *xxxx*
Defines the device number *xxxx* of an I/O device which is to be benchmarked.

FILe Lets the benchmarking data be written not only to volatile in-storage logs but also to disk files during the specified period.

hh:mm Are the start and end times respectively of the period during which disk logs are to be created. The time must be entered in exactly this format, i.e. two digits each for hours and minutes, separated by a colon.

USer *userid*
Defines the user identification *userid* of a virtual machine which is to be benchmarked.

EPoint *epoint*
Defines the ISFC End Point number (hexadecimal, leading zeros may be omitted) which is to be benchmarked.

LLink *partner*
Defines the name of a ISFC Logical Link which is to be benchmarked.

OFF Disables benchmarking for the specified object, or for all objects already benchmarked if FC BENCHMRK OFF is used.

Usage

1. The following files may be created:
   I/O device files:

devno CACHDLG
For the CACHDLOG

devno CACHELG
For the CACHELOG

devno CPOWNLG
For the CPOWNLOG

devno DEVLOG
For the DEVLOG

devno HPFLOG
For the HPFLOG

devno QDIOLOG
For the QDIOLOG

devno QEBSMLG
For the QEBSMLOG

devno SCSILOG
For the SCSILOG

devno SEEKDLG
For the SEEKDLOG

devno SEEKLLG
For the SEEKLLOG

User files:

userid LXCPULG
For the LXCPULOG

userid LXMEMLG
For the LXMEMLOG

userid LXNETLG
For the LXNETLOG

userid MTUSRLG
For the MTUSRLOG

userid UCOMMLG
For the UCOMMLOG

userid UPACTLG
For the UPGACTLG

userid UPAGELG
For the UPAGELOG

userid UPUTLLG
For the UPGUTLLG

userid UQDIOLG
For the UQDIOLOG

userid URESPLG
For the URESPLOG

userid USERLOG
For the USERLOG

userid USTATLG
For the USTATLOG

userid UTRANLG
For the UTRANLOG

ISFC End Point files:

epoint ISFELOG
For the ISFELOG

ISFC Logical Link files:

partner ISFLLOG
For the ISFLLOG

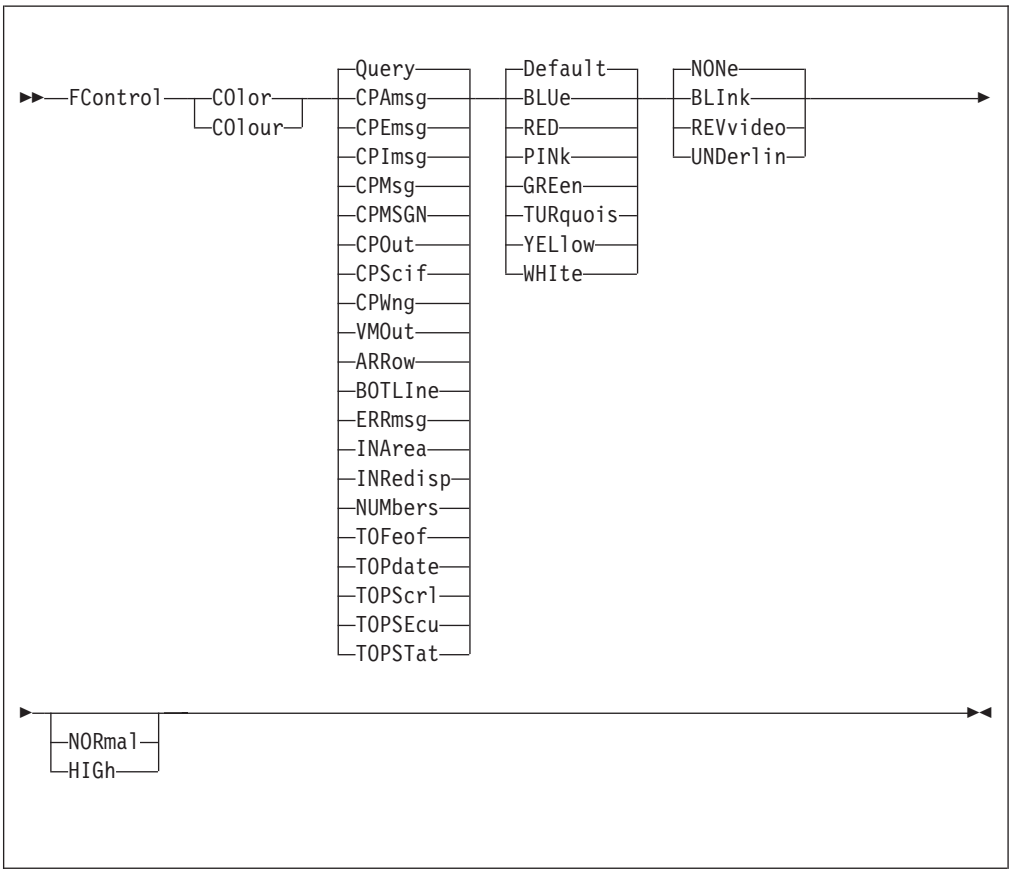
2. Up to three log generations will automatically be kept, with a '1' or '2' suffix for previous days' logs as for the console and the detailed performance history log.

FCONTROL COLOR

Purpose

This subcommand allows specification of extended color and highlighting to be used for all the different fields displayed by Performance Toolkit. The subcommand can be entered on any screen, but the extended color and highlighting will be used only on terminals with the appropriate support (e.g. 3279 for color and highlighting, 3290 extended highlighting only).

Format



Parameters

Query Displays the current color settings for all fields. This is also the default if no field name is entered.

fieldname
If not 'Query'

CP output line definitions:

CPAmsg
CP message line that is treated as a Performance Toolkit action message (i.e. contains preceding carriage return characters)

See the "Action Messages" section in the "General System Operation" chapter of the *z/VM: Performance Toolkit Guide* for more information.

CPEmsg
CP error message (EMSG)

CPImsg
CP information message (IMSG)

CPMsg
CP message (MSG)

CPMSGN
CP noheader message

CPOut
CP command output line

CPScif
Output line from another machine which we received via the Single Console Image Facility (SCIF)

CPWng
CP warning

VMOut
Output line generated by the virtual machine (e.g. CMS)

Performance Toolkit field definitions:

ARRow
The command pointer

BOTLIne
Bottom line of the display

ERRmsg
Performance Toolkit error messages

INArea
Command input area

INRedisp
CP and CMS commands redisplayed in the general display area

NUMbers
Performance Toolkit's line numbers on the left side of the display area (inserted only if numbers have been set on, see "FCONTROL NUMBERS" on page 65).

TOFeof
Top-of-file and end-of-file indicators shown at the beginning and end of Performance Toolkit's console log in re-display mode

TOPdate
The date field on the left of the top line

TOPScrl
Active scrolling information displayed in the center part of the top line

TOPSEcu
Secondary user information (or Performance Toolkit header) displayed in the canter part of the top line

TOPSTat
Screen mode field ('RE-DISPLAY' or 'PERF. MONITOR') displayed on the right of the top line when not in basic mode

The next two parameters are the extended highlighting you want to select and the color. It does not matter which is entered first.

Color Specification:

DEFAULT
Performance Toolkit's default colors are to be used. Color will be blue for the following fields: CPOUT, VMOUT, CPEMSG, CPIMSG, CPSCIF, TOPDATE, and NUMBERS. All other fields will be displayed in white. On 3270 and 3278 type displays the 'white' fields will be highlighted while the 'blue' fields will be displayed with normal intensity.

BLUe, RED, PINk, GREen, TURquois, YELlow and WHIte
(When specified) are the colors that should be used instead of the default ones.

Highlighting:

NONe
No extended highlighting (the default)

BLInk
Line should be blinking

REVvideo
Reverse video

UNDerlin
Complete line is to be underlined

The following two arguments apply only to screens without extended highlighting support. They can also be entered from screens with extended highlighting support, but the changed values will not become active.

NORmal
Normal intensity

HIGh High intensity

Usage

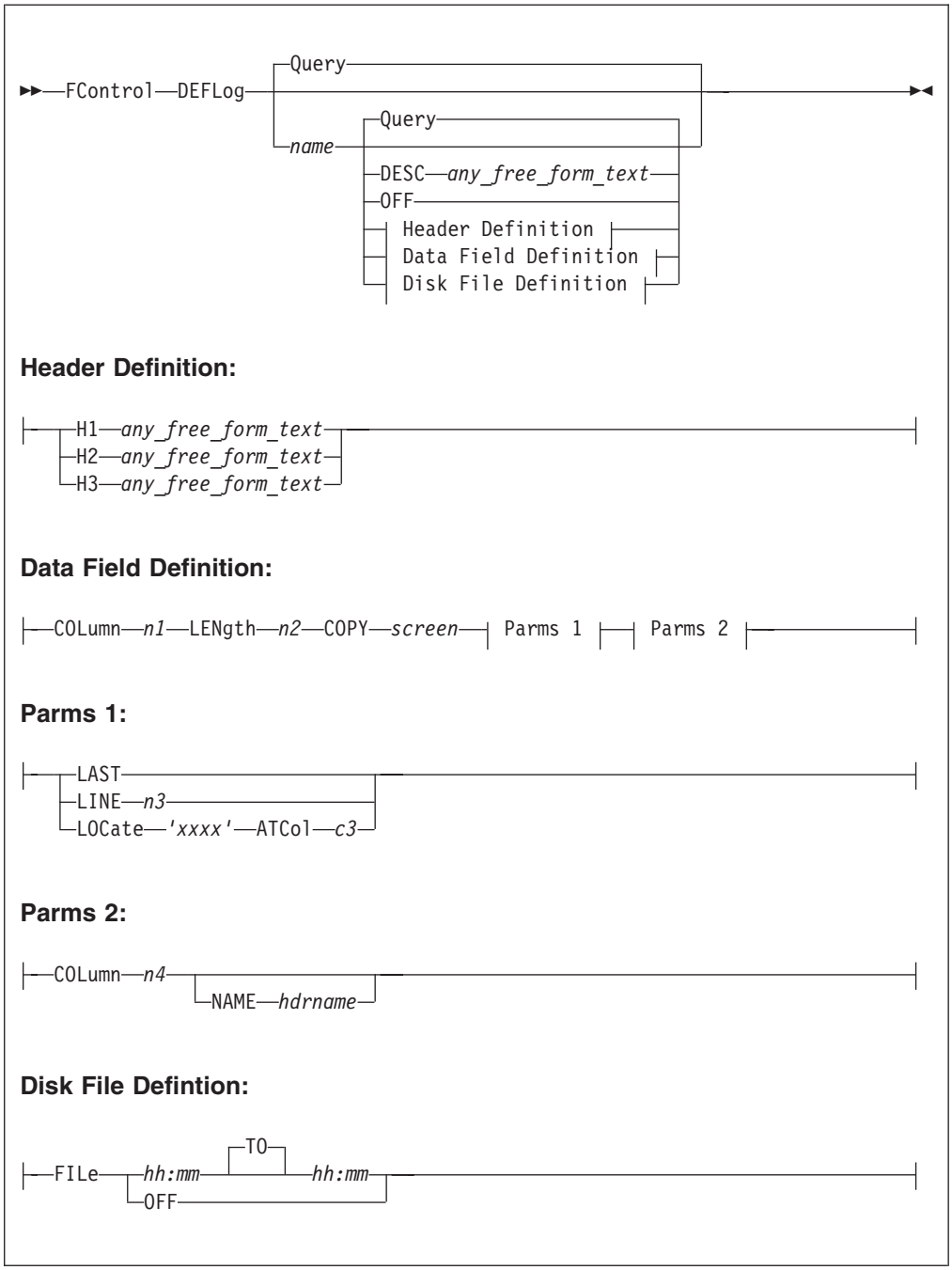
1. The first parameter is the name of the field whose attributes you want to specify. Please note that default values for both highlighting and color will be set once a valid field name has been entered. These default values will become active unless they are replaced by valid color and/or highlighting definitions in the same command.

FCONTROL DEFLOG

Purpose

The FCONTROL DEFLOG subcommand allows defining your own 'by time' performance data logs, to be built from parts of standard performance displays and user-defined text. It causes a User Defined Performance Data Logs Screen (FCX187) to be displayed.

Format



Parameters

Query
Displays the names of all user defined logs. This is also the default action if no screen name is entered.

name Defines the name of the new display which is also the command you will have to enter for selecting it

Query
Lets the definitions of the selected user defined log be displayed. This is also the default action if no further arguments are entered.

DESC The log description, where *any_freeform_text* will be used to describe the log in the UDEFMENU.

OFF Deletes the definitions for the selected user defined log.

H1/H2/H3
Indicate that header lines number 1, 2 or 3 respectively are to be defined, where *any_freeform_text* stands for the text that is to be inserted.

COLumn *n1*
Specifies the leftmost column of the field in the new performance log *name* where the information is to be placed which is defined by the remaining arguments

LENgth *n2*
Defines the length of the field in the new performance log

COPY *screen*
Defines the name of the standard performance display from which lines are to be copied

'Standard' refers here to one of the general displays which can be selected by entering a single command, without additional arguments, i.e. you cannot specify any of the 'detailed' displays with data for specific users or I/O devices.

Special case: Use the argument `CPOWNED` to specify the CP owned device display as input.

Source Line Specification:

LAST Indicates that the last line of the source display is to be copied from. Copying from the last line is usually a requirement when using any of the 'by time' log displays as input, where the most recent data fields are always found in the last line.

LINE *n3*
Defines a fixed line in the 'source' display where the source field is located

LOCate *'xxxx'* **ATCol** *n3*
Can be used to locate the source line on displays with variable output format.

'*xxxx***'** Is a string which is to be searched for. It must be enclosed in single quotes and can have a maximum length of eight characters.

ATCol *c3*
Defines the column *c3* where the string *'xxxx'* is to be looked for. These arguments are mandatory in order to reduce the overhead required for locating a line.

*Note that the column number **c3** refers to the string's position in the internal output buffer.* The column number seen on the display must be incremented for each display attribute found to the left of the string: Attributes take up two bytes in the buffer, but only one position on the actual display.

Source Column and Optional Header Information:

COLumn *n4*
Defines the leftmost column on the selected line in the 'source' display from where on data are to be copied, for length *n2*

NAME *hdrname*
Defines an optional character string which, when defined, will be inserted in header line 3 above the columns containing the data fields defined by the command.

The string:

- Must not contain blanks (a blank will be assumed to indicate the end of the string)
- Will be right-adjusted if it is shorter than the length *n2* defined for the field
- Will be truncated to the field length *n2* if it is longer.

Output File on Disk:

FILe Lets the benchmarking data be written not only to volatile in-storage logs but also to disk files during the specified period.

hh:mm
Are the start and end times respectively of the period during which disk logs are to be created. The time must be entered in exactly this format, i.e. two digits each for hours and minutes, separated by a colon.

OFF Deactivates logging to disk file.

The file name of the disk file will be the name of the user defined log, and the file type is always `UDEFLOG`

Up to three log generations will automatically be kept, with a '1' or '2' suffix for previous days' logs as for the console and the detailed performance history log.

Usage

1. The first ten columns are reserved for the time stamp with the sample interval end time; they cannot be overwritten by performance data fields.
2. The number of field definitions for any single user-defined performance log is limited to 20.
3. The maximum width of the new log is 132 characters. Field definitions extending beyond this width cannot be accepted.
4. The source data may contain display attributes for highlighting specific fields. These are 2-byte strings which end up taking only one position on the output screen.

   While the DEFLOG logic should compensate for attribute strings on columns preceding the string you want to copy, you may copy:

- Only the second part of such a string if the 'source' display column you specified is just one position too low (this second part may appear as one of the characters '-' or 'Y', or as another strange character)
- Part of a trailing attribute string if the field length you specified was a bit too long
- Less of the actual data than expected if the field length specified spans two or more fields, with intervening attribute strings (the two bytes of each attribute must be accounted for in your 'length' definition even though each attribute will take up only the space of one character in the final display).

5. Set your field definitions so that only the actual data fields are copied, or, if you intend to copy the attribute(s) too, remember to take into account the additional data length to be copied (one additional byte per attribute).
6. In the resulting screen, keep in mind the following notes:
   a. *Current/Average Data:* The fields will be copied just as they have been generated for the source screen, i.e. on performance displays where different values are displayed for the 'current' and 'average' settings, averages will be copied while the average setting is active. This is probably not what you want to see on your log, so do not set averages while collecting this kind of log data.
   b. *Data Availability:* Valid data can, obviously, be copied from the source screen only when the prerequisites for generating it are met.

Results

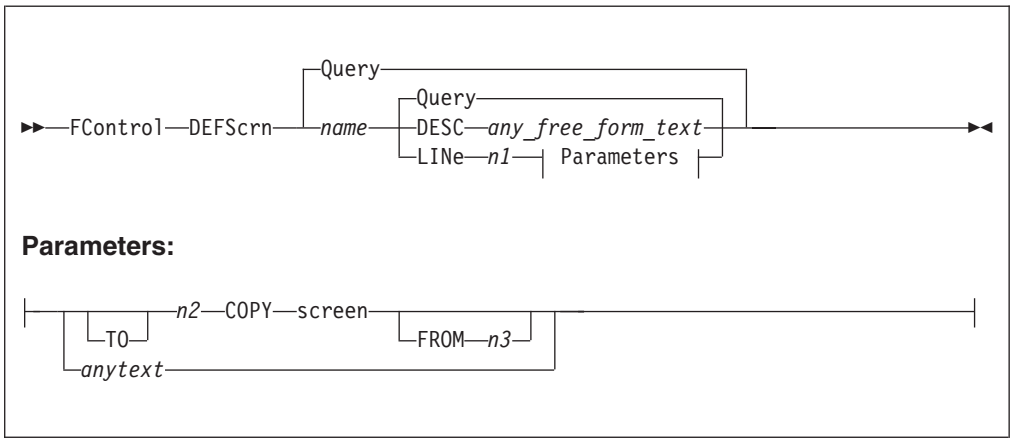
See “FCX187, User Defined Performance Data Logs Screen – FC DEFLOG” on page 586.

FCONTROL DEFSCRN

Purpose

The FCONTROL DEFSCRN subcommand allows you to define your own performance displays, to be built from parts of the standard performance displays and user-defined text. It causes a User Defined Performance Screen (FCX148) to be displayed.

Format



Parameters

Query
Displays the names of all user defined screen. This is the default action if no screen name is entered.

name Defines the name of the new display which is also the command you will have to enter for selecting it

Query
Lets the definitions of the selected user defined screen be displayed. This is the default action if no further arguments are entered.

DESC The log description, where *any_freeform_text* will be used to describe the log in the UDEFMENU.

LINe *n1*
Specifies the line number in the new display *name* where the information is to be placed which is defined by the remaining arguments

{TO} *n2*
Specifies the last line number of a range of lines in the new display which are to be filled with data from the same standard performance display.

When not specified, only one line is retrieved from the standard display and copied to line number *n1*.

COPY *screen*
Defines the name of the standard performance display from which lines are to be copied.

'Standard' refers here to one of the general displays which can be selected by entering a single command, without additional arguments, i.e. you cannot specify any of the 'detailed' displays with data for specific users or I/O devices.

Special case: Use the argument `CPOWNED` to specify the CP owned device display as input.

FROM *n3*
Defines the first line in the 'source' display where lines are to be copied into the new display. Copying will start at the first line of the source display if the FROM argument is omitted.

'*any text*'
Defines a string of characters, enclosed by single quotes, which is to be placed on line *n1* of the new screen.

Usage

1. The number of definition commands for any single user-defined display is limited to eight, and the maximum number of lines which can be defined for the new performance screen is limited to 70.
2. Valid data can be copied from the source screen only when the prerequisites for generating it are met. Make sure that you include only specifications for copying from performance screens which are likely to be available.

Results

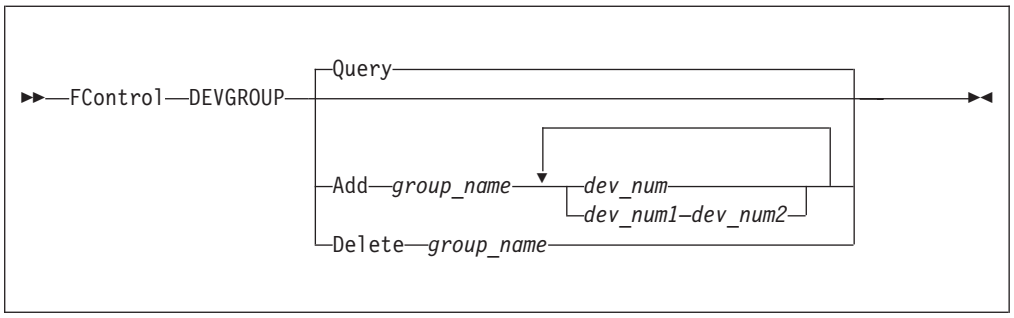
See “FCX148, User Defined Performance Screen – FCONTROL DEFSCRN” on page 511.

FCONTROL DEVGROUP

Purpose

The FCONTROL DEVGROUP subcommand allows you to define device groups for which separate averages are to be calculated and displayed on the FCX108 (DEVICE, DEVICE DASD) and the FCX282 (DEVICE HPF) screens.

Format



Parameters

Query
Lists the currently active device group definitions. This is the default.

Add Adds a set of devices, specified by the device numbers, to a device group specified by the *group_name*.

Delete
Deletes the device group specified by the *group_name* operand from the list of active device groups and removes it from reports.

group_name
The name of the device group that the FCONTROL DEVGROUP command operates with. A maximum of eight characters are accepted.

dev_num
The number of the device to be added to the device group *group_name*.

dev_num1–dev_num2
Indicates that you can specify a list or range of device numbers. If you specify a range of device numbers, all valid devices in the range, including the first and the last devices you specify, are added to the device group *group_name*.

Usage

1. DEVGROUP specifications become effective immediately after they have been entered.
2. If you issue multiple FCONTROL DEVGROUP ADD commands for the same device group name, all devices specified are added to that same group.
3. If a range being added to a device group intersects or overlaps with a range previously defined for the group, the resulting range will include all specified range values.
4. A specific device can belong to several device groups.

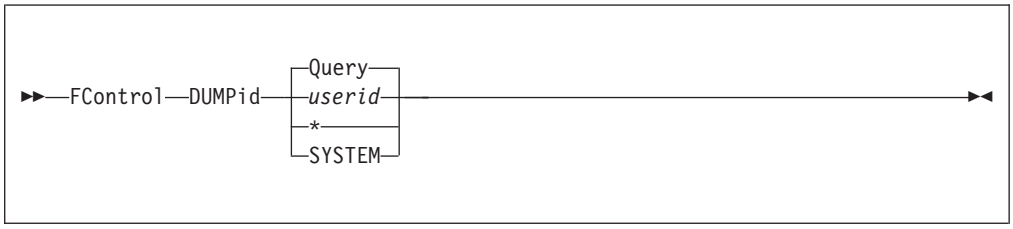
5. If you request a device report for a specific device type (for example, DEVICE DASD or, DEVICE HPF), you will still see device group rows for every device group you defined, whether or not those rows are meaningful for the specific report you requested.
6. If you define a device group that consists of devices of multiple types -- for example, if you mix CTCs and DASDs in the same device group -- the device group statistics the Performance Toolkit calculates might not be useful or meaningful.

FCONTROL DUMPID

Purpose

The FCONTROL DUMPID subcommand defines the destination address where dumps are to be sent in case of an abend with automatic dump. Dumps are sent to the virtual reader of the machine where Performance Toolkit has been running at the time of the abend if no other address has been specified, or it has been specified as an asterisk '*'. The CP VMDUMP command is used for creating these dumps.

Format



Parameters

userid Defines the user identification of the virtual machine where automatic dumps are to be sent after an abend of Performance Toolkit. An asterisk may be specified to send the dumps to the virtual reader of the machine where Performance Toolkit has been running.

SYSTEM
Defines the target destination for automatic dumps as it has been specified on the SYSTEM_USERIDS configuration file statement. (This is the user ID designated to receive any CP abend dumps.) For further details, see the description of this parameter in the help for the CP VMDUMP command.

Query Inserts and displays the current target destination for abend dumps. This is the default if no *userid* is specified.

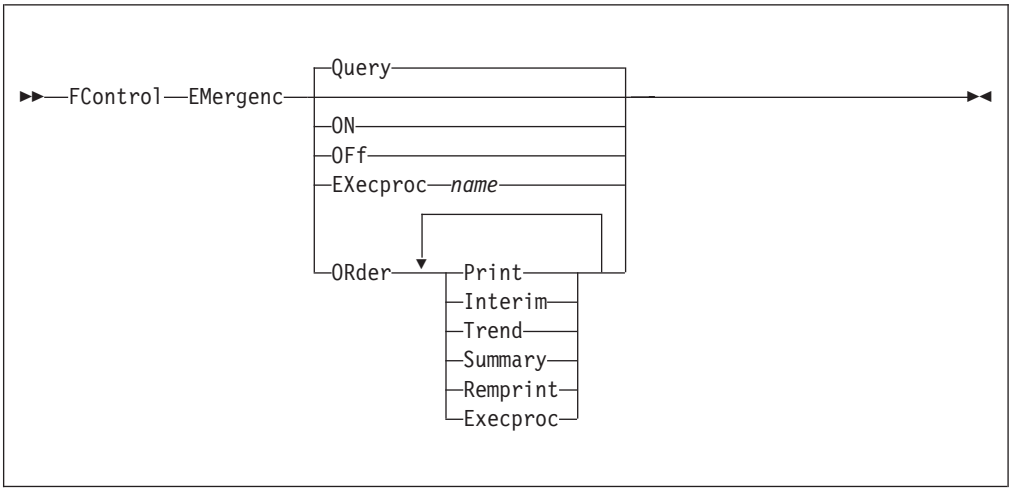
FCONTROL EMERGENC

Purpose

The FCONTROL EMERGENC subcommand allows you to control Perfkit's emergency safeguard feature (ESF). With this feature enabled, Perfkit will automatically save any unsaved data collected during normal monitoring in the event of an emergency, such as a z/VM shutdown or a sudden shortage in virtual memory. Data that can be saved includes printed reports, as well as trend and summary files.

Apart from saving data, Perfkit will also call any user-defined EXEC procedure you've specified when an emergency event occurs.

Format



Parameters

Query

Returns a list of all the emergency safeguard feature (ESF) specifications as they are currently set. This is the default if no further argument is entered.

ESF status can be one of the following:

Disabled
No special actions are taken in emergency situations. This is the default setting.

Enabled
Emergency events detection activated, ready to take specified actions.

Suspended
Emergency events detection activated, but they will be ignored because permanent data collection is not active. Use FC MONCOLL ON command to activate it.

ON Activates the emergency safeguard feature.

OFf Deactivates the emergency safeguard feature.

EXecproc *name*

Defines *name* EXEC as the CMS EXEC procedure that will be called upon detection of an emergency event. Note that you must also specify the order

in which all actions, including this EXEC procedure, will be specified, using an additional FC EMERGENC ORDER command.

For more information on this parameter, see Usage Note 4 on page 31.

ORder

Allows specification of the actions that will be done, as well as their order, when an emergency event is detected. Multiple selections are possible. Note that each subsequent FC EMERGENC ORDER command invocation will clear any previously defined actions.

The valid actions are as follows:

Print Indicates that the print reports defined with the FC MONCOLL RESET *hh*:*mm*:*ss*P command(s) will be created.

Interim
Indicates that the print reports defined with the FC MONCOLL RESET *hh*:*mm*:*ss*I command(s) will be created.

Trend Indicates that the trend records defined with the FC MONCOLL RESET *hh*:*mm*:*ss*T command(s) will be processed and saved.

Summary
Indicates that the summary records defined with the FC MONCOLL RESET *hh*:*mm*:*ss*S command(s) will be processed and saved.

Remprint
Indicates that the print reports defined with the FC SETEVENT ... PRINTRMT command(s) will be created.

Execproc
Indicates that the CMS EXEC procedure previously defined by the FC EMERGENC EXECPROC command will be called.

Usage

1. If an emergency event occurs and any of the PRINT, INTERIM, TREND or SUMMARY actions have been specified with the FC EMERGENC ORDER command, then Perfkit will attempt to save any collected data by scanning the reset chain (as defined by the FC MONCOLL RESET command) to find any appropriate actions that have been scheduled before the next reset. If any such actions are found, Perfkit will perform the corresponding report printing and/or trend/summary file creation just as if they had been defined using the FC MONCOLL RESET command. Perfkit will avoid any unnecessary duplicate actions.
2. For the REMPRINT action, the operation is similar to that described above, except in this case Perfkit will scan the event chain defined with the FC SETEVENT command, looking for only those event elements that reference the PRINTRMT command. If any scheduled PRINTRMT commands are found, Perfkit will process them, avoiding any duplicate actions.
3. When performing the emergency safeguard actions, there are special timing considerations that must be kept in mind regarding TREND and SUMMARY reports. Because the overall time available for performing these safeguard actions may be limited by the system (as defined by the CP SET SHUTDOWNTIME command), care should be taken when defining the order in which these actions are taken, so that the most valuable data is saved first.

Note that Perfkit keeps trend data in records with a fixed size of 4K bytes, while summary data records have variable lengths. Because of this format difference, trend files can be written to disk much faster.

4. Special notes for the EXECPROC option:
   a. Remember that you must specify a user-defined EXEC procedure in two separate commands – an FC EMERGENC EXECPROC *name* command to define the actual EXEC procedure, and an FC EMERGENC ORDER command to specify the order in which all actions, including this EXEC procedure, will be specified.
   b. A user-defined EXEC procedure will be notified of the emergency event reason by way of a special parameter that will be passed to it. The possible parameter values and their meanings are as follows:

      ***SHUTDWN**
      A signal shutdown event has been detected.

      ***NOMEM**
      Perfkit ran out of virtual storage.

      ***NOCONS**
      Permanent Perfkit console I/O error (it was detached or redefined with a different device number).

      ***UNKNOWN**
      All others (this value should not occur).

      A sample parameter handling code is shown below:

```
/* Sample Emergency Safeguard Feature EXECPROC procedure */
Arg emgparm .
Select
  When emgparm = '*SHUTDWN' Then reason = 'SHUTDOWN'
  When emgparm = '*NOMEM'   Then reason = 'Perfkit memory shortage'
  When emgparm = '*NOCONS'  Then reason = 'Permanent console I/O error'
  When emgparm = '*UNKNOWN' Then reason = 'unknown reason'
  Otherwise Nop
End
'tell OP1 Emergency exit is being taken due to' reason
```

   c. When writing a user-defined EXEC procedure, remember that certain restrictions may apply, due to the nature of the emergency of event. In the case of a system shutdown, for instance, the same timing consideration as described in Usage Note 3 on page 30 will apply. If the procedure is called due to a lack of virtual storage, any further storage-intensive functions may lead to a CMS system abend. (Although note that a special reserved free storage buffer will be provided to help mitigate this possibility.)

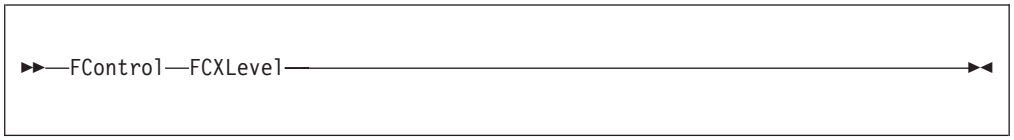
FCONTROL FCXLEVEL

Purpose

The FCONTROL FCXLEVEL subcommand allows displaying the Performance Toolkit program version, release, modification level and service level.

Message FCXxxx500I will be issued with this information. In addition, the service level information for each part in the module used for this invocation of Performance Toolkit will be written to the log. See "MODLEVEL" on page 111 for the details on how this information is obtained.

Format



Parameters

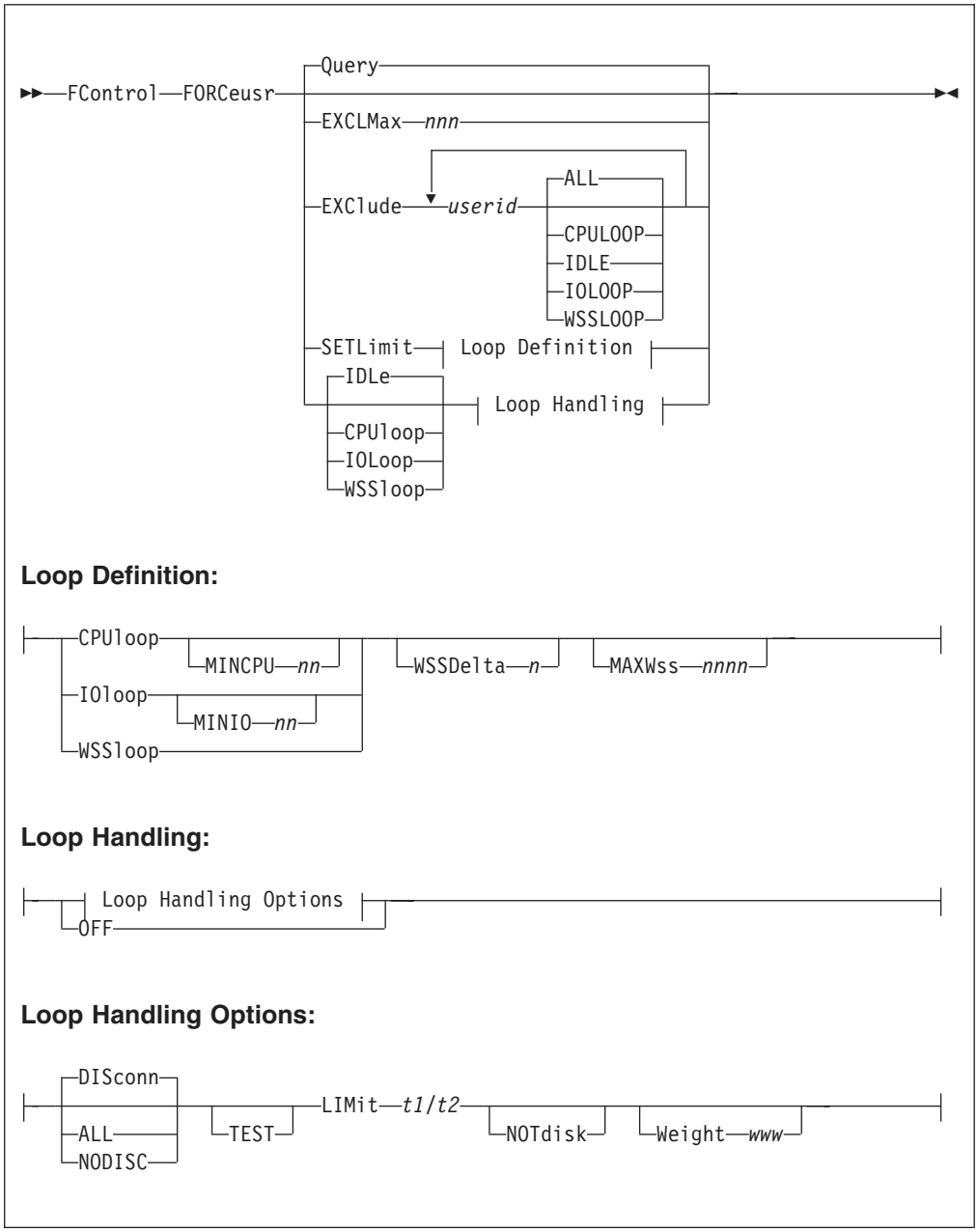
No parameters are allowed or tested for.

FCONTROL FORCEUSR

Purpose

The FCONTROL FORCEUSR subcommand is intended for controlling the user monitoring function. It allows monitoring and, optionally, forcing of virtual machines which have been looping, or have been idle for a long time. Forcing of such machines will free the resources (e.g. CPU, main storage) they occupied, and can improve the performance of the remaining users of the system. Make sure, however, that all users are informed of such a policy before activating this facility, and that they understand the implications (e.g. data stored onto a temporary minidisk will be lost when a machine is forced). The command is valid, and looping/idle user detection active, only when permanent performance data collection has been activated.

Format



Parameters

EXCLMax *nnn*

Defines the maximum number of users which must fit into the 'exclude' table. The number *nnn* can be any value between 10 and 2000. A default table size of 500 will be used if the 'EXCLUDE *userid*' argument is used without a prior explicit table size specification.

EXClude *userid*

Specifies which virtual machines are to be excluded from being monitored / forced, and, optionally, for which cases they are to be excluded. 'Wildcard' characters '*' and '%' can be used for creating generic entries which could apply to several machines; they have the same meaning as for

the CMS 'LISTFILE' command. Several userids can be specified with a single command, and several EXCLUDE commands can be entered. All userids from all EXCLUDE commands will be inserted into a common exclude table, up to the maximum which fits into the table (defined by EXCLMAX argument, or default of 500).

Users can only be added to the exclude list, but not removed, you will have to re-initialize PERFKIT if you want to clear the table.

ALL Indicates that the user is to be excluded from FORCEUSR processing for *all* the monitored cases (i.e. `CPULOOP`, `IDLE` and `IOLOOP`). `ALL` is the default setting which will be assumed if no specific cases are specified.

CPULOOP
Indicates that FORCEUSR CPULOOP processing is not to be applied for the user even if the virtual machine appears to be in a CPU loop

IDLE Indicates that FORCEUSR IDLE processing is not to be applied for the user

IOLOOP
Indicates that FORCEUSR IOLOOP processing is not to be applied for the user

WSSLOOP
Indicates that FORCEUSR WSSLOOP processing is not to be applied for the user

Multiple selections are possible, i.e. you can exclude a virtual machine from both IOLOOP and IDLE state monitoring, but leave CPU loop detection active. The above arguments must be entered in full length.

Query
Returns a list of all the FORCEUSR specifications as they are currently set. This is the default if no further argument is entered.

SETLimit
Allows specification of the criteria used to determine whether a virtual machine should be assume to be in a loop of some sort.

CPUloop
Indicates that the criteria for detecting a CPU loop are to be set

MINCPU *nn*
Specifies the minimum CPU load (in percent) which must be reached before a virtual machine can be a CPULOOP candidate.

The value is initially set to 10(%).

IOLoop
Indicates that the criteria for detecting an I/O loop are to be set

MINIO *nn*
Specifies the minimum virtual I/O rate which must be reached before a virtual machine can be an IOLOOP candidate.

The value is initially set to 500 (I/Os per second).

WSSloop
Indicates that the criteria for detecting a WSS loop are to be set

WSSDelta
Specifies the maximum difference in a virtual machine's working set size which is to be tolerated for the selected kind of loop. The initial WSSDELTA values are

1 For the CPULOOP case

4 For the IOLOOP case

15 For the WSSLOOP case

Note that all looping virtual machines should, by definition, be permanently executing the same instructions all over again, and their working sets should thus always be the same. If the loop is large enough, however, the working set size can change by several pages, and this is especially true in the case of any loop which involves I/O activity.

Machines will be assumed to be not looping if their working set size changes by more than the specified max. delta between consecutive monitor sample intervals.

MAXWSS
Specifies the maximum working set size allowed for a virtual machine for the selected kind of loop.

The initial MAXWSS values are set to 10000 for all three loop cases.

Although a loop could theoretically touch any number of pages, i.e. there is no guarantee at all that a machine with a large working set is not looping, experience has shown that setting an upper limit for the working set can increase the probability of catching only real loopers, and reduce the risk of treating a non-looping machine as a looper.

Machines will be assumed to be not looping if their working set size exceeds the maximum number of pages at the end of a sample interval.

CPUloop
Indicates that the following arguments refer to CPU loop detection. A machine is considered to be in a CPU loop when it has used at least the total CPU percentage specified with the MINCPU argument, has not had any IUCV activity nor executed a single non-spooled I/O and not more than two I/Os to spooled UR devices in an interval *and* when the number of pages in its working set has not changed by more than the WSSDELTA value between consecutive measurements, *and* when it has been found in either the dispatch or eligible list at the end of each interval and was never found dormant or test-idle by user state sampling.

Note that this may apply also to some CPU bound machines which are *not* looping, and be sure to put the corresponding userids on the exclude list.

IDLe Indicates that the following arguments refer to idle machine monitoring. A machine is considered to be idle when it has used less than 10ms of total CPU, no emulation CPU, has not executed a single non-spooled I/O and not more than two I/Os to spooled UR devices in an interval.

IOLoop
Indicates that the following arguments refer to I/O loop detection. A machine is considered to be in an I/O loop when it has a virtual I/O rate of at least the value specified with the MINIO argument *and* when the

number of pages in its working set has not changed by more than the WSSDELTA value between consecutive measurements, *and* when it has been found in either the dispatch or eligible list at the end of each interval and was never found dormant or test-idle by user state sampling.

This code should allow to detect, for instance, users which have ended up in an I/O loop to their virtual console, but the 'I/O loop' condition may also be fulfilled by large machines which are *not* looping. Be sure to put the corresponding userids on the exclude list.

WSSloop
Indicates that the following arguments refer to WSS loop detection. A machine is considered to be in a 'constant WSS loop' if it has used at least the percentage of total CPU specified with the MINCPU argument, has executed any number of I/Os, *and* when the number of pages in its working set has not changed by more than the WSSDELTA value between consecutive measurements, *and* when it has been found in either the dispatch or eligible list at the end of each interval and was never found dormant or test-idle by user state sampling.

ALL Specifies that machines are to be forced regardless of logged-on or disconnected state.

DISconn
Specifies that machines are to be forced only if they are disconnected. Machines which are logged on to a terminal will not be forced.

NODISC
Specifies that machines are to be forced only if they are logged on to a terminal. Disconnected machines will not be forced.

TEST Starts user monitoring in test mode: looping machines, or machines which have been idle, will receive warning messages that they are about to be forced when the set warning threshold has been exceeded, but instead of actually forcing the machine when the FORCE threshold has been reached a message will be generated to *, telling you which machines would have been forced if the facility had been really activated.

This test mode is intended to help you in testing the completeness of your exclude list (i.e. the list of users excluded from FORCE processing by corresponding 'FC FORCEUSR EXCLUDE ...' commands). Run the facility in test mode first, and add all machines which should not have been forced to the exclude list, before activating actual FORCE processing.

LImit *t1/t2*
Defines the periods, in minutes, for which a virtual machine may loop, or remain idle, before some action is taken:

t1 Is the period after which a warning message will be sent to the machine to inform the user of the current status, and, if t2 is not zero and TEST mode has not been set, of the time that remains to take corrective action before the machine will actually be forced. One of the following messages will be sent:

```
Machine has been idle for over t1 min., will be forced in nn
min.

Machine in CPU loop  for over t1 min., will be forced in nn
min.

Machine in I/O loop  for over t1 min., will be forced in nn
min.
```

Message number 338 will also be generated to inform you of the machine's status (not generated for IDLE users unless FORCE interval has been set to 0).

t2 Is the period after which the machine is to be forced off the system. Message number 339 will be generated to inform you that a machine has been forced, and of the reason for doing so.

Acceptable values for the warning threshold *t1* range from 1 to 254 minutes and for the FORCE threshold *t2* from 0 to 255 minutes, and *t2* must at least be equal to the warning threshold *t1* if *t2* is not 0. Generation of the warning message to the user and of message number 338 will be suppressed if the *t2* interval is set equal to the *t1* interval.

A value of '0' for *t2* Indicates that only warning messages are to be generated, but no machines are to be forced.

NOTdisk
Indicates that users are only to be forced if they do not own temporary minidisks. Users with T-disks will only receive warnings, but will not actually be forced.

The same logic is applied to users with VDISKs (virtual disks in storage).

Weight *www*
Sets the 'weight' *www* of the exception message when the selected case is encountered, where *www* can be any number in the range 0 to 255. A default value of 10 will be assumed when the `WEIGHT` argument has not been specified.

The `WEIGHT` specification is relevant only when a machine's exception data are sent to a central monitor machine (activated with the REMSEND argument of the FC MONCOLL command). All applicable weights will then be added, and the result divided by 10 to obtain the exception severity code which will be used to set the color of the load bar in the central monitoring machine.

The 'weight' number for a 'loop' case will be added once per looping user, i.e. it may be added several times if multiple users are looping.

OFF Disables monitoring of users and FORCE processing for the selected function (CUPLOOP, IDLE, IOLOOP or WSSLOOP).

Usage

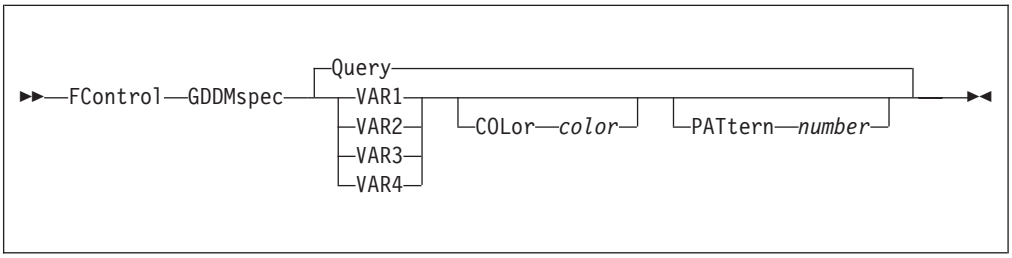
1. See the "User Monitoring" section in the *z/VM: Performance Toolkit Guide* for more information on user monitoring, and for hints on the use of the FC FORCEUSR command.

FCONTROL GDDMSPEC

Purpose

The FCONTROL GDDMSPEC subcommand allows setting colors and shading patterns which are to be used when creating GDDM graphics.

Format



Parameters

Query Lists colors and patterns defined for variables 1 to 4. This is the default if no further argument is entered.

VAR1-VAR4
Specifies whether the remaining arguments are intended for the first, second, third or fourth Y-variable

COLor
Indicates that the color for the selected variable is to be changed. The next argument *color* will be assumed to be the color specification; it must be one of the following:

BLUe For blue

RED for red

PINk For pink

GREen
For green

TURquois
For turquoise

YELlow
For yellow

WHIte
For white

DARkblue
For dark blue (blue)

ORAnge
For orange (red)

PURple
For purple (red)

DRKgreen
For dark green (green)

DRKTurqu
For dark turquoise (turquoise)

MUStard
For mustard (yellow)

GRAy
For gray (white)

BROwn
For brown (red)

The colors used for simple plots (using native screen colors and plot characters shown with reverse video) are adapted also when the colors for GDDM graphics are changed, but the whole range of colors is not available then. The colors used for simple plots are shown in parenthesis where the original selection cannot be used.

PATtern
Indicates that the default shading pattern for the selected variable is to be changed.

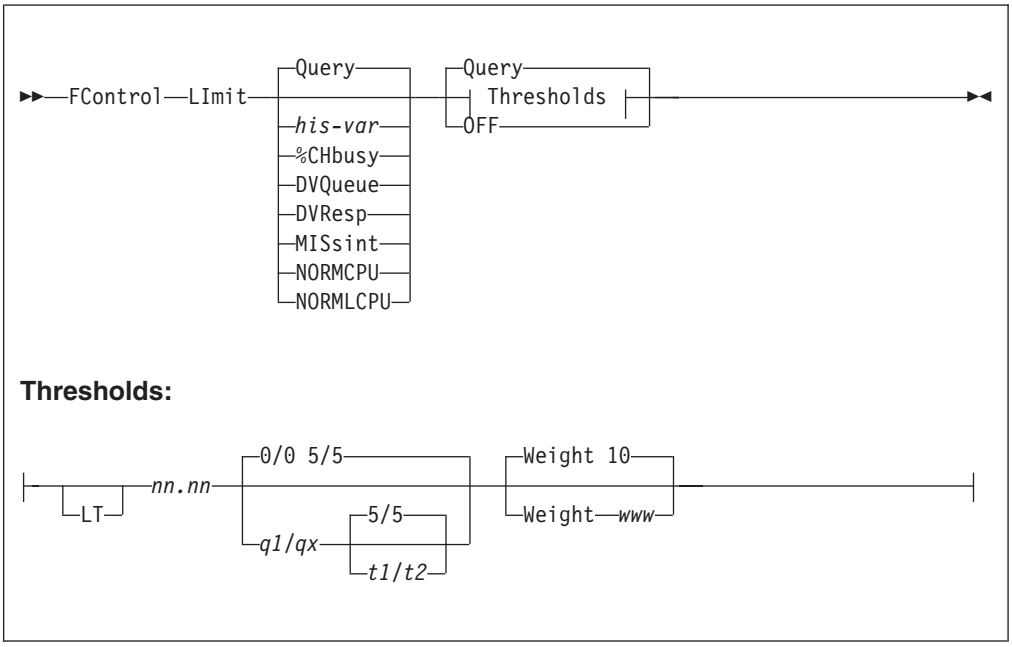
number
Must be a value between 0 and 16, corresponding to the numbers used when setting a pattern using the GSPAT macro. See the appropriate GDDM Programming Reference manual for examples of the GDDM-defined shading patterns.

FCONTROL LIMIT

Purpose

The FCONTROL LIMIT subcommand can define thresholds to Performance Toolkit for many performance indicators. Messages will be issued when a limit has been exceeded for a certain time to inform you of the problem, so that the necessary actions can be taken. Thresholds can only be defined if permanent performance data collection has previously been activated. See "FCONTROL MONCOLL" on page 52 (and specifically the CPMON parameter).

Format



Parameters

his-var

Is a HISTLOG/HISTSUM performance variable for which a threshold is to be set or displayed. Thresholds can be set for any of the performance variables contained in these files, including the following variables: See Appendix D, "HISTLOG/HISTSUM File Records," on page 917 for a full list of the valid variables, and of the names to be specified.

CPU Total CPU load

%VEC
Total vector facility load

IO/S Total I/O rate

PG/S Total page rate (reads & writes)

ACT The number of users active in an interval

C1ES 85% threshold of class 1 elapsed time

TR-Q Number of interactive users in queue

NT-Q Number of non-interactive users in queue

%PQ % of in-queue users found in page wait

%IQ % of in-queue users found in I/O wait

%EL % of in-queue users found in resource wait

%ST % of pageable DPA in use

%PGSL
% of system PAGE area on DASD in use

%SPSL
% of system SPOOL area in use

Note: If you wish to use a variable that begins with the pound character (#), which would otherwise be interpreted as the logical line end character, you must precede that character with the logical escape character (double quote, "). For example, for the variable `#CPU`, you must specify `"#CPU`.

Note that these characters *cannot* be used when accessing Perfkit remotely. For more information, see the "Logical Line End and Escape Characters" section of the "General System Operation" chapter in the *z/VM: Performance Toolkit Guide*.

Message number 315 will be shown when the set limit is exceeded (or, if the 'LT' argument has been specified, if the measured value is lower than the threshold).

%CHbusy
Indicates that a threshold for the channel busy percentage is to be set or displayed. Message number 318 will be shown when the set limit is exceeded.

DVQueue
Indicates that the I/O request queue length threshold for disks is to be set or displayed. Message number 319 will be shown when the set limit is exceeded.

DVResp
Indicates that the device response time limit, in milliseconds, is to be set or displayed. Message number 320 will indicate an exceeded limit.

Note that both the `DVQUEUE` and the `DVRESP` thresholds will be monitored for DASD only, and that message 320 will be shown only if a minimum I/O activity of 5 I/Os per second was found for the disk.

MISsint
Indicates that queue counts and message intervals for the missing interrupt detection logic are to be set or displayed. Message number 354 will be generated when a missing interrupt is detected. Note that the threshold value *nn.nn* will be ignored for this case although you *must* enter it, because the remaining arguments are positional.

NORMCPU
Indicates that a threshold for the normalized CPU load is to be set or displayed, i.e. for the relative CPU load based on the total processing power of the system instead of a single processor. This is a value between 0 and 100% regardless of the number of processors.

NORMLCPU
Indicates that a threshold for the normalized logical CPU load is to be set or displayed. NORMLCPU is calculated similar to NORMCPU, except that it is based on the sum of active time and voluntary wait time instead of

total elapsed time. The distinction is important for systems running in a constrained LPAR environment or second level under another VM.

Query Lists the current threshold definitions. This is the default if no further argument is entered.

Thresholds:

LT Specifies that exception messages are to be generated if the measure value is *lower* than the defined limit *'nn.nn'*.

The LT argument is meaningful only for performance redisplay variables; it will be ignored when specified with any other variable.

nn.nn Is the maximum value above which (or, if the 'LT' argument has been specified, *below* which) notification is desired. The initial setting is 'OFF', i.e. the respective values will not be monitored or displayed.

q1/qx Are the minimum numbers of class 1 users and of class 0/2/3 users which must be in-queue to make the corresponding reading valid. The reason for this co-requisite is the fact, that limits set for normal production may be exceeded even on an otherwise very lightly loaded system when a single user does some non-characteristic work (e.g. extremely I/O-bound save jobs during off-hours). Specify *'q1/qx'* values high enough so that messages are issued only when the measured value is really significant.

t1/t2 *'t1'* is the minimum period (in minutes) during which the threshold must have been exceeded before a message is issued.

't2' is the time interval (also in minutes) after which the message is to be repeated until the monitored value decreases below the set limit. The minimum that can be set is 1 minute.

The maximum value that can be set for *'t1'* or *'t2'* is 60 minutes, they both default to 5 minutes if omitted.

Consider also the length of the CP monitor SAMPLE interval when setting these time limits: Where the *t1* and *t2* values are shorter than the data collect interval, threshold checking may be performed on the values of just a single sample.

Weight *www*
Sets the 'weight' *www* of the exception message when the set threshold has been exceeded for the selected variable, where *www* can be any number in the range 0 to 255. A default value of 10 will be assumed when the WEIGHT argument has not been specified.

The WEIGHT specification is relevant only when a machine's exception data are sent to a central monitor machine (activated via REMSEND argument of the FC MONCOLL command, see "Remote Performance Monitoring Facility" in the *z/VM: Performance Toolkit Guide*). All applicable weights will then be added, and the result divided by 10 to obtain the exception severity code which will be used to set the color of the load bar in the central monitoring machine.

The 'weight' number for exception messages referring to channel or device data may be added several times if multiple channels or I/O devices exceed the set thresholds.

OFF Indicates that the corresponding value is no longer to be monitored.

Query

Displays the current limit for the selected value in the command input area. This is the default.

Usage

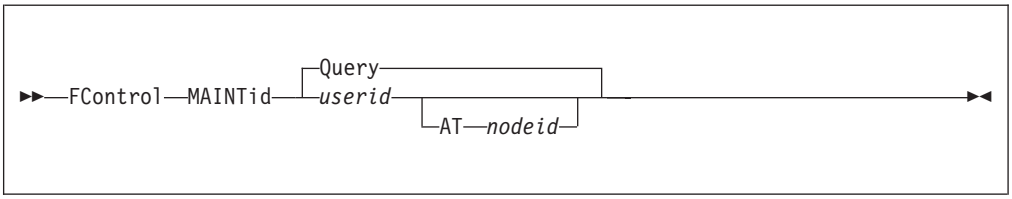
1. See also the "Setup of Threshold Monitoring" section in the *z/VM: Performance Toolkit Guide* for hints on how to set thresholds.

FCONTROL MAINTID

Purpose

The FCONTROL MAINTID subcommand defines the destination address where high priority alert messages are to be sent under certain conditions. Some examples of such conditions are: insufficient storage for internal work areas, divide exceptions, etc.

Format



Parameters

userid Defines the user identification of the virtual machine where high priority alert messages are to be sent.

nodeid Defines the node identification for the virtual machine where high priority alert messages are to be sent. It is assumed that *userid* is a machine on the local system if no *nodeid* is specified.

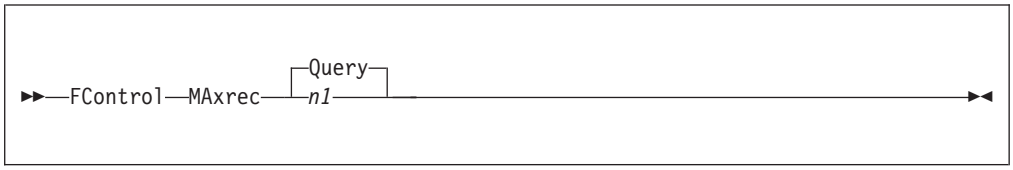
Query Inserts and displays the current target destination for alert messages. This is the default if no *userid* is specified.

FCONTROL MAXREC

Purpose

The FCONTROL MAXREC subcommand specifies the number of records to be written to the '*mmddyy* CONLOG' file before issuing an intermediate 'CLOSE' command (the file will actually be closed only once Performance Toolkit would go back to its normal wait state). MAXREC is initialized to a value of ten. Please be aware that the CONLOG file may be incomplete after a VM system restart. MAXREC should be increased only if the LOG is of no great importance, but making it too small will increase general overhead.

Format



Parameters

n1 Specifies the min. number of records to be written before closing the 'CONLOG' file. Minimum is 1 and the highest value accepted is 200.

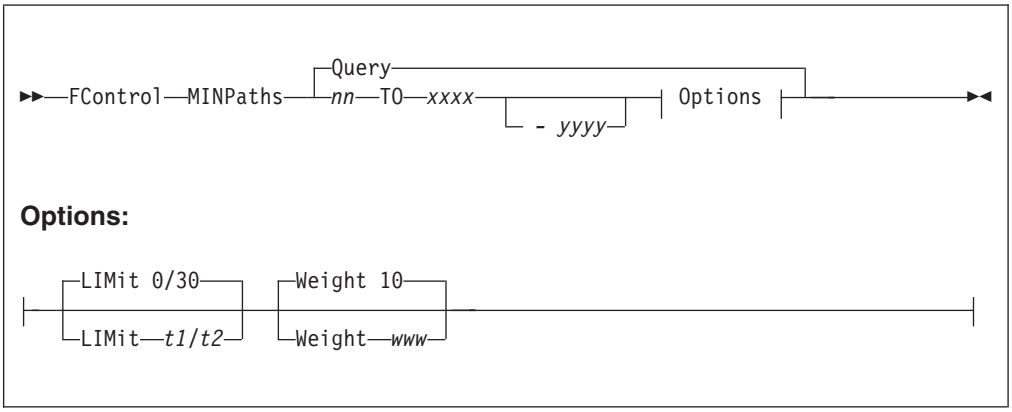
Query
Inserts and displays the current value of MAXREC on the command line. QUERY is the default.

FCONTROL MINPATHS

Purpose

The FCONTROL MINPATHS subcommand can define the minimum number of channel paths which are to be active to selected I/O devices. Messages will be issued when less than the minimum number of paths are found to be active to inform you of the problem so the necessary actions can be taken. MINPATHS monitoring requires that permanent performance data collection of CP monitor data be active.

Format



Parameters

nn Is the minimum number of paths which should be active.

Message number 321 will be shown when less than the specified number of paths are active to the device(s) specified.

xxxx{**-***yyyy*}
Defines the device number(s) of the device(s) to which the path limit *nn* applies.

You can specify either a single device number *xxxx* or a range of devices, where *xxxx* is the first device number and *yyyy* the last device number in the range (typically all the I/O devices in a string).

LIMit *t1*/*t2*
Defines the period during which the number of active channel paths must have been too low before message 321 is issued, where

't1' is the initial period (in minutes) during which the number of active paths must have been to low before a message is issued.

't2' is the time interval (also in minutes) after which the message is to be repeated until the number of active channel paths is no longer below the set minimum. The minimum value that can be set for *t2* is 1 minute.

The maximum value that can be set for *'t1'* or *'t2'* is 255 minutes, the values default to a setting of '0/30' if omitted.

Note that the data collection interval for the CP monitor data (upon which the MINPATHS analysis is based) can be set considerably higher than 1 minute. MINPATHS analysis will occur after each SAMPLE interval, and message 321 will be generated just after the first monitor sample where the *t1* or *t2* interval is found to have been exceeded.

Weight *www*

Sets the 'weight' *www* of the exception message when the set threshold has been exceeded for the selected variable, where *www* can be any number in the range 0 to 255. A default value of 10 will be assumed when the `WEIGHT` argument has not been specified.

The `WEIGHT` specification is relevant only when a machine's exception data are sent to a central monitor machine (activated via REMSEND argument of the FC MONCOLL command). All applicable weights will then be added, and the result divided by 10 to obtain the exception severity code which will be used to set the color of the load bar in the central monitoring machine.

Note that the MINPATHS weights will not be added together if several devices have an insufficient number of active channel paths (e.g. a whole DASD string if a channel to the control unit is down). The maximum 'weight' value for any of the affected I/O devices is taken instead.

Query

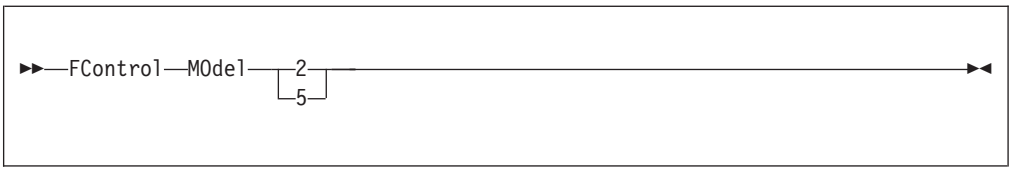
Lets the current MINPATHS definitions be displayed. 'Query' is also the default.

FCONTROL MODEL

Purpose

The FCONTROL MODEL subcommand allows a 3278 model 5 terminal to be switched between model 5 ('wideline') mode and model 2 mode. The command is valid on model 5 terminals only.

Format



Parameters

2 Causes the screen to be switched from model 5 mode back to model 2 mode.

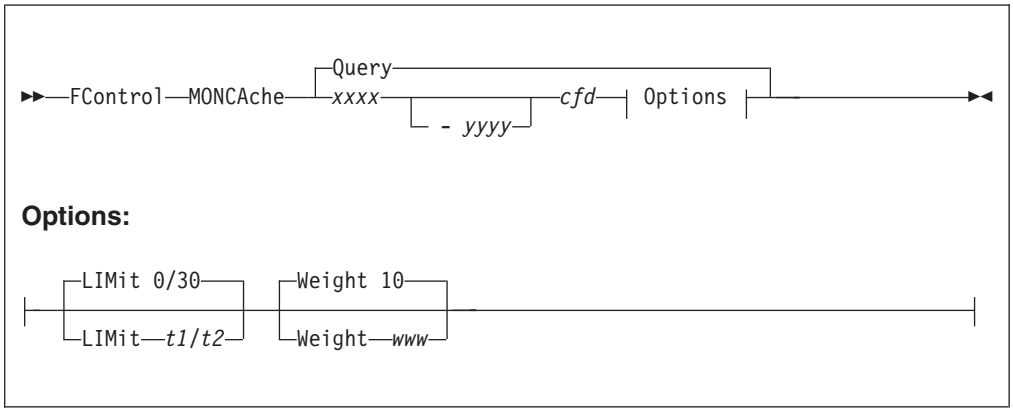
5 Switches the screen from model 2 mode (the initial setting) to model 5 (wideline) mode.

FCONTROL MONCACHE

Purpose

The FCONTROL MONCACHE subcommand defines the expected cache status for selected disks. Messages will be issued when the current status does not match the expected one so that the necessary actions can be taken, and the corresponding status field on the CACHEXT display will be highlighted (shown in red with reverse video). MONCACHE monitoring requires that permanent performance data collection of CP monitor data be active.

Format



Parameters

xxxx{**-***yyyy*}
: Defines the device number(s) of the device(s) to which the cache status *cfd* applies.

  You can specify either a single device number *xxxx* or a range of devices, where *xxxx* is the first device number and *yyyy* the last device number in the range.

cfd
: Are three characters which define the expected cache status, for:

  c General cache status

  f DASD fast write status

  d Dual copy status

  The status definition characters to be entered for *c*, *f* and *d* must be one of the following:

  A Indicating that the function should be active

  D Indicating that the function should be deactivated

  * Indicating that the status is not to be monitored

  Message 326 will be generated if the actual status does not match the one defined for the disk.

LIMit *t1*/*t2*
: Defines the period during which an unexpected cache status must have persisted before message 326 is issued, where

  't1' is the initial period (in minutes) during which the unexpected status must have been found before a message is issued

't2' is the time interval (also in minutes) after which the message is to be repeated until the cache status is correct again. The minimum value that can be set for *t2* is 1 minute.

The maximum value that can be set for *'t1'* or *'t2'* is 255 minutes, the values default to a setting of '0/30' if omitted.

Note that the data collection interval for the CP monitor data (upon which the MONCACHE analysis is based) can be set considerably higher than 1 minute. MONCACHE analysis will occur after each SAMPLE interval, and message 326 will be generated just after the first monitor sample where the *t1* or *t2* interval is found to have been exceeded.

Weight *www*
Sets the 'weight' *www* of the exception message when an unexpected cache status has been found, where *www* can be any number in the range 0 to 255. A default value of 10 will be assumed when the `WEIGHT` argument has not been specified.

The `WEIGHT` specification is relevant only when a machine's exception data are sent to a central monitor machine (activated via REMSEND argument of the FC MONCOLL command). All applicable weights will then be added, and the result divided by 10 to obtain the exception severity code which will be used to set the color of the load bar in the central monitoring machine.

Note that the MONCACHE weights will not be added together if several devices have been found with an incorrect cache status (e.g. a whole DASD string if there is a problem with the cache on the control unit level). The maximum 'weight' value for any of the affected disks is taken instead.

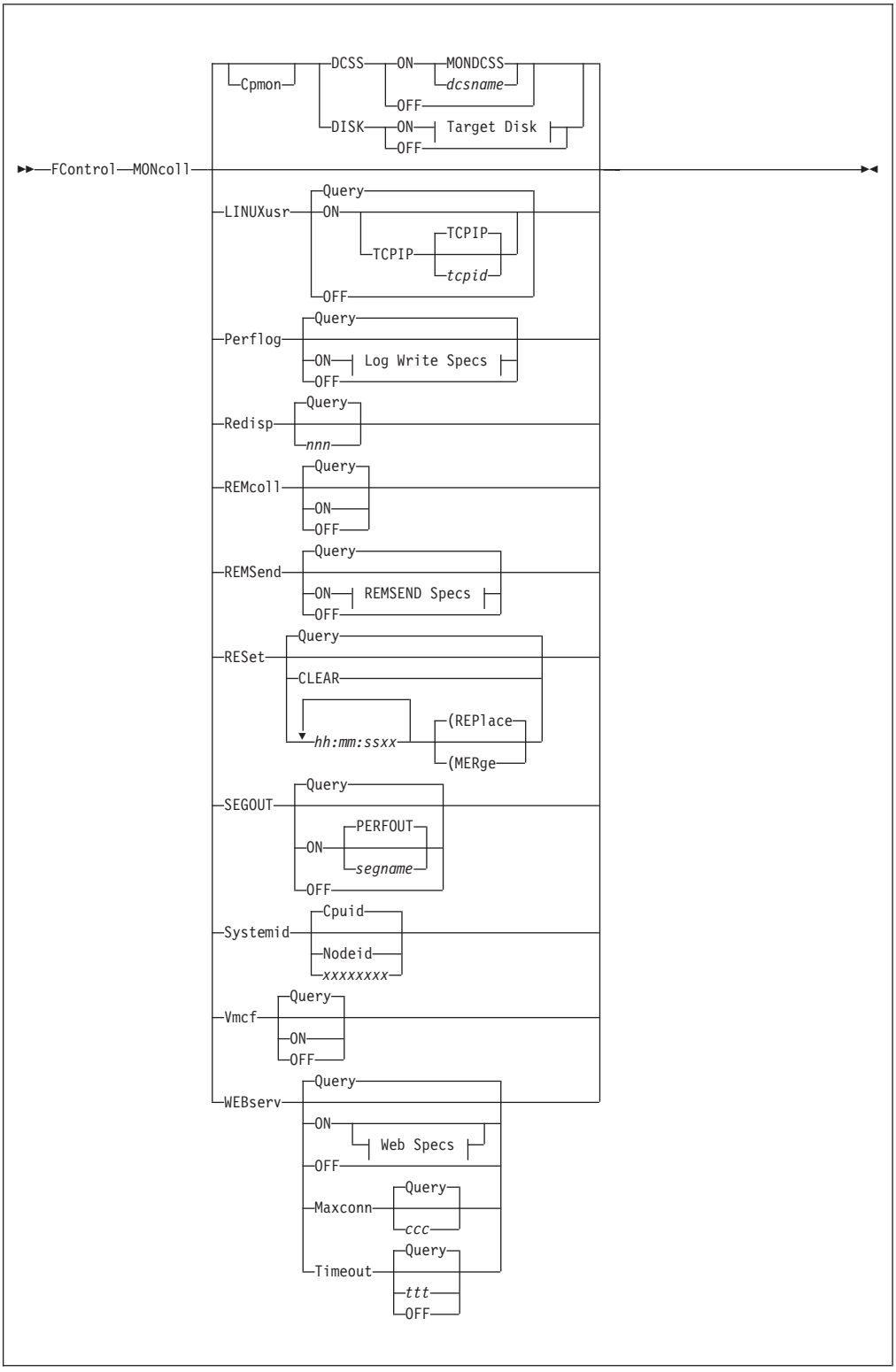
Query
Lets the current MONCACHE definitions be displayed. 'Query' is also the default.

FCONTROL MONCOLL

Purpose

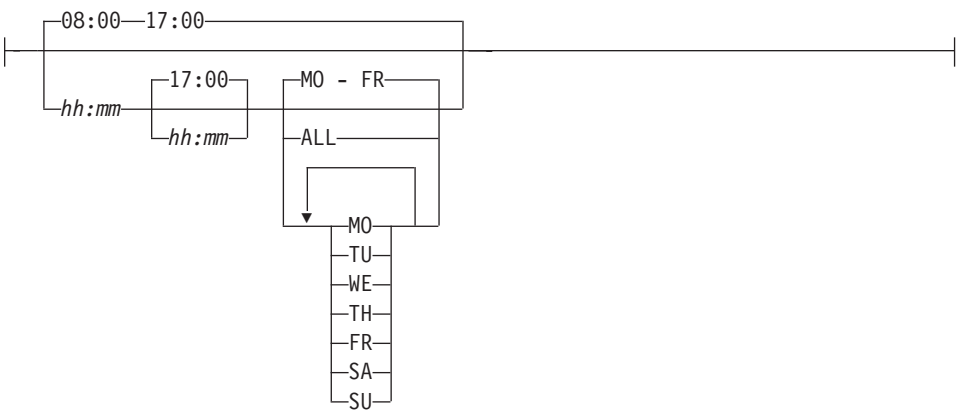
The FCONTROL MONCOLL subcommand allows you to control data collection for performance monitoring. With the exception of the REMCOLL argument, this command is valid only if the userid is authorized to execute DIAGNOSE codes X'04' and X'90', which usually requires command privilege class E.

Format

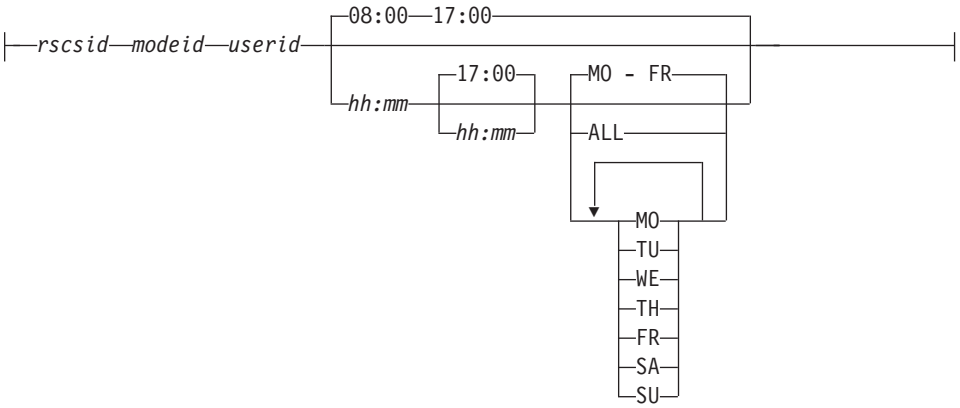

FControl
MONcoll
Cpmon
DCSS
ON
MONDCSS
dcsname
OFF
DISK
ON
Target Disk
OFF
LINUXusr
Query
ON
TCPIP
TCPIP
tcpid
OFF
Perflog
Query
ON
Log Write Specs
OFF
Redisp
Query
nnn
REMcoll
Query
ON
OFF
REMSend
Query
ON
REMSEND Specs
OFF
RESet
Query
CLEAR
hh:mm:ssxx
(REPlace
(MERge
SEGOUT
Query
ON
PERFOUT
segname
OFF
Systemid
Cpuid
Nodeid
xxxxxxxx
Vmcf
Query
ON
OFF
WEBserv
Query
ON
Web Specs
OFF
Maxconn
Query
ccc
Timeout
Query
ttt
OFF

Target Disk:

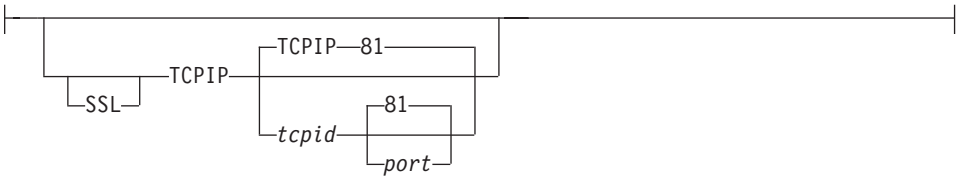
Log Write Specs:



REMSEND Specs:



Web Specs:



Parameters

Cpmon
controls the use of CP MONITOR data for performance analysis

DCSS

Indicates that data extraction from the MONITOR shared segment is to be controlled

ON *dcssname*

Indicates that data extraction from the CP MONITOR segment *dcssname* is to be activated, where *dcssname* is the segment name. The default DCSS name `MONDCSS` will be used if no segment name is specified.

Note that:

- Performance Toolkit will attempt to CONNECT to the segment using IUCV, the virtual machine where Performance Toolkit is running must previously have been authorized, therefore, for accessing that segment by means of a `NAMESAVE dcssname` statement in the directory, exactly as you would have to make the definition for the machine if it were to run the MONWRITE data collector module.
- Data extraction from the MONITOR shared segment requires that this segment can be loaded in the machine where Performance Toolkit is running. It may be necessary to increase the virtual storage size of that machine in order to do this.
- Performance Toolkit will automatically execute a MONITOR START command when data extraction from a shared segment is activated. When this command is successful (return code of 0), Performance Toolkit will also STOP the monitor when you either deactivate *MONITOR data collection, or when you exit from Performance Toolkit to basic CMS and no other users are connected to the *MONITOR facility.

Activating CP monitor data collection will let performance data be collected permanently. This mode allows automatic threshold monitoring (see “FCONTROL LIMIT” on page 41), but it will also cause some additional permanent overhead. Permanent data collection should, therefore, be activated only in one virtual machine per z/VM system (e.g. system operator's or system programmer's machine).

OFF Indicates that data extraction from the MONITOR shared segment is to be stopped.

DISK Indicates that MONITOR data extraction from a disk file written by the MONWRITE module is to be controlled.

ON *monw-id disknr diskmode fn ft*

Indicates that data extraction from a MONITOR disk file is to be activated, where

monw-id

Is the userid of the machine which owns the disk where the MONWRITE program writes the CP MONITOR data

disknr Is the virtual device number of the minidisk which contains the MONITOR data file.

Note that Performance Toolkit will attempt to LINK to this disk as virtual device number '01F1'; *the virtual machine where Performance Toolkit is running must previously have been authorized, therefore, for linking to that disk.*

fm Is the file mode to be used by Performance Toolkit for accessing the disk

fn Is the file name of the MONITOR data file

ft Is the file type of the MONITOR data file.

OFF Indicates that data extraction from the MONITOR disk file is to be stopped, and the disk released and detached.

LINUXusr

Controls the activation/deactivation of the TCP/IP request interface for performance data retrieval from Linux RMF DDS interfaces.

Query Displays the current interface setting on the command line. This is the default.

ON Specifies that the request interface is to be activated. This is also the default. Further arguments can specify details, if the defaults are not acceptable:

TCPIP *tcpid*
Defines the userid of the TCP/IP service machine that provides access to the TCP/IP network, where *tcpid* is the user identification of the TCP/IP server.

OFF Indicates that the TCP/IP request interface is to be deactivated.

Perflog

Controls the disposition of general performance data from the REDISP or REDHIST screens (see also "FCONTROL SETTINGS" on page 84).

ON Specifies that all performance data inserted into the redisplay screen must also be written to file '*mmddyy* PERFLOG A', and permanent data collection will be set on even if the 'FC MONCOLL ON' command has not been previously entered.

Up to three generations of the PERFLOG file will automatically be kept on the A-disk, with filetypes of PERFLOG, PERFLOG1 and PERFLOG2. These files are intended for archiving or for additional analysis by the user. Although not used for generating the default redisplay screen, they can also be selected for display by using the 'FILE *fn ft fm*' arguments of the REDHIST command (see "REDHIST" on page 259).

hh:mm Defines the start and end times of the period during which performance data are to be saved on disk. The time must be entered exactly as shown, i.e. with two digits for hours and minutes each, separated by a colon. The default period is from 08:00 to 17:00.

MO-FR
Specifies that data are to be collected only from Monday to Friday. This is also the default.

ALL Specifies that data are to be collected for the whole week.

MO TU WE TH FR SA SU
Specifies the days of the week for which performance data are to be collected. Any combination of days is acceptable.

OFF Specifies that collection of performance data on disk is to be stopped.

Query Displays the current setting on the command line. This is the default.

Redisp

Defines the number of lines to be set aside during initialization for use as performance redisplay buffer.

Query Inserts the current log buffer setting into the command line. This is the default if no further argument is entered.

nnn Defines the number of lines to be set aside.

If working with the default monitor sample interval of 60 seconds Performance Toolkit needs 60 lines for one hour's data. The minimum number is 60, the maximum 14,400 lines, with a default of 720 lines.

Note: The log buffer space requirements can be reduced by means of letting averages for more than one sample interval be shown on each of the 'by time' log detail lines. For details see the "By-Time Log Data" description in “Interval” on page 354.

This command must be included in the initialization profile 'FCONX $PROFILE' to be effective. The buffer size cannot be changed once the program has been initialized.

REMcoll

Controls automatic collection of performance data sent from other systems via RSCS message (generated in the remote system by means of the REMSEND argument of the 'FC MONCOLL' command).

Query Inserts the current setting into the command line. This is the default if no further argument is entered.

ON Specifies that this machine is to act as central data collector machine for the remote performance monitoring facility, i.e. that performance data sent from another machine are to be received and inserted for use in FCONRMT mode.

OFF Indicates that REMSEND data received from other machines are not to be collected.

REMSend

Controls the automatic sending of summary performance data from this system to another machine, for use with the remote performance monitoring facility.

ON Specifies that summary performance information is to be sent to another machine.

rscsid Is the userid of the RSCS machine which is to be used for data transmission

nodeid Is the node ID of the system to which data are to be transmitted.

Asterisks may be entered for both the 'rscs-ID' and 'node-ID' if the target machine is on the same VM system. Data transmission occurs then directly via the CP 'MSG' command, instead of via the MSG command of RSCS, and this will save some overhead.

Use of an asterisk for the RSCS machine's userid only, with a valid node-ID specification, will let the default RSCS userid be used, as specified in the SYSTEM NETID file.

userid Is the userid of the virtual machine which is to receive and collect the transmitted data.

hh:mm Defines the start and end times of the period during which performance data are to be sent to the other machine. The time must be entered exactly as shown, i.e. with two digits for hours and minutes each, separated by a colon. The default period is from 08:00 to 17:00.

MO-FR
Specifies that data are to be sent only from Monday to Friday. This is also the default.

ALL Specifies that data are to be sent during each day of the week.

MO TU WE TH FR SA SU
Specifies the days of the week for which performance data are to be sent. Any combination of days is acceptable.

OFF Indicates that automatic data transmission to another machine is to be stopped.

Query Displays the current setting. This is the default if no further argument is entered.

RESet

Displays the currently defined RESET times for performance data, or it allows you to clear any existing RESET times and to specify any number of new RESET times, optionally with automatic printing and/or summary/trend file creation for selected performance data.

Query
Displays currently defined RESET times.

CLEAR
Removes *all* of the currently active RESET times. Note that the initial RESET time of '00:00' will always be set again whenever the CLEAR option is issued.

hh:mm:ss
Defines a new RESET time. The time can also be specified as *hh:mm* only (in which case '00' seconds will be assumed) but hours, minutes and seconds must be specified with two digits each. Multiple reset times can be entered, separated by blanks. The time entered must be between 00:00:00 and 23:59:59. Reset times following an invalid argument will be ignored.

Append suffixes *xxx* to the reset time to indicate what specific action is required:

R_P Defines the start time for a new overall report period. This is the period used for the 'average' setting.

R_I Defines the start time for a new interim report period. This is the period used for the 'interim' setting, where applicable.

R_S Defines the start time for summary record generation.

R_T Resets trend data counters.

P Indicates the time at which an automatic PRINT ALL command is to be issued, to print all the reports defined in file FCONX REPORTS (or in the 'reports' file defined by a previous 'FC SET REPORTS ..' command).

I Indicates the time at which an automatic print command is to be issued to print all the INTERIM reports defined in file FCONX REPORTS (or in the 'reports' file defined by a previous 'FC SET REPORTS ..' command).

Note that automatic printing of INTERIM reports in fixed intervals can also be achieved by means of the 'FC SET INTERIM ..' command.

T Indicates the time at which new trend records are to be generated. The type and number of trend records to be generated can be defined in file FCONX TRENDREC, or in the TRENDREC file defined by a 'FC SET TRENDREC ..' command.

S Indicates the time at which new summary records are to be generated. The type and number of trend records to be generated can be defined in file FCONX SUMREC. or in the SUMREC file defined by a 'FC SET SUMREC ..' command.

If no suffixes are appended the default action is a full reset for all periods, i.e. the equivalent of appending all of the 'reset' suffixes `R_PR_IR_TR_S`

(MERge
Indicates that the actions specified for a specific time are to be merged with any other previously specified actions for the same time, i.e. both the previously specified and the new actions will be executed.

Note: When using the FC MONCOLL RESET command, the (MERGE option should *not* be specified when setting the time to 00:00:00, as this is the default RESET time. The (REPLACE option (the default) should instead be used to set/replace any RESET times to 00:00:00.

(REPlace
Indicates that the reset actions specified for a specific time are to replace any previously specified actions for the same time, i.e. only the new actions will be executed. This is the default.

If print output has been selected together with reset, average data will be calculated just prior to resetting, and these average values will be printed. Message number 371 will be shown to indicate the switch to 'average' displays if Performance Toolkit is in monitor mode at this time.

Multiple 'FC MONCOLL RESET ...' commands can be entered: all of the reset times entered since the last 'CLEAR' will be active. An initial RESET time of '00:00' will always be set, and this time will also be set again whenever the CLEAR option is issued.

SEGout
Indicates that the formatted output collectors are to be turned on or off, where:

ON Will turn on the formatted output collectors.

segname
Indicates the name of the shared segment where the calculated values from the Perfkit reports will be stored. PERFOUT is the default segment name.

Note: A default PERFOUT segment, with a default size, is defined during system installation. If you wish to define a larger size for this segment, or to define the segment with a different name, please consult the Performance Toolkit Program Directory.

OFF Will turn off the formatted output collectors.

Query Displays the current setting on the command line. This is the default if no further argument is entered.

Systemid
Defines the type of system-identifier which is to be inserted into the header line of all performance monitor displays.

Cpuid
Will cause the CPU-ID to be inserted. This serial number is usually the real hardware CPUID, but it can be overwritten by directory statement or by the CP SET CPUID command.

Nodeid
Specifies that the RSCS node-ID of the system is to be used as identifier. If many different systems are to be monitored by the same person, use of the RSCS node-ID allows much easier identification of the systems than the CPUID.

The RSCS node-ID is determined by looking for the corresponding entry in the SYSTEM NETID file. It cannot be set if no entry exists.

xxxxxxxx
Specifies that the string *xxxxxxxx* is to be used as identifier.

Vmcf Indicates that the VMCF interface is to be activated or de-activated, where

ON Activates the VMCF interface.

OFF Deactivates the VMCF interface.

Query Displays the current setting on the command line. This is the default if no further argument is entered.

The VMCF argument is valid only when permanent data collection has previously been activated.

WEBserv
controls the activation/deactivation of the Web Server function for performance data retrieval via the Internet and standard Web Browsers. It also allows to set the maximum allowed number of web connections and the timeout for inactive web sessions.

ON Specifies that the Web Server interface is to be activated. Further arguments can specify details, if the defaults are not acceptable:

SSL Specifies that a secure connection will be used.

TCPIP *tcpid* {*port*}
Defines the userid of the TCP/IP service machine that provides access to the TCP/IP network, and, optionally, also the port number to be used. *tcpid* is the user identification of the TCP/IP machine, and *port* is the port number.

If not specified, the default port number of 81 will be used, and if the name of the TCP/IP service machine is not specified either it is assumed that the standard name `TCPIP` can be used. Note that the port number argument is positional. The TCPIP userid must also be entered if a port number is to be defined.

OFF Indicates that the Web Server interface is to be deactivated.

Query Displays the current setting. This is the default if no further argument is entered.

Maxconn
Controls the maximum allowed number of web connections to Performance Toolkit. The default is 100 connections.

ccc Sets this number as *ccc*, where *ccc* can be in the range of 1-999.

Query Displays the current setting on the command line. This is the default if no further argument is entered.

Timeout
Controls the time period after which the user of an inactive session will be requested to enter his logon credentials in order to continue working. The default is 30 minutes.

ttt Sets this timeout as *ttt* minutes, where *ttt* can be in the range of 1-1440.

OFF Disables timeout checking.

Query Displays the current setting on the command line. This is the default if no further argument is entered.

Usage

- For PERFLOG:
  1. To generate a record at each monitor interval from 9:00 am to 5:00 pm each day, issue:
     ```
     FC MONCOLL PERFLOG ON 09:00 17:00 ALL
     ```
  2. To generate a record at each monitor interval throughout the day, issue:
     ```
     FC MONCOLL PERFLOG ON 00:00 00:00 ALL
     ```
- For RESET:
  1. All the reset and action specifications must be directly appended to the time, i.e. use the string `10:00R_P` to force a reset of the 'average' period at 10:00:00.
  2. The 'P', 'I', 'T' and 'S' suffixes also imply the corresponding reset actions 'R_P', 'R_I', 'R_T' and 'R_S' but reports will be printed, and history file records built, *before* resetting the counters.
  3. If multiple reset or action specifications are to be entered for the same time they can simply be appended after each other in any sequence, without any intervening blanks. You would use the string `11:00:00R_STP` to start a new

'summary' file period at 11:00:00 and to also build new trend records and print reports for the 'trend' and 'average' periods ending at 11:00:00.

4. At least one reset action per day will automatically be enforced for each of the P, I, T and S periods. This default reset occurs at midnight for any period for which no explicit reset time has been entered.

See the "Resetting Performance Data/Defining Periods" section in the *z/VM: Performance Toolkit Guide* for a general description of the different periods and their uses.

- For WEBSERV:

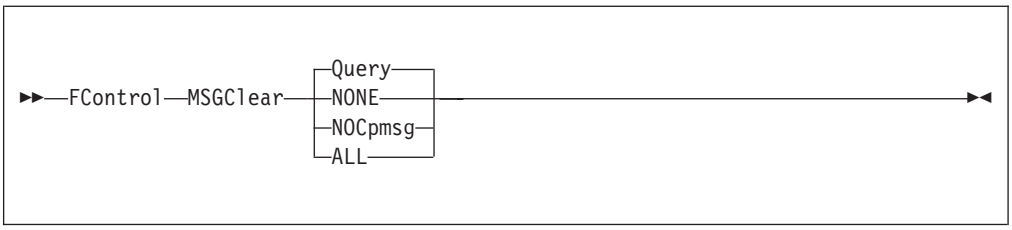
  See the "Preparing the Performance Toolkit, Internet Interface" section in the *z/VM: Performance Toolkit Guide* for a detailed explanation of using the internet interface.

FCONTROL MSGCLEAR

Purpose

The FCONTROL MSGCLEAR subcommand specifies whether CP messages and Performance Toolkit action messages are to be kept on the display when the screen is cleared (CLEAR command, CLEAR PF-key or PA2-key).

Format



Parameters

Query Displays the current MSGCLEAR setting. This is the default if no further argument is entered.

ALL Specifies that *all* screen lines are to be cleared, regardless of their contents (i.e. including CP messages and Performance Toolkit 'action' messages). 'ALL' is the initial setting.

NOCpmsg
Indicates that CP messages are *not* to be removed from the screen by the CLEAR function. CP messages can then be cleared only by means of the 'DELETE' or 'REPLY' commands.

NONE
Specifies that neither CP messages nor Performance Toolkit action messages are to be cleared from the screen by the CLEAR function. Both CP messages and action messages can then be cleared only by means of the 'DELETE' or 'REPLY' commands.

FCONTROL MSGWAIT

Purpose

The FCONTROL MSGWAIT subcommand specifies how many minutes a message may be left pending on the screen before the operator gets additional notification.

Format

Parameters

n1 Specifies the number of minutes that may elapse before an additional information message is displayed. Minimum is 1 and the highest value accepted is 60.

OFF Disables the function. This is also the initial setting.

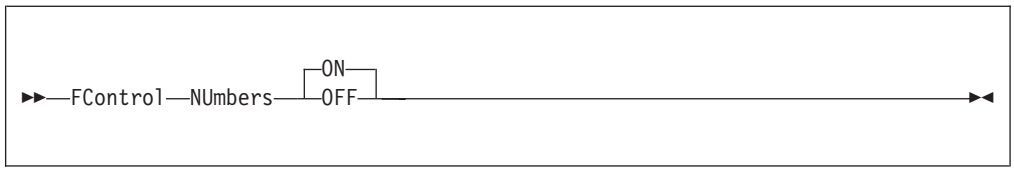
Query
Inserts and displays the current MSGWAIT setting on the command line. This is the default.

FCONTROL NUMBERS

Purpose

The FCONTROL NUMBERS subcommand specifies whether line numbers are to be shown on the left hand side of the screen output area or whether they are to be omitted.

Format



Parameters

ON Indicates that line numbers are to be inserted.

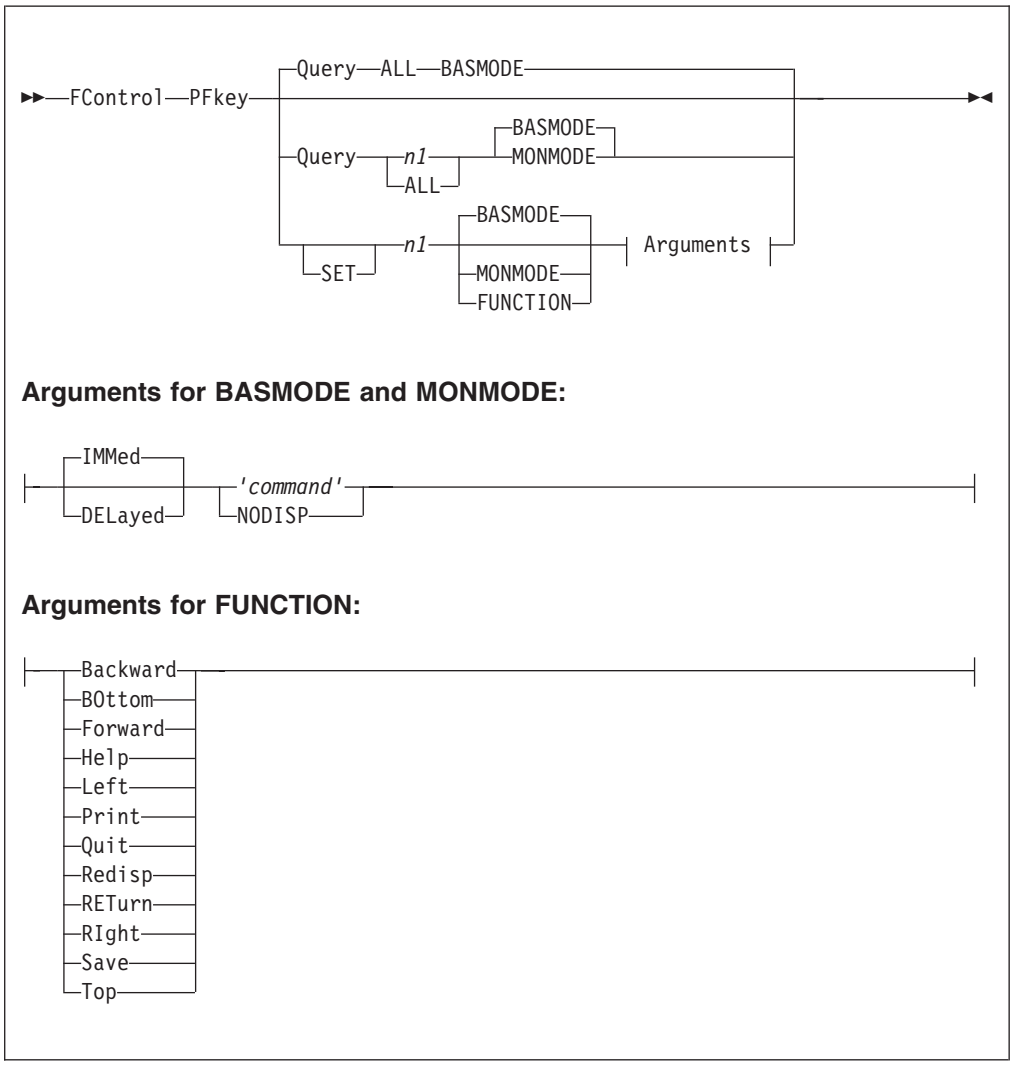
OFF Indicates that no line numbering is desired.

FCONTROL PFKEY

Purpose

The FCONTROL PFKEY subcommand inserts the command text specified into Performance Toolkit's internal PF-key tables (separate tables are kept for basic mode, re-display mode and performance monitor mode). Pressing a PF-key will cause the command text from the table corresponding to the current mode to be executed as if it had been entered on the command line.

Format



Arguments for BASMODE and MONMODE:

Arguments for FUNCTION:

Parameters

SET Indicates that a a new function is to be assigned to a PF-key. This is optional.

Query
Indicates that the current PF-key settings are to be displayed. The reply will be inserted into the command line if a single PF-key is queried, or into the output area of the basic mode screen if all PF-keys are queried.

n1 Specifies the number of the program function key that is to be defined or queried. Valid PF-key numbers are 1-24.

ALL Indicates that *all* PF-key settings are to be displayed. 'ALL' is valid only in conjunction with the 'QUERY' argument. Note that the output for the 'ALL' argument will be inserted into the basic mode screen; it cannot be viewed while in redisplay or performance monitor mode.

BASMODE
Specifies that a PF-key function for use in 'basic' mode is to be assigned or queried.

FUNCTION
Specifies that a *common* PF-key function is to be assigned (e.g. HELP, QUIT, or scrolling functions for which the same PF-keys are to be used in basic, redisplay and performance monitor mode).

PF-key FUNCTIONs will automatically be assigned to *all* PF-key tables where the corresponding function is meaningful, overlaying any commands which had previously been assigned to the corresponding PF-key. If the same function had previously been assigned to another PF-key within the same range of 1-12, or 13-24, the previous PF-key function assignment will automatically be cleared; i.e. a certain function can be assigned only to one PF-key in a 1-12 and/or 13-24 group.

MONMODE
Specifies that a PF-key function for use in performance monitor mode is to be assigned or queried.

Arguments for defining basic mode or monitor mode PF-keys:

IMMed
Command is to be executed immediately when the PF-key is pressed. This is also the default value. Argument valid for defining PF-keys in basic mode and performance monitor mode only.

DELayed
Command text is to be inserted in the command line when PF-key 'n1' is pressed so that it can be modified before pressing the 'ENTER'-key. This argument is valid for defining PF-keys in basic mode and performance monitor mode only.

'*command*'
The command to be executed or inserted into the command line (do not enter the apostrophes). It will be translated to upper case.

When using the 'DELAYED' option of the PFKEY command you can also insert a '¢'-sign (or whatever sign occupies the X'4A' code position on your keyboard) anywhere in the command text. The cursor will then be positioned at the location of the '¢'-sign after insertion of the text into the command line (and the '¢'-sign removed) so that the command text can easily be modified. The cursor will be positioned at the start of the command line if no '¢'-sign has been supplied.

NODISP
If the command text is 'NODISP' the corresponding PF-key is set up for the NODISP-function which allows you to control the visibility of data entered after a CMS prompt ('ENTER:' in front of the command line). The NODISP-function does not influence the visibility of normal commands entered while the arrow `'===>'` is shown in front of the input area. After pressing the PF-key this input will remain invisible while it is entered, and

it will not be written to the console log. Only the normal input area is set up for invisible input, data entered on the command line extension (bottom line with PF-key assignments) will remain visible.

The command line will automatically be reset to normal display after entering one line of data, so that the NODISP function will have to be activated again if several consecutive input lines are to remain invisible. You can also reset the command line to normal display by pressing the PF-key a second time ('flip-flop'-action of the NODISP function) when the function has erroneously been activated.

This feature allows the entering of passwords in basic mode for use, for instance, by EXEC procedures without creating a security exposure. It is not meaningful when used in performance monitor mode.

Arguments for defining FUNCTION PF-keys:

Note that the functions specified will automatically be assigned to all applicable tables, as defined by the characters 'B' (for basic mode), 'R' (for re-display mode) and 'M' (for performance monitor mode) in the following list.

Backward
R+M, for scrolling backward (towards beginning of data).

The BACKWARD function is initially assigned to PF-keys 7 and 19.

BOttom
R+M, for scrolling to bottom (to end of data).

The BOTTOM function is initially assigned to PF-keys 5 and 17.

Forward
R+M, for scrolling forward (towards end of data).

The FORWARD function is initially assigned to PF-keys 8 and 20.

Help B+R+M, for displaying HELP information.

The HELP function is initially assigned to PF-keys 1 and 13.

Left R+M, for shifting display window to the left.

The LEFT function is initially assigned to PF-keys 10 and 22.

Print M, for printing current performance display data.

The PRINT function is initially assigned to PF-keys 9 and 21.

Quit B, to exit from Performance Toolkit.

The QUIT function is initially assigned to PF-keys 3 and 15.

Redisp
B+R+M, for re-displaying console log (basic and re-display mode), or general system performance data (performance monitor mode).

The REDISP function is initially assigned to PF-keys 2 and 14.

RIght R+M, for shifting display window to the right.

The RIGHT function is initially assigned to PF-keys 11 and 23.

RETurn
B+R+M, for returning to previous level or mode.

The RETURN function is initially assigned to PF-keys 12 and 24.

Save M, for saving GDDM graphics on disk (valid on graphics displays 'GRAPHxxx' only).

The SAVE function is initially assigned to PF-keys 6 and 18.

Top R+M, for scrolling to top (to beginning of data).

The TOP function is initially assigned to PF-keys 4 and 16.

Usage

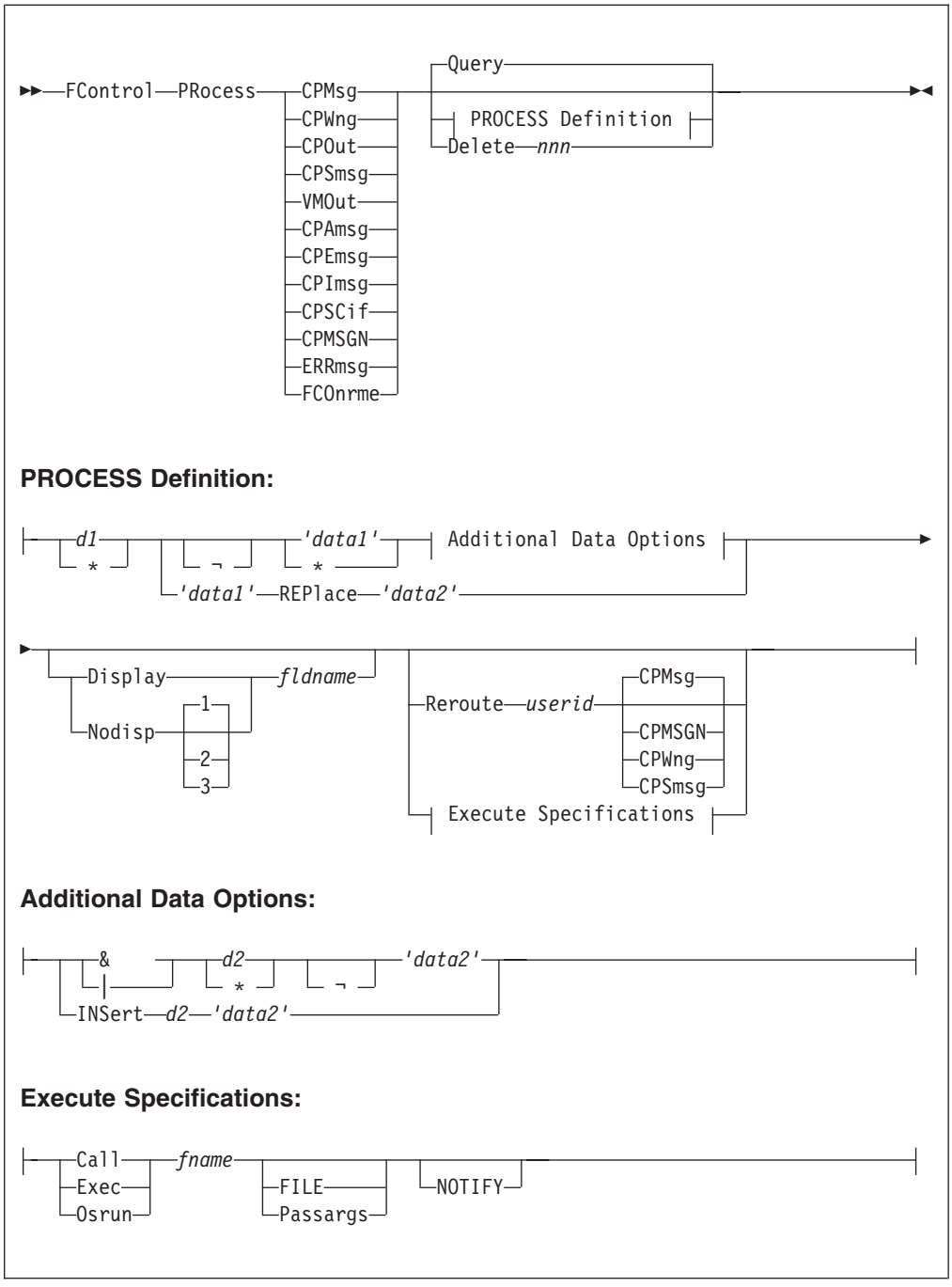
1. The PF-key definitions for the FCONXREP procedure are not affected by the 'FC PFKEY' command; you will have to modify this procedure if you want to use different PF-keys.

FCONTROL PROCESS

Purpose

This command allows definition of additional processing which is to be done when lines with certain characteristics are received.

Format



Parameters

The first argument indicates which type of output line is to be processed:

CPMsg
CP message

CPWng
CP warning

CPOut
CP command output line

CPSmsg
CP SMSG. Note that SMSGs will not automatically be received in IUCV format. You will have to enter the command 'SET SMSG IUCV' first if you want Performance Toolkit to receive and handle SMSGs (can also be included in the initialization file FCONX $PROFILE).

VMOut
Output line generated by the virtual machine (i.e. CMS)

CPAmsg
CP message line that is treated as Performance Toolkit action message (i.e. contains preceding carriage return characters).

See the "Action Messages" section in the "General System Operation" chapter of the *z/VM: Performance Toolkit Guide* for more information.

CPEmsg
CP error message

CPImsg
CP information message

CPSCif
Output line from another machine which we received via the Single Console Image Facility (SCIF)

CPMSGN
CP noheader message

ERRmsg
Performance Toolkit 'A'-type message

FCOnrme
Performance Toolkit exception message from a remote system for central monitoring

Note: Since these exception messages are not intended to be shown on the basic mode screen, you cannot refer to it, or to the CP console log, to determine the original message layout, and the displacements to be used for trapping a message. The format used is as follows:

```
text: nodeid  : xxxxx xxxxxxxx xxxxxxxxx

A         A

disp.: 0         10
```

where:

nodeid Is the RSCS node-ID of the originating system

xxxxx Is the complete message text to be placed into the system's `EXCPLOG` file

i.e. the format is similar to SCIF messages from another user on the same system.

Setting new PROCESS definitions: specify whether only certain lines should be processed which contain special data at specific locations:

d1 Is a number which indicates the displacement to the string. Enter an asterisk if any displacement is accpetable.

Please note that the displacement usually refers to the original line received from CP. Further processing by Performance Toolkit may insert additional data (message number, time stamp) in front of the line, it may remove data (userid of SCIF messages after 'FC SECUSER' command) from the line before it is shown on the screen, or the line may have to be split before it can be shown. The CP console log contains the original line format and should be referenced in case of doubt.

Exceptions:

- CP messages (CPMSG) and warnings (CPWNG) are written to the CP console log by Performance Toolkit preceded by a '>' sign which is to be ignored when calculating the displacement.
- Performance Toolkit 'A'-type messages are also written to the console log, but they will be preceded by a '>' sign and a time stamp. The displacement must be calculated from the start of the actual message line 'FCXxxxnnnx ...'.

¬ Indicates that additional processing is required only if the string is ***not*** found at the specified displacement. The '¬' operator can also be entered as 'NOT'.

'*data1***'** The data string that should be looked for (requires quotes at the beginning and end of the string and can include blanks, but it must not exceed a maximum length of 20 characters).

An asterisk can be specified to indicate that no data search is to be made, i.e. that all output lines of the type specified above should be treated in the same way. Note that specifying additional logical operators (& or |) does not make sense if one of the data strings has been defined with an asterisk. Although the definition will be accepted as long as the syntax is correct, the line will always be processed if 'any data' has been specified for either the data1 or data2 field.

& / | Logical operators which indicate that a second string is to be searched for and that the line is to be processed if either both (for '&') or any (for '|') of the strings have been found. You can also code 'AND' for '&' and 'OR' for '|'.

d2 Is a number which indicates the displacement to the second data string.

¬ Indicates that the second string should not be found.

'*data2***'** The second data string that should be looked for.

INSert

Indicates that string '*data2*' is to be inserted into the line at displacement *d2*. The remainder of the original line will be shifted to make room for the inserted string. Note that the '¬' or 'NOT' operators are not allowed in conjunction with the *data2* string after the INSERT argument.

REPlace

Indicates that part of the line contents are to be replaced as follows:

- The string *'data1'* is searched for. If found, the beginning of the selected line, up to and including the string *'data1'*, will be removed.

- When a second data string *'data2'* has been specified, this second string will be inserted in front of the remaining text. Otherwise just the remainder will be shown.

Note that the '¬' or 'NOT' operators are not allowed in conjunction with the REPLACE argument, and that no displacement can be specified for the second data string.

This form of the FC PROCESS command is especially useful for removing message prologues, such as the normal message header:

```
'hh:mm:ss MSG FROM userid: '
```

from messages generated by the RSCS machine, or the even longer prologues received when working in a machine which acts as logical operator for remote VM systems.

Display
The output line is to be displayed. Since this is the default anyway, you have to specify it only if the line is to be displayed as some other line type (see 'fldname').

Nodisp
The output line is not to be displayed. It will, however still be written to Performance Toolkit's console log file so that it can be re-displayed. Such lines will receive a '>' prefix character on the redisplay screen to indicate that they were suppressed on the basic mode screen.

1 | 2 | 3
are optional 'suppression' classes which you can assign to a suppressed line. The SUPPRESS option of the REDISP command then allows you to selectively suppress one or more of these classes even in redisplay mode.

A class of 1 will be set by default if no explicit class is specified with the NODISP argument.

fldname
Can be any of the selectable output field names CPMSG, CPWNG, CPOUT, CPSMSG, VMOUT, CPAMSG, CPEMSG, CPIMSG, CPSCIF and CPMSGN (but CPSMSG will be treated like CPMSG for output). If omitted, the original output line type is assumed. Specification of a certain linetype will cause the output line to be displayed with the color, highlighting and scrolling attributes of this new linetype. Even when specified together with the 'NODISP' option, the color and highlighting will be changed accordingly in redisplay mode.

Reroute *userid***:**
The line received is to be sent to another virtual machine *userid* which must be logged on to the same VM system. The line will be sent to that machine in the format defined by the next parameter.

CPMsg
The line is to be sent as CP message.

CPWng
The line is to be sent as CP warning (requires special privilege class!).

CPSmsg
The line is to be sent as CP SMSG.

CPMSGN
The line is to be sent as CP noheader message (requires special privilege class!).

Call *fname*
Command *fname* is to be stacked for execution (*'fname'* must be the file name of an EXEC procedure or of a CMS module to be called).

Exec *fname*
Command 'EXEC *fname*' is to be stacked for execution (*'fname'* must be the file name of an EXEC procedure).

Note that EXEC procedures can also be called by specifying the `Call` argument; the `Exec` argument has been retained mainly for compatibility with previous FCON/ESA levels.

Osrun *fname*
The load module *fname* is to be executed using the 'OSRUN' command (*'fname'* must be the name of a load module in a CMS load library for which you have previously issued a '`GLOBAL LOADLIB ...`' command).

FILE The output line being processed is also to be written to disk as file 'FIL*nnnnn* PROCESS A3' with a max. line length of 160. The file name is variable (the *'nnnnn'*-part is numeric and will be incremented for each new file written in order to prevent duplicate names). It will also be passed to the module or EXEC procedure being executed as first and only parameter, thus allowing the program to read the output line for further detailed analysis. The FILE option will not be executed if Performance Toolkit has previously found the A-disk to be full.

Please note that the file will automatically be erased when read for the first time (file mode 'A3'), unless the same line is to be processed by multiple commands, in which case the file mode will be set to 'A1', i.e. you will have to delete it yourself after use.

Rename the file to another file mode number before reading it if it should be kept for later reference. Do not, on the other hand, use the FILE option unless you really intend to read the line later on, otherwise there may soon be dozens of unused files lying around on the A-disk.

Passargs
Indicates that the complete message line is to be passed to the called command as arguments, up to a maximum length of 132 characters. Any characters in excess of this maximum length will be truncated without notification.

Nothing will be passed on if neither the `FILE` nor the `Passargs` arguments have been entered.

NOTIFY
Indicates that the information line

`Processing CMD '`*fname xxxxx xxxxx*'

Is to be displayed when the conditions for execution are met, and the corresponding command is stacked for later execution. The string *xxxxx xxxxx* consists of the arguments passed to the command during execution.

The command will be stacked and executed without an additional information line if the `NOTIFY` argument is omitted, and the short form of the CMS 'Ready' message will not be shown either.

Querying PROCESS definitions:

Query
Indicates that all PROCESS definitions for the selected line type are to be displayed. They will be shown together with a number prefix which you will need if you want to delete a specific definition. This is the default operation if no further arguments are entered.

Deleting PROCESS definitions:

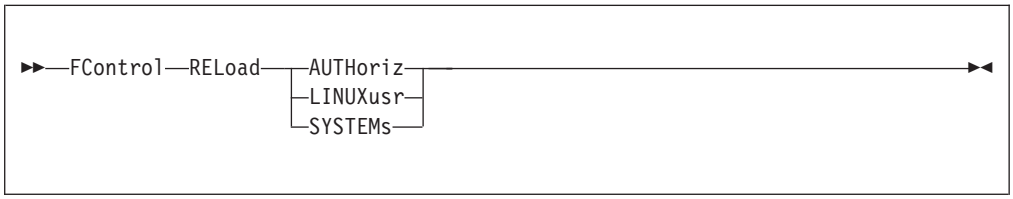
Delete *nnn*
Indicates that PROCESS definition *nnn* for the selected line type is to be removed. It will then no longer be executed.

FCONTROL RELOAD

Purpose

The FCONTROL RELOAD subcommand allows refreshing the in-storage copy of the data contained in the matching disk file.

Format



Parameters

AUTHoriz
Indicates that the remote data retrieval authorization file `FCONRMT AUTHORIZ` is to be reloaded.

Changes made to an FCONRMT AUTHORIZ file after starting PERFKIT will not become active before restarting PERFKIT unless the file is explicitly reloaded.

LINUXusr
Indicates that the Linux system definition file `FCONX LINUXUSR` is to be reloaded.

Changes made to an FCONX LINUXUSR file after starting PERFKIT will not become active before restarting PERFKIT unless the file is explicitly reloaded.

SYSTEMs
Indicates that the `FCONRMT SYSTEMS` file is to be reloaded.

Changes made to an FCONRMT SYSTEMS file after starting PERFKIT will not become active before restarting PERFKIT unless the file is explicitly reloaded. Definitions for systems for which no connections currently exist can be added, removed or altered. Connections for systems with active connections will persist.

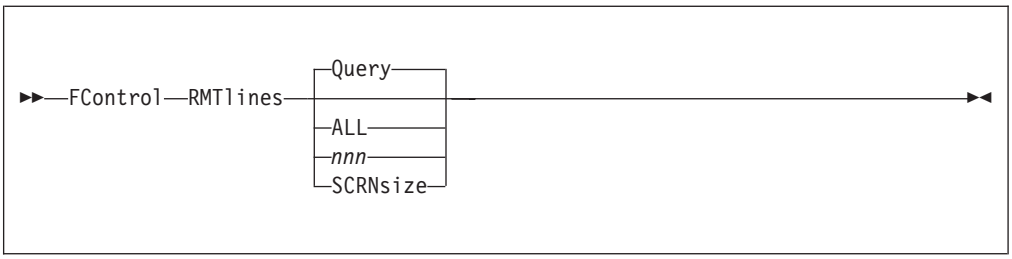
No attempt will be made to automatically activate the S&F interface. Use the FC MONCOLL VMCF OFF and FC MONCOLL VMCF ON commands to attempt that.

FCONTROL RMTLINES

Purpose

The FCONTROL RMTLINES subcommand allows setting a default value for the number of performance data lines which are to be retrieved in remote performance data retrieval mode.

Format



Parameters

nnn Specifies the number of lines which are to be retrieved

ALL Indicates that *all* lines are to be retrieved. This is also the initial setting.

Query Displays the current setting on the command line. This is the default if no further argument is entered.

SCRNsize
Sets the number of lines to be returned equal to the number of lines needed to fill the current screen.

Usage

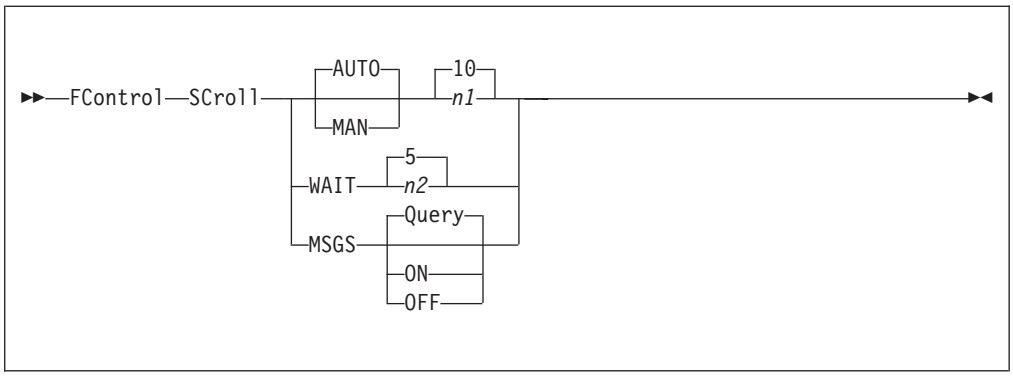
1. This command must be entered in the Performance Toolkit session of the *retrieving* machine to be effective. Every user can specify the number which is best suited for their personal needs. Entering this command in the actual performance data collection machine will have no effect on the other users which retrieve data from this machine.

FCONTROL SCROLL

Purpose

The FCONTROL SCROLL subcommand allows changing the current basic mode scroll setting which is displayed in the top right hand corner of the Basic Mode screen.

Format



Parameters

AUTO
Indicates that scrolling is to be done automatically once the screen becomes full.

MAN Indicates that the screen should be left locked when it becomes full until the 'ENTER'-key is pressed.

n1 Indicates the number of lines by which the screen should be shifted when it is scrolled (default 10 lines). The minimum is 1 and the maximum number that can be set is equal to the size of the scrollable output area - 1.

WAIT
Means that the scroll wait time (the delay from the moment the screen has become full until it is shifted) is to be changed.

n2 Specifies the number of seconds for the scroll wait time. The number specified must be between 0 and 60 seconds (default 5 seconds). Setting a scroll wait time of zero seconds causes immediate scrolling of most output lines, but a minimum scroll wait time of one second will still be observed when a command has been entered and the command line has reached the top of the screen. This slight inconsistency in the handling of scroll wait times has been introduced in order to allow you to freeze the screen temporarily and have a closer look at the output generated by the command, even when normal scrolling is immediate.

Only the delay for future scroll waits will be changed, a pending scroll wait will not be affected.

MSGS
Controls the autoscrolling of the priority CP messages. The default setting – used when FCONTROL SCROLL MSGS has not been issued – is OFF, which indicates that none of the CP messages will be automatically shifted out of the screen when it becomes full.

Query Displays the current MSGS setting on the command line. QUERY is the default when you issue FCONTROL SCROLL MSGS with no other parameters.

ON Indicates that the priority CP messages should be automatically shifted out of the screen when it becomes full. FCONTROL SCROLL MSGS ON can be used to prevent screen locking due to the screen filling up with CP messages.

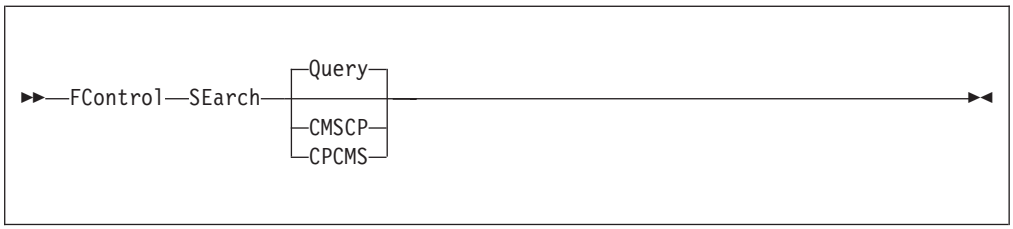
OFF Indicates that the autoscrolling of the priority CP messages should be disabled. If this setting is in effect and the screen fills up with the CP messages, scrolling is disabled and the message `Screen locked - Delete some messages` is shown in the center of the top line. When this happens, you need to delete some messages so normal operation can continue.

FCONTROL SEARCH

Purpose

The FCONTROL SEARCH subcommand defines the command search order to be used when a non-Performance Toolkit command is entered without a 'CP' or 'CMS' prefix.

Format



Parameters

Query Displays the current search order setting in the command line. This is the default if no further argument is entered.

CMSCP
Indicates that the default command search order to be used is PERFKIT ==> CMS ==> CP. This search order is similar to the search order that is normally used in CMS machines.

CPCMS
Indicates that the default command search order to be used is PERFKIT ==> CP ==> CMS. It is to be preferred, for performance reasons, in machines where CP commands are predominant. This is also the initial setting.

FCONTROL SECUSER

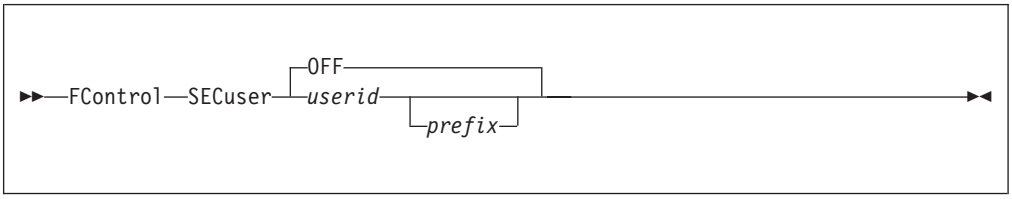
Purpose

The FCONTROL SECUSER subcommand tells Performance Toolkit that it is to act as a secondary console for another machine. Performance Toolkit will then:

- Indicate the name of the machine in the top line of the screen
- Automatically insert the command 'SEND userid ' at the beginning of the command line, so that you no longer have to enter it yourself. The 'SEND userid ' prefix can be overtyped or deleted if other commands are to be entered which should be executed directly.
- Remove all the 'userid : ' prefixes from SCIF output lines so that the output format is the same as on the original machine.

These functions make sense only if the machine where you enter the SECUSER command is more or less dedicated to operating the other virtual machine.

Format



Parameters

userid Is the user identification of the other machine for which we act as a secondary console.

prefix Is an additional command prefix that is to be inserted into the command line.

Usage

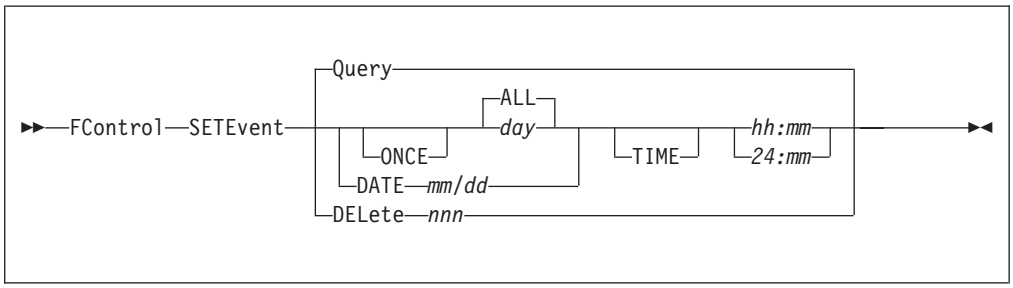
1. When working with RSCS Version 2 or 3, you might specify 'RSCS' for the prefix. This would cause the command string 'SEND userid RSCS' to be inserted and thus eliminate the need to manually key in the prefix whenever an RSCS command has to be entered. OFF disables the function.

FCONTROL SETEVENT

Purpose

The FCONTROL SETEVENT subcommand allows defining the weekday(s) and the time at which specific events are to take place. It is intended to help in automating certain tasks related to the PERFSVM machine, but can also be used for general automation tasks on systems where no other tool is available for the automatic execution of timer driven events.

Format



Parameters

DATE *mm/dd*
Defines a specific day on which the event is to take place. The date format *mm/dd* must be exactly as shown. (i.e. two digits each for the month and the day, separated by a slash.) A DATE specification implies a once only execution. (i.e. the event will be removed from the table after execution.)

ONCE Indicates that the event is to take place one time only.

day Defines the weekday(s) on which the event is to take place. A combination of any number of the following strings can be entered, separated by blanks. Their meaning is:

ALL The event is to take place on all weekdays

M-F The event is to take place on the workdays Monday to Friday only

MON The event is to take place on Mondays

TUE The event is to take place on Tuesdays

WED The event is to take place on Wednesdays

THU The event is to take place on Thursdays

FRI The event is to take place on Fridays

SAT The event is to take place on Saturdays

SUN The event is to take place on Sundays

Specifying the 'days' `M-F SAT`, for instance, will let the event take place on all days except Sunday.

DELete *nnn*
Removes the event with number *nnn* from the chain of events.

Use the 'Query' argument of the command for listing the currently defined events and their numbers.

Query Indicates that all currently defined events are to be displayed. This is the default.

TIME *hh:mm*
Is the time when the event is to take place. The TIME argument is optional. The format must be exactly as shown, i.e. two numbers each for hours and minutes, separated by a colon.

If the hour *hh* is specified as 24 the corresponding event will be scheduled at *mm* minutes past each full hour of the day.

command
Is the command which is to be executed at the selected moment. Note that the command entered will be stacked for execution like any other command entered from the command line, i.e. do not forget to add 'CMS', 'EXEC' or 'CP' prefixes as required.

Usage

1. You will have noted that the highest resolution is to minutes only, and that seconds cannot be entered. This is due to the implementation of the facility which does not actually set additional timer events, but checks during each of the standard internal one-minute cycles of the program whether the time has been reached to execute another one of the set events. In other words, the command may be executed with a delay of up to 60 seconds.

Examples

Entering the command

```
FC SETEVENT M-F SAT 09:00 CP MSG * This is not a Sunday
```

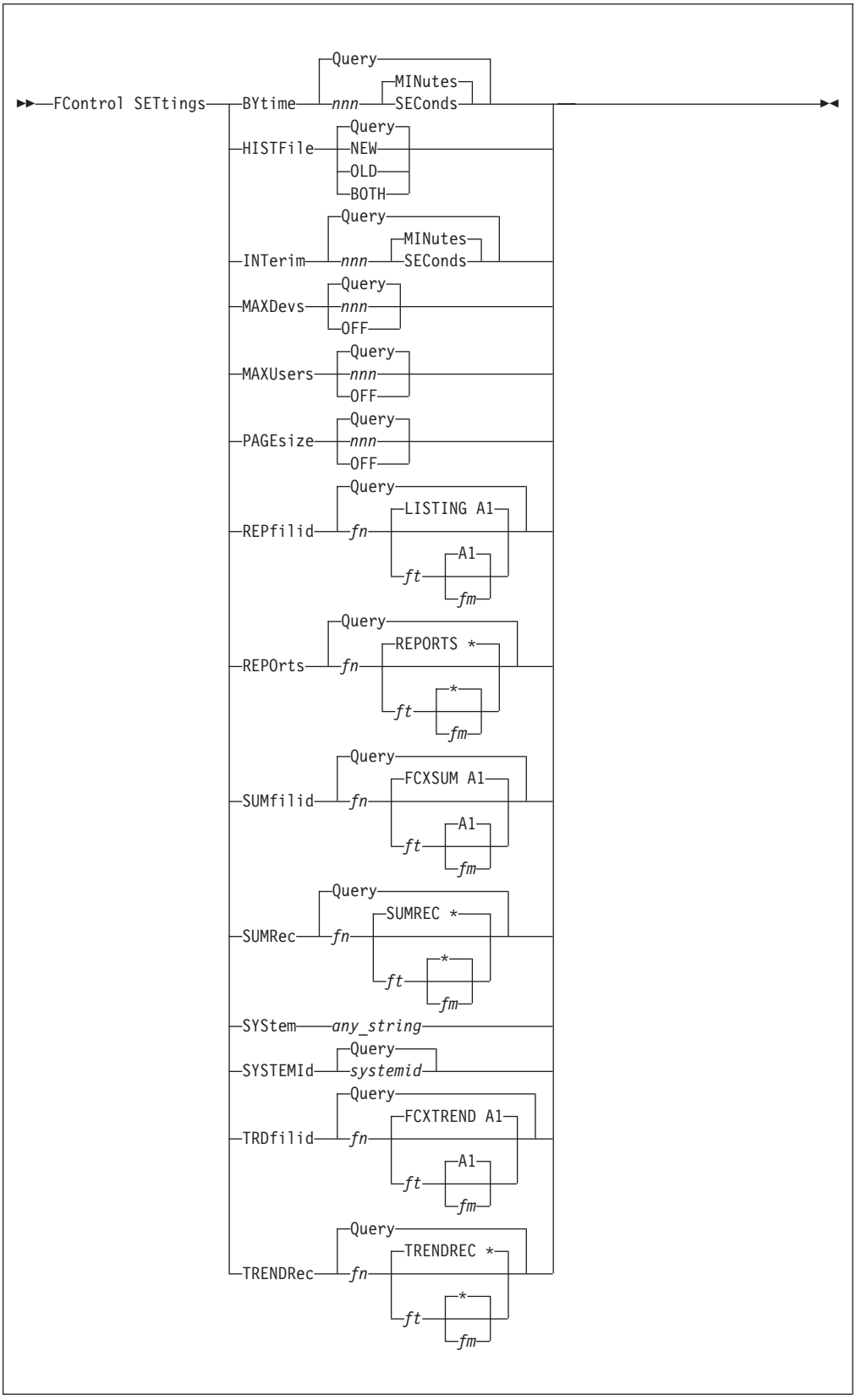
will let the message 'THIS IS NOT A SUNDAY' be displayed at 9:00 AM on all days except on Sundays.

FCONTROL SETTINGS

Purpose

The FCONTROL SETTINGS subcommand allows setting some general defaults.

Format


FControl SETtings
BYtime
Query
nnn
MINutes
SEConds
HISTFile
Query
NEW
OLD
BOTH
INTerim
Query
nnn
MINutes
SEConds
MAXDevs
Query
nnn
OFF
MAXUsers
Query
nnn
OFF
PAGEsize
Query
nnn
OFF
REPfilid
Query
fn
LISTING A1
ft
A1
fm
REPOrts
Query
fn
REPORTS *
ft
*
fm
SUMfilid
Query
fn
FCXSUM A1
ft
A1
fm
SUMRec
Query
fn
SUMREC *
ft
*
fm
SYStem
any_string
SYSTEMId
Query
systemid
TRDfilid
Query
fn
FCXTREND A1
ft
A1
fm
TRENDRec
Query
fn
TRENDREC *
ft
*
fm

Parameters

BYtime

Defines the time interval to be reported by each line of a 'by time' log. A new line will be created for each monitor sample interval if no BYTIME value has been set.

nnn Specifies the length of time interval in seconds or in minutes. The default is in minutes.

Query Inserts and displays the current BYTIME setting on the command line. QUERY is the default.

HISTFile

Indicates that the performance history log file(s) to be created will be defined, where

NEW Indicates that *only* the new extended history log files are to be created (file types HISTLOG and HISTSUM)

OLD Indicates that *only* the old extended history log files are to be created (file types PERFLOG and PERFHIST)

BOTH

Indicates that both the old and new history files are to be created.

BOTH has also been chosen as the initial default setting to ease migration, but you should be aware that *all* of the data available in the old PERFLOG/PERFHIST files is also available in the new files.

Query

Inserts and displays the current HISTFILE setting on the command line. QUERY is the default.

INTerim

Defines the length of fixed 'interim' periods, used for calculating 'interim' averages for many displays after entering the 'INTERIM' subcommand.

nnn Specifies the length of the time interval in seconds or in minutes. Minutes is the default.

Note that time intervals smaller than the monitor sample interval cannot be reported. The 'interim' intervals are synchronized to start with the beginning of the current 'report' period, used for displaying 'average' data.

MAXDevs

Indicates that the maximum number of I/O devices which are to be included on printed reports is to be set or queried, where

nnn Is the maximum number of I/O devices to be included

OFF Indicates that the number of included I/O devices should not be limited

Query

Inserts and displays the current MAXDEVS value on the command line. QUERY is the default.

MAXUsers

Indicates that the maximum number of users which are to be included on printed reports is to be set or queried, where

nnn Is the maximum number of users to be included

OFF Indicates that the number of included users should not be limited

Query
Inserts and displays the current MAXUSERS value on the command line. QUERY is the default.

PAGEsize
Indicates that the default page size is to be set or queried

nnn Is the maximum number of lines to be printed per page

OFF Indicates that no page size limit is to be used, i.e. performance reports are to be printed with just one initial header

Query
Inserts and displays the current PAGESIZE value on the command line. QUERY is the default.

REPfilid
Indicates that the report file ID for 'printing' performance reports to disk is to be set or queried, where

fn Is the disk file name

ft Is the disk file type. A file type of `LISTING` will be used if no explicit file type is entered.

fm Is the disk file mode. A file mode of `A1` will be used if no explicit file mode is entered.

Query
Inserts and displays the current REPFILID setting on the command line. QUERY is the default.

REPOrts
Indicates that the file identification for the 'reports' control file referred to by the 'PRINT ALL' command is to be set or queried, where:

fn Is the disk file name.

ft Is the disk file type. A file type of `REPORTS` will be assumed if no explicit file type is entered.

fm Is the disk file mode. A file mode of `*` will be used if no explicit file type is entered.

Query Inserts and displays the current REPORTS setting on the command line. This is the default.

File `FCONX REPORTS` will be looked for if no alternate print control file ID has been set.

SUMfilid
Indicates that the (initial) file identification for the 'summary' output file is to be set or queried, where:

fn Is the disk file name.

ft Is the disk file type. A file type of `FCXSUM` will be used if no explicit file type is entered.

fm Is the disk file mode. A file mode of `A1` will be used if no explicit file mode is entered.

Query Inserts and displays the current SUMFILID setting on the command line. This is the default.

An initial file ID of *systemid* `FCXSUM A1` will be used if no alternate file ID has been set, where the system identification of the VM system is inserted for *systemid*. Be aware that the file type may be automatically changed if an existing file with the same file ID already exists. Consecutive numbers from '01' to '99' will be either appended to the file type if it is up to 6 characters long, or to the first 6 characters of the file type if it is longer, to create unique file *identifiers*.

SUMRec
Indicates that the file identification for the summary records control file is to be set or queried, where:

fn Is the disk file name.

ft Is the disk file type. A file type of `SUMREC` will be used if no explicit file type is entered.

fm is the disk file mode. A file mode of `*` will be used if no explicit file mode is entered.

Query Inserts and displays the current SUMREC setting on the command line. This is the default.

File `FCONX SUMREC *` will be looked for if no alternate summary records control file ID has been set.

SYStem
Allows specifying a character string which describes the VM system for which reports are to be generated. The string entered will be included in the header part of all printed reports.

The maximum string length accepted is 64; the string will be truncated to this length if it is longer.

SYSTEMId
allows setting or querying a short system identifier which will be included on the right hand side of the print header of all printed performance reports, where

systemid
Is a short (maximum eight characters long) character string which is to be inserted in the print header to describe the VM system (usually the system-ID or the RSCS node-ID)

Query
Inserts and displays the current SYSTEMID setting on the command line. QUERY is the default.

TRDfilid
Indicates that the file identified for the 'trend' output file is to be set or queried, where:

fn Is the disk file name.

ft Is the disk file type. A file type of `FCXTREND` will be used if no explicit file type is entered.

fm Is the disk file mode. A file mode of `A1` will be used if no explicit file mode is entered.

Query Inserts and displays the current TRDFILID setting on the command line. This is the default.

File *systemid* FCXTREND A1 will be created if no alternate file ID has been set, where the system identification of the VM system is inserted for *systemid*.

TRENDRec

Indicates that the file identified for the trend records control file is to be set or queried, where:

fn Is the disk file name.

ft Is the disk file type. A file type of TRENDREC will be used if no explicit file type is entered.

fm Is the disk file mode. A file mode of * will be used if no explicit file mode is entered.

Query Inserts and displays the current TRENDREC setting on the command line. This is the default.

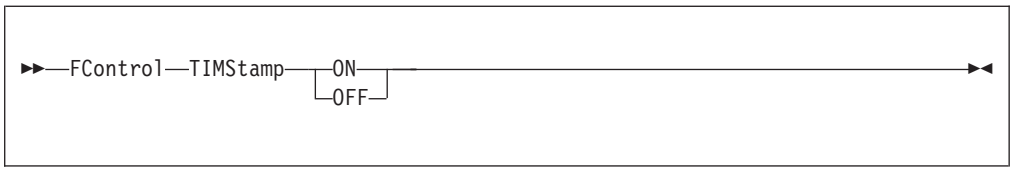
File FCONX TRENDREC * will be looked for if no alternate trend records control file ID has been set.

FCONTROL TIMSTAMP

Purpose

The FCONTROL TIMSTAMP subcommand tells Performance Toolkit whether time stamps should be included in front of each line on the basic mode and redisplay screens.

Format



Parameters

ON Indicates that time stamps are to be inserted in front of *new* lines from now on.

OFF Indicates that no time stamps are to be inserted in front of *new* lines.

Usage

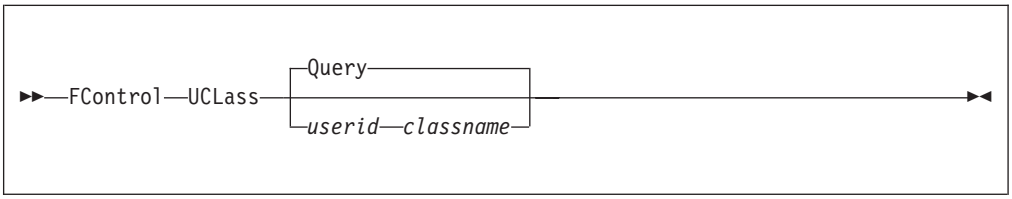
1. Note that the time stamp setting affects only new lines; any previously entered or received lines will not be changed.
2. The user acting as a system operator (who receives all the time-stamped system messages) will usually have all command lines time-stamped by Performance Toolkit even without entering the FC TIMSTAMP ON command. The command can be used there to prevent time stamps for command lines; all other lines will not be affected.
3. The current TIMSTAMP setting affects the interpretation of *all* command lines, when a command is re-executed. This can lead to unexpected results if a command was originally entered with TIMSTAMP ON. Re-execution of the command with TIMSTAMP set OFF will cause the time-stamp prefix to be interpreted as part of the command line.

FCONTROL UCLASS

Purpose

The FCONTROL UCLASS subcommand allows you to define user classes for which separate averages are to be calculated and displayed on user based screens.

Format



Parameters

userid Specifies a user identification which is to be counted as part of the class *classname*.

The string *userid* can be

- The identification of a specific virtual machine, or
- A generic identification, containing wildcard characters '*' and/or '%' which are to be used in the same way as for the CMS 'LISTFILE' command, to designate a set of users with similar userids.

classname

Defines the user class name which is to be inserted in the 'Userid' column on the line with the group's averages. A maximum of eight characters are accepted, including blanks.

Query

lists the currently active user class definitions. This is the default.

Usage

1. UCLASS specifications become effective only for users logging on *after* they have been entered.
2. Multiple statements with the same user class name *classname* are allowed.
3. A specific virtual machine can only be part of one user class: The last matching class will be used, where the scanning sequence is identical to the sequence in which the FC UCLASS commands were entered.

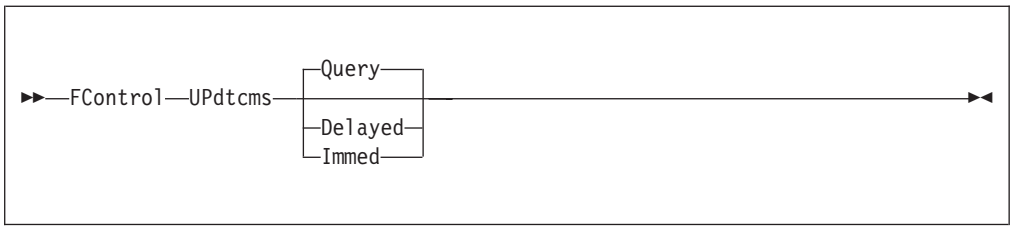
   This means that FC UCLASS statements should be entered in decreasing order of generality, to let the most specific selection become effective.

FCONTROL UPDTCMS

Purpose

The FCONTROL UPDTCMS subcommand defines the manner in which the screen is to be updated while a CMS command is being executed under Performance Toolkit.

Format



Parameters

Query
Displays the current setting on the command line (default).

Delayed
Indicates that all output lines are to be stacked and that the screen should be updated only when the CMS command has ended, or if we enter a CMS console read state. This is the initial display mode, and it also gives best performance.

Immed
CP lines will still be stacked first, but when CMS output lines are received they will immediately be inserted into the screen, together with any stacked CP lines.

Be aware that 'immediately' can mean just that: lines may be shown immediately regardless of the current screen contents, i.e. even if it is in use by another full screen application (no 'MORE...' status).

Usage

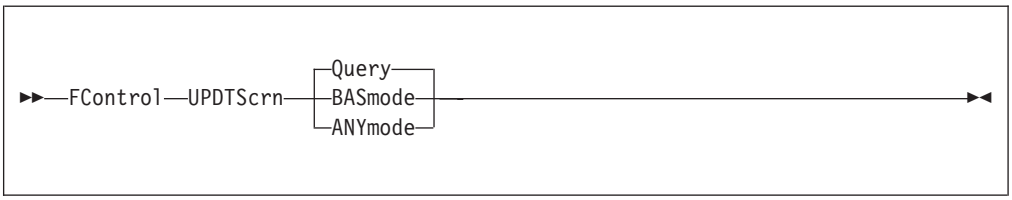
1. If the full screen application uses the CMS CONSOLE macro for handling its console I/O, no screen update will take place before this application has terminated.

FCONTROL UPDTSCRN

Purpose

The FCONTROL UPDTSCRN subcommand specifies whether console output lines are to be unstacked and inserted into the basic mode screen in any mode, or only while the screen is actually in basic mode, thus allowing you to view all output before it may be scrolled and disappear.

Format



Parameters

ANYmode
Indicates that output lines are to be unstacked and inserted into the basic mode display regardless of the current operating mode of Performance Toolkit. ANYMODE is also the initial setting.

BASmode
Indicates that output lines should be unstacked and inserted into the basic mode display only while Performance Toolkit is actually used in basic mode too. All output will remain stacked while the program is used in any non-basic mode.

Query
Indicates that the current setting is to be queried, and the result to be inserted into the command line where you can modify it. This is the default operation if no further argument is entered.

Usage

1. Using ANYMODE mode has the advantage that new console output does not have to remain stacked (and use a lot of virtual storage) if the screen is left in any non-basic mode (e.g. re-display mode) for a long time, thus preventing potential problems when storage is exhausted.

   The disadvantage of working with the ANYMODE setting is that, after a long redisplay or performance monitoring session, the user will not see output lines which have been received and already scrolled before switching the display back to basic mode (although it will always be possible, of course, to view such output in re-display mode).
2. Using the BASMODE setting will make sure that the user can see *all* output lines before they are scrolled, but it can lead to loss of output data or even an abend when the machine's virtual storage is completely filled up and new lines can no longer be stacked.

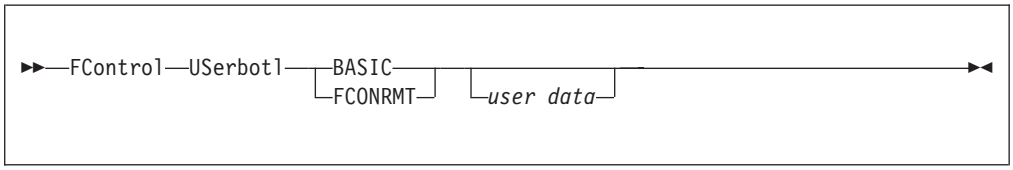
   BASMODE corresponds to the standard operating mode of FCON/ESA prior to Version 2.3.00 where the screen update mode could not yet be selected.

FCONTROL USERBOTL

Purpose

The FCONTROL USERBOTL subcommand defines the contents of the bottom line for either the 'basic' mode display, or for the initial system overview display in remote monitoring mode (shown after FCONRMT command). When specified, the data entered will replace the default bottom line information on the selected display.

Format



Parameters

BASIC
Indicates that the command refers to the bottom line of the basic mode display

FCONRMT
Indicates that the command refers to the bottom line of the initial system overview display of remote monitoring mode. The other remote monitoring displays (performance data, exception log and history data) are not affected.

'*user data*'
Is the character string that is to replace the default bottom line. The apostrophes are not required, they will be assumed to be part of the data if entered. The maximum length allowed is 77 characters for the basic mode display, and 78 characters for the remote monitoring display.

If user data is not entered, the bottom line will be reset to show the original default information again.

Note that the bottom line for the basic mode display is automatically split in two parts:

- The first part, where the PF-key assignments are originally shown, can be used as an extension of the command line for entering long commands
- A second part which is defined as 'protected' and which cannot be overwritten.

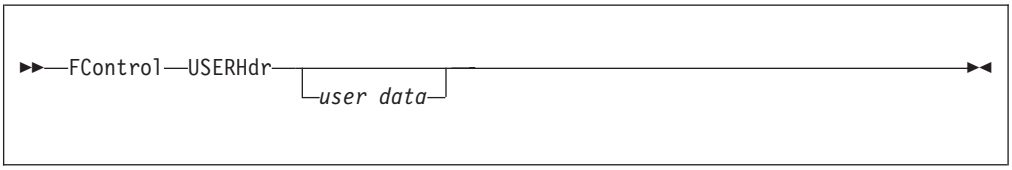
The two parts are separated by a 3270 field definition attribute which will appear as a blank whose position you cannot change.

FCONTROL USERHDR

Purpose

The FCONTROL USERHDR subcommand defines a special user header line that is to be used instead of Performance Toolkit's default 'idle' header line. When specified, the data entered will be shown in the center of the top line as long as no special conditions (e.g. scrolling, CMS command active) arise that will overlay it temporarily.

Format



Parameters

'*user data*'

Is the character string that is to replace the default header line. The apostrophes are not required, they will be assumed to be part of the data if entered. The maximum length allowed is 55 characters.

Usage

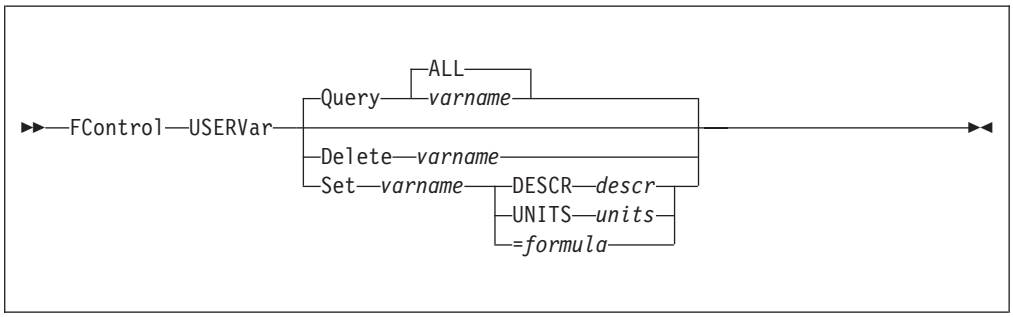
1. If no user data are entered, the header line will be reset to show Performance Toolkit's default information again.

FCONTROL USERVAR

Purpose

The FCONTROL USERVAR command allows the definition of 'user performance variables' for use with the PLOTxxx and GRAPHxxx commands, and they will also be included in the variable correlation coefficients display. These user variables will be calculated according to a formula you have supplied when defining them, based on the original set of performance variables available in the selected source.

Format



Parameters

Delete
Indicates that a user variable is to be deleted, where *varname* is the name of the user variable

Query
Indicates that the current definitions for one or several user variables are to be displayed, where

ALL Specifies that all currently defined user variables are to be displayed

varname
Specifies the name of a single user variable which is to be displayed

Query is the default operation if no further argument is entered.

Set Indicates that a new user variable is to be defined, or the definitions of a previously defined user variable altered

varname
Is the name of the user performance variable which is to be defined

= *formula*
Specifies the algorithm which Performance Toolkit is to use in calculating the new variable. '*formula*' can be a combination of:

Performance variable names
Which are the basis for further calculations. All variables available with the history log displays REDISP and REDHIST are eligible for use as input in a formula.

Note that such variables must be entered with leading and trailing single quotes if they contain characters which also have a mathematical meaning such as +, -, *, /, or (). Performance Toolkit will treat these characters as mathematical operators otherwise and

will, consequently, split the variable name at such points, which will probably cause the resulting bits not to be recognized as variables, or, even worse, to be treated as an entirely different variable.

Literals
Fixed numbers

Operators
Which define the operations to be performed on the basic performance variables and literals. Valid operators are

```
+ - * /
```

Parentheses
Which specify the sequence in which the mathematical operations are to be performed.

The requested operations will be performed in the usual sequence as defined by the rules of algebra: multiplications and divisions before additions and subtractions, and from left to right within the same level of priority, unless parentheses force a different sequence.

DESCR
Defines a short description *descr* of the variable, with a maximum length of 16 characters.

This description will be included in the header line of plots and GDDM graphics when specified; a question mark '?' will be shown instead if the description is missing.

UNITS
Specifies the units *units* for the variable, with a maximum length of 4 characters. This specification, as the variable description above, will be used when creating graphics output. It is for information only; it does not affect the calculation of the variable at all.

Usage

1. The specified formula will be checked for correct format. You will receive error messages, and the variable definition will not be accepted, when errors are detected.

   Even for a mathematically correct formula, you may not always see the expected results when you specify the newly defined variable name with a PLOTxxx or GRAPHxxx command due to internal restrictions:

   - All values are converted to short floating point format for the actual calculation. The result, however, is kept as a binary fixed integer, with two decimals. This means that results must remain within the range 0.01 to 20'000'000 or they are set to the respective limit of 0 or 20'000'000).

     Make sure to keep your results within this range, by adding one final multiplication or division to your formula if necessary.
   - Note that the basic performance variables may sometimes have a value of zero. If your formula leads to a division by zero (dividing by a performance variable whose value can be zero), the division is not executed, leaving the original value intact. This avoids a division exception, but may cause incorrect results to be shown.

     You may be able to avoid divisions by zero by adapting your formula accordingly.
2. The message:

```
FCXxxx467I nnn zero-divide(s) avoided, nnn times maximum exceeded
```

will be displayed when one or more of the above conditions were found. This always means that some values had to be changed to go on working, and it is your responsibility to evaluate the impact on the resulting graphics.

Be aware that the set of available variables is smaller when the input comes from the redisplay buffer, or from old PERFLOG or PERFHIST files: User variables based on any variable(s) that are only available with the new HISTLOG and HISTSUM file format are not valid in this case.

Examples

Let us assume you are interested in the amount of CPU used per total number of transactions (trivial + non-trivial), which could give you some indication on workload changes. The user variable CPU/TR with the following definition would be the answer:

```
FC USERVAR SET 'CPU/TR' = CPU / (100*('TR/S'+'NT/S'))
```

The result should be large enough (i.e. more than 0.01 seconds) to avoid loss of data due to the minimum value mentioned in the 'Usage Notes' above. However, the value may be less than 0.1 second, resulting in very coarse granularity since only multiples of 0.01 sec. can be shown. Displaying the number of milliseconds per transaction instead of seconds would allow us to show more detail: just multiply the result by 1000. This would change the formula to:

```
FC USERVAR SET 'CPU/TR' = (CPU / (100*('TR/S'+'NT/S')) * 1000
```

or

```
FC USERVAR SET 'CPU/TR' = CPU*10 / ('TR/S'+'NT/S')
```

and should give satisfactory values even on fast processors.

FCONTROL USRLIMIT

Purpose

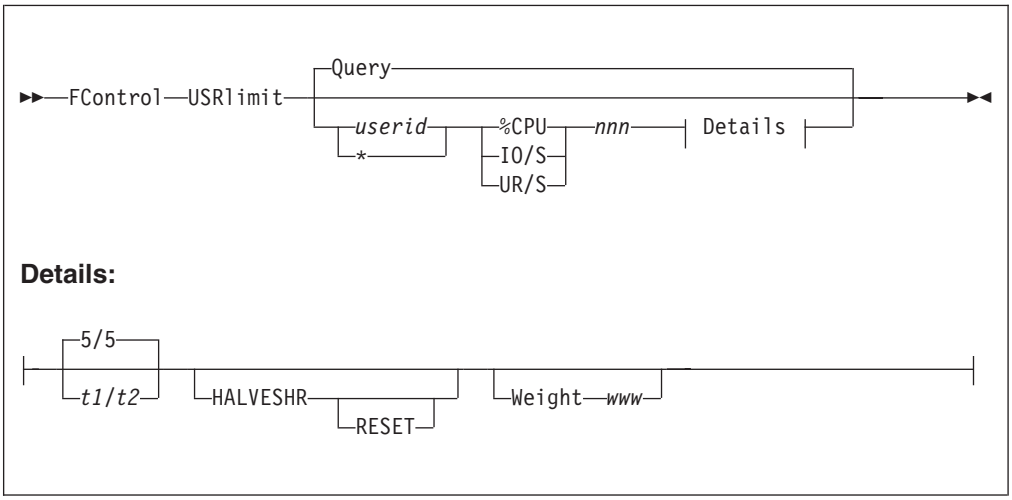
The FCONTROL USRLIMIT command allows setting thresholds for user resource consumption, and you can let the offending users' relative SHARE be automatically reduced in order to reduce their impact on general system performance. You can set:

- Individual thresholds for specific users' resource consumption, and/or
- General thresholds for all users

and specify whether or not their relative SHARE is to be changed.

Alert messages will be generated when a threshold has been exceeded for more than a predetermined time interval, and the relevant load fields on the general user display will be shown with special highlighting (red, reverse video) if the display terminal supports extended color and highlighting. The command is valid only when permanent performance data collection has been activated (command FC MONCOLL ON).

Format



Parameters

userid is the user identification of the virtual machine for which a threshold is to be set.

'Wildcard' characters '*' and '%' can be used for creating generic entries which could apply to several machines; they have the same meaning as for the CMS 'LISTFILE' command. Note that because a wildcard entry could cause an override to a userid in a previous USRLIMIT entry, it is recommended that the wildcard entries be the first entries in the USRLIMIT sequence of commands, following by any non-wildcard entries.

Where an explicit entry with individual thresholds exists, *only* the individual thresholds will by applied – i.e. if you have set an individual %CPU threshold for user MAINT, but no IO/S or UR/S thresholds, then user MAINT's virtual I/O rate and UR I/O rate will not be monitored even if a general *-entry for virtual I/O rates and UR I/O has been set too.

%CPU
Indicates that a threshold for the total CPU consumption is to be set

IO/S Indicates that a threshold for the virtual I/O rate is to be set

UR/S Indicates that a threshold for the total UR I/O rate is to be set, i.e. for the total I/O rate to virtual readers, card punches and printers.

nnn Is the threshold which is to be set for the selected resource (without any decimals)

t1 Is the initial period, in minutes, after which a first alert message is to be generated

t2 Is the period, also in minutes, after which the alert message is to be repeated if the threshold value for the resource is still exceeded.

The actual intervals used for message generation depend also on the length of the monitor sample interval. See 'Usage Notes' below for more information.

HALVESHR
Specifies that a user's relative SHARE is to be set to half the previous value whenever the conditions for message generation are also met, i.e. the same *t1/t2* intervals apply as for message generation. This process is repeated, if necessary, until a relative SHARE value of 1 is set.

The argument will be effective only for users whose original relative SHARE (when Performance Toolkit was started, or when they logged on) was equal to the default of 100. Users with another relative SHARE, which have an absolute SHARE set, or which own a dedicated processor, are exempt from automatic SHARE reduction. The assumption is that the special SHARE value was assigned for a good reason, and that it should not be changed by this.

Note that the machine where Performance Toolkit is running must have been authorized to issue the CP command 'SET SHARE ...' (requires privilege class A) in order to change users' relative SHAREs.

RESET
Specifies that a user's relative SHARE is to be reset to the original default value of 100:

- When the machine is found to be inactive (not in-queue), *and*
- When it has not exceeded any of the applicable user thresholds in the last interval.

The machine's relative SHARE value will never be increased again if the `RESET` argument has not been specified.

Note that specifying `RESET` for one of the monitored resources (e.g. CPU) will let the users' SHARE be restored to 100 also if it had been originally reduced because the threshold for another resource (e.g. IO/S) had been exceeded.

Weight *www*
Sets the 'weight' *www* of the exception when one of the set thresholds is exceeded, where *www* can be any number in the range 0 to 255. If no argument is specified, a value of 10 will be set as a default for the first FC USRlimit command.

The `WEIGHT` specification is relevant only when a machine's exception data are sent to a central monitor machine (activated via REMSEND argument

of the FC MONCOLL command, see "Remote Performance Monitoring Facility" in the *z/VM: Performance Toolkit Guide* for a description of the central monitoring function). All applicable weights will then be added, and the result divided by 10 to obtain the exception severity code which will be used to set the color of the load bar in the central monitoring machine.

Only one `WEIGHT` value can be set for all user thresholds: the last one specified will be used for ***all*** of them. The 'weight' number for an exceeded user threshold will be added once per exceeded threshold, i.e. it may be added several times if multiple thresholds have been exceeded.

Query

Lists all of the currently active USRLIMIT settings. Query is the default opertion if no further argument is entered

Usage

1. For performance reasons the applicable thresholds are copied to each virtual machine's internal data buffer only once, either during PERFKIT initialization, or when the virtual machine logs on. All USRLIMIT specifications must, therefore, be included in the initialization file FCONX $PROFILE in order to become effective for *all* users.
2. Message generation and HALVESHR setting are coupled to the data collection interval (the monitor sample interval), i.e. a message will be generated and the user's relative share halved during the first data collection cycle after the initial or repeat intervals have elapsed. The actual intervals will thus differ from the values set with *t1* and *t2* above, and the effect will be more marked if the monitor sample interval is considerably longer than the *t1* and *t2* intervals.

Examples

After setting a threshold of 30% for the total CPU consumption of all users on the system with command:

```
FC USRLIMIT * %CPU 30 8/10
```

the following message could be generated when USER1 has exceeded this limit for more than eight minutes:

```
User USER1 %CPU 34.8 exceeded threshold 30.0 for 8 min.
```

The message will be repeated after another 10 minutes unless the CPU consumption of user USER1 drops below the threshold value in the mean time.

No further action is taken. By specifying the command with the 'HALVESHR' and 'RESET' arguments:

```
FC USRLIMIT * %CPU 30 8/10 HALVESHR RESET
```

you let the users' SHARE be divided by two whenever they have exceeded a threshold for the specified interval. It will be restored to the original value of 100 once they are found to have become idle.

You can also intercept the message using the 'FC PROCESS ...' command, and use it for triggering further action (e.g. by calling an EXEC procedure which could do some additional analysis, send a warning message to the user, or even FORCE it off the system).

See also the "User Monitoring" section in the *z/VM: Performance Toolkit Guide* for more information on user threshold monitoring, and for hints on the use of the FC USRLIMIT command.

Basic Mode Subcommands

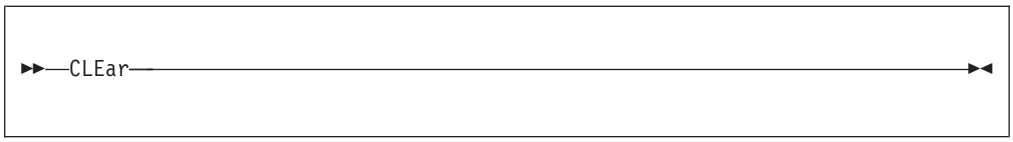
All references to PF-key numbers pertain to the initial settings. Different PF-keys may have to be used if you re-assigned them.

CLEAR

Purpose

The CLEAR command clears the screen. The operation of the CLEAR command for the clearing of CP messages and Performance Toolkit action messages can be controlled by the 'FC MSGCLEAR command'; *all* lines will be cleared by default.

Format



Parameters

No parameters are allowed or tested for.

Usage

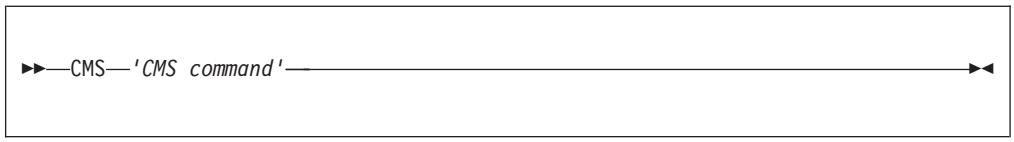
1. The CLEAR function can also be performed by pressing the 'CLEAR'-key or the PA2 key. The PA2-key will clear only the scroll area lines and leave the command and bottom lines unchanged, while both the 'CLEAR' command and the CLEAR-key clear and reset the complete screen.

CMS

Purpose

The CMS prefix indicates that the standard command search order is to be bypassed and the following command executed as a CMS command. It causes the Remote CMS Command Execution Screen (FCX123) to be displayed.

Format



Parameters

'*CMS command*'
: Is any valid CMS command or EXEC name (do not enter the apostrophes).

Usage

1. *Do not attempt to activate any full screen application.* Doing so will place the server machine in a full screen mode session which you cannot end by sending remote commands.

   You will have to logon to the server machine in order to exit from the full screen application if you have inadvertently started one.
2. See also "BASMODE" on page 141 for a more user friendly method of executing commands remotely (for APPC/VM sessions only).

Results

See "FCX123, Remote CMS Command Execution Screen – CMS" on page 461.

CP

Purpose

The CP prefix indicates that Performance Toolkit's standard command search order is to be bypassed and the following command executed as a CP command. It causes the Remote CP Command Execution Screen (FCX122) to be displayed.

Only the '#CP' form of the command is accepted while a CMS console read is pending ('ENTER:' in front of the command line), but no distinction between the two forms is made in the normal case when the command line is preceded by the standard arrow.

Format

Parameters

'*CP command*'
: Is any valid CP command (do not enter the apostrophes).

Usage

1. CP MODE will be entered if no command follows, and Performance Toolkit's CP interface will then be disabled so that all command input and output is shown on the console as usual. Commands entered in this mode will not be contained in Performance Toolkit's log.
2. Enter 'BEGIN' to switch back to Performance Toolkit-mode (required only if 'CP' has been entered without a command following it).
3. Please note that even the '#CP' form is not intercepted by CP but has to be read and interpreted by Performance Toolkit first. The command can, therefore, *not* be accepted while CMS programs are running which have disabled I/O interrupts from the console.

Results

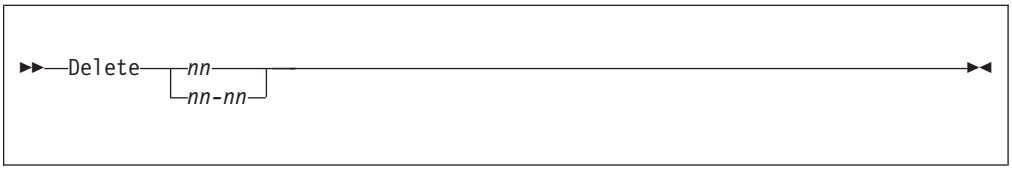
See “FCX122, Remote CP Command Execution Screen – CP” on page 460.

DELETE

Purpose

The DELETE command resets the message or action message lines specified so that they can be scrolled again like any other line on the screen.

Format



Parameters

nn {**-** *nn*}
: Defines the number(s) of the line(s) to be reset. When a range of numbers has been specified, all lines whose numbers are within the defined range will be reset. The first line number of a range *must* be one of the line numbers on the screen, while the second number can be any other number.

Usage

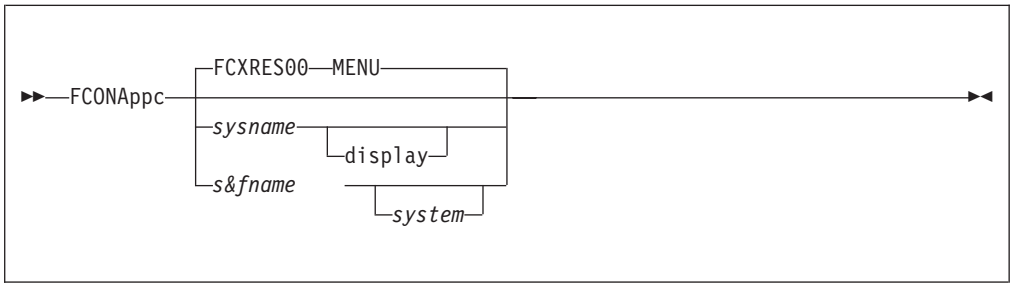
1. After resetting, the line's color and highlighting attributes will be changed to the ones defined for CP output (CPOUT) and the '*' or '+' prefix removed, and the line will be scrollable.

FCONAPPC

Purpose

The FCONAPPC command switches Performance Toolkit into APPC/VM remote performance monitoring mode.

Format



Parameters

sysname
: Is either of the following:

- A global APPC/VM resource name you want to connect to (for direct connections to a particular server), or
- A nickname in a communications directory which describes the resource you want to connect to.

A default *sysname* of `FCXRES00` will be assumed when the command is entered without an argument.

display
: Is the selection command for a performance monitoring display which is to be retrieved. The initial performance monitoring menu (MENU display) will be retrieved, by default, if no other selection is made.

s&fname
: Is either of the following:

- An APPC/VM system resource name for connecting to the local PERFSVM machine's store and forward interface, or
- A nickname in a communications directory which describes the S&F system resource you want to connect to.

system
: Is the optional name of the system you want to connect to. The initial performance data menu for the selected system will be shown if a valid system name has been specified; otherwise a system overview menu with all accessible systems will be presented.

Usage

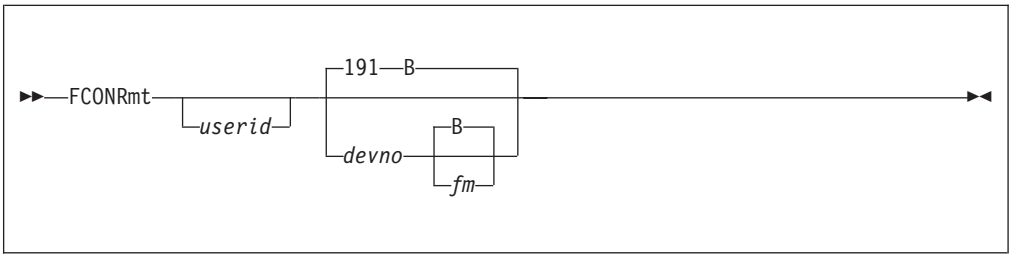
1. Although it is recommended to use the system-ID or the RSCS node-ID of remote systems as nicknames, it may not always be possible to do so. Ask your systems administrator or check your xCOMDIR NAMES files to verify the *sysname* names to be used for connecting to the PERFSVM machine on a specific VM system, or to the S&F interface on the local system.
2. The FCONAPPC command can also be entered from the FCONRMT system overview display.

FCONRMT

Purpose

The FCONRMT command switches PERFKIT into remote performance monitoring mode, and causes the System Load Overview Screen (FCX198) to be displayed.

Format



Parameters

userid Is the user identification of a central data collector machine which has been set up to continuously collect performance data from other VM systems.

devno Is the virtual device number of the central data collector machine's A-disk. Device number 191 will be assumed if no other number is entered. The program will attempt to link to this disk as virtual device number 1F1.

fm Is the file mode with which the central collector machine's A-disk is to be accessed. Default file mode is 'B'.

Usage

1. The FCONRMT command will always activate remote performance monitoring mode. Depending on the machine where the command is entered, and on the command format used, different results will be obtained:
   - If the FCONRMT command is entered without further arguments in a machine which has been set up to act as a central data collector machine for other VM systems, you will see an initial system overview display which shows the status of all remote systems, and this display will allow selection of other more detailed performance information for each of the monitored systems.
   - If the FCONRMT command is entered with the userid and device number of a central data collector machine, you will see a copy of the system overview display from the central collector machine, and this display will automatically be updated in one-minute intervals. You can also display all the additional more detailed data which has been collected in the central machine, and retrieve additional data from the remote systems.

     Note, however, that this display is based on the reading of files from another machine which may update these files even while they are being read. The disk will be re-accessed before reading a file, but errors are still possible. Just retry the command if an error has been found.
   - If the FCONRMT command is entered without further arguments in a machine which does *not* act as central data collector machine, you will just enter remote performance monitoring mode for performance data retrieval, but no automatic updating will take place.

2. See the "Remote Performance Monitoring Facility" section in the *z/VM: Performance Toolkit Guide* for a detailed description of remote performance monitoring.

Results

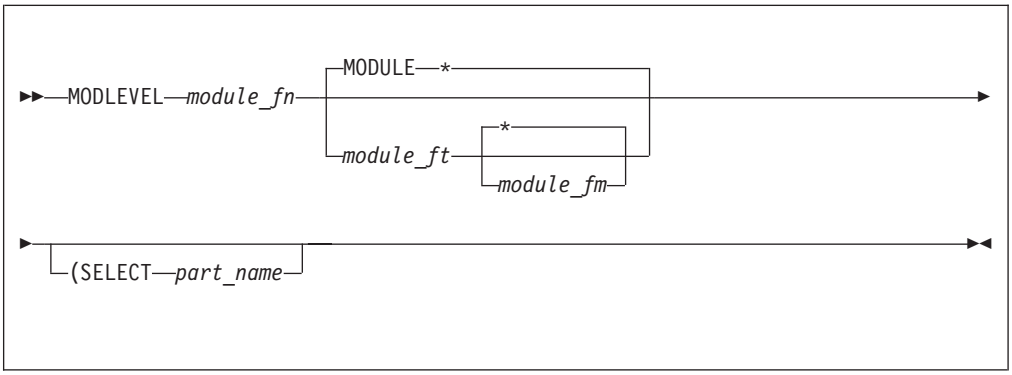
See the "Using Remote Performance Monitoring" section in the *z/VM: Performance Toolkit Guide* for more information on the System Load Overview Screen (FCX198).

MODLEVEL

Purpose

The MODLEVEL subcommand allows you to display service level information for one or all parts in a Performance Toolkit module.

Format



Parameters

module_fn
: The file name of the module for which service level information is desired.

module_ft
: The file type of the module for which service level information is desired. The default is MODULE.

module_fm
: The file mode of the module for which service level information is desired. The default is *.

(SELECT *part_name*
: Use this parameter to display the service level information for one specific part in the module. If not specified, all parts in the module will be displayed.

Usage

- When you issue this subcommand to display the service level information for all parts in a Performance Toolkit module, you will see a display as per the following example:

```
modlevel perfkit module a
 SLVL  FCXINI    BASE
 SLVL  FCXBAS    BASE
 SLVL  FCXBAN    BASE
 SLVL  FCXBAF    BASE
  .
  .
  .
 SLVL  FCXOMV    BASE
 SLVL  FCXOMX    VM65432
```

  In this example, all of the parts in PERFKIT MODULE have the original release's service level (BASE), except FCXOMX, which was updated by APAR VM65432.
- When you issue the FC FCXLEVEL subcommand (“FCONTROL FCXLEVEL” on page 32) from within a Perfkit display screen, the Perfkit program version, release, modification level and service level will be displayed. In addition, the

service level information for each part in the module used for the current invocation of Perfkit (i.e. as if the MODLEVEL subcommand was issued for this module) will be written to the log.

HISTDATA

Purpose

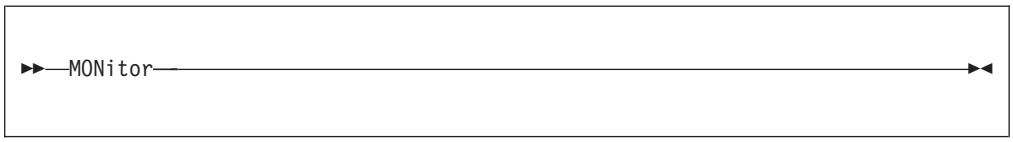
The HISTDATA command creates a menu with detailed and/or summary performance data history files to which you have access. The command is valid in both basic and performance monitor mode: please see the description in the performance monitor mode commands section for more details (“HISTDATA” on page 196).

MONITOR

Purpose

The MONITOR command switches Performance Toolkit into performance monitoring mode, and causes the Performance Data Selection Menu (FCX124) to be displayed. It is valid only in machines that are allowed to execute DIAGNOSE codes X'04' and X'90', i.e. which have been given command privilege class E.

Format



Parameters

No parameters are allowed or tested for.

Usage

1. See section “Performance Monitor Mode Subcommands” on page 133 for subcommands valid in performance monitor mode.

Results

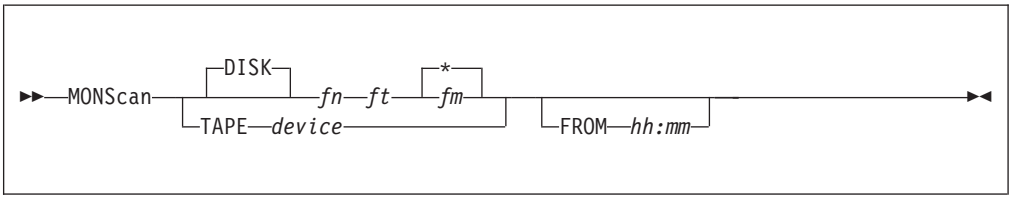
The first screen shown in performance monitor mode is the Performance Data Selection Menu (FCX124). See the "Operation in Performance Monitor Mode" chapter in the *z/VM: Performance Toolkit Guide* for more information.

MONSCAN

Purpose

The MONSCAN command allows you to select a CP monitor file on disk or tape (created by the standard MONWRITE utility) as input for performance data analysis. When the specified file is found, a performance data scan mode is entered which looks almost identical to the normal real-time monitoring mode and which allows you to browse through the accumulated monitor data.

Format



Parameters

DISK Indicates that a monitor data disk file is to be processed. The next few arguments describe the disk file:

fn Is the file name of the MONWRITE disk file

ft Is the file type of the MONWRITE disk file

fm Is the file mode of the MONWRITE disk file. Default file mode is '*', i.e. all accessed disks will be searched for the specified file if the file mode is omitted.

TAPE Indicates that a monitor data file on tape is to be processed, where

device Describes the tape unit on which the monitor data tape has been mounted and which has been attached to the virtual machine. It can be defined as either a virtual device number or as one of the standard CMS tape unit names TAP*n*.

FROM *hh:mm*

Allows specifying a start time which is to be searched for, where the time must be specified in exactly that format, i.e. 2 digits each for hours and minutes with a separating colon.

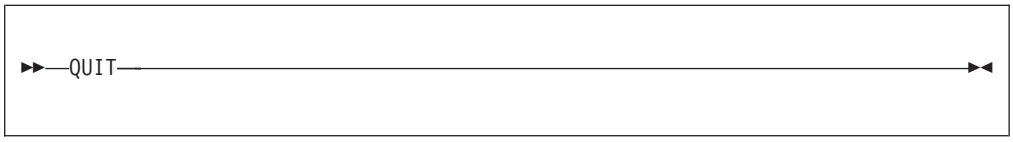
When found, the initial position for the data scan will be at the first batch of SAMPLE data which were created at or after the start time *hh:mm*.

QUIT

Purpose

A QUIT command entered in basic mode ends Performance Toolkit operation and returns the screen to standard VM console mode.

Format



Parameters

No parameters are allowed or tested for.

Usage

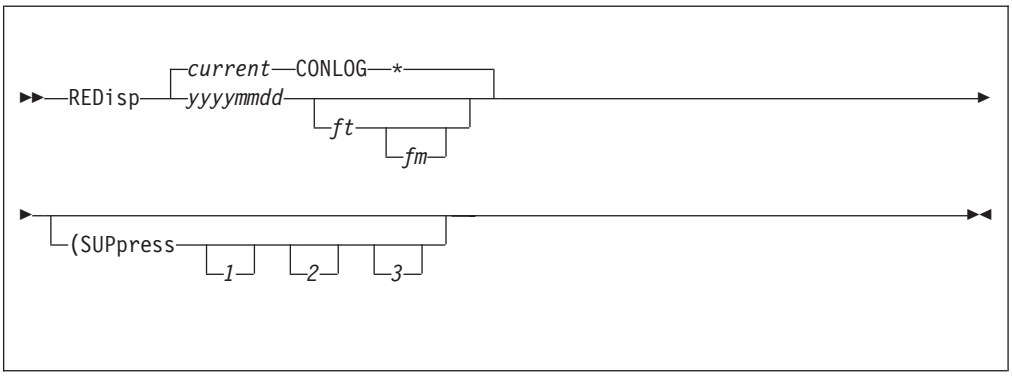
1. The same function is performed if you press PF3 or PF15.
2. You will have to enter the QUIT command twice if permanent performance data collection has been activated (information message 192 will be shown after the first QUIT command). This is to prevent loss of accumulated performance data if the QUIT command has been accidentally entered (wrong PF-key pressed.).

REDISP

Purpose

The REDISP command switches the screen into 'Re-Display'-mode for browsing through the accumulated console log file (see the "Redisplay Mode" section in the *z/VM: Performance Toolkit Guide* as well as “Redisplay Mode Subcommands” on page 123).

Format



Parameters

yyyymmdd
Is the file name of the log file. Current date is the default, which will also be assumed if an asterisk is entered for the file name.

ft Is the file type of the log file. Default file types are CONLOG (for current log), or CONLOG1, CONLOG2 or CONLOG3 for previous log generations. They will be looked for in this order if no file type is specified or if it has been entered as an asterisk.

fm Is the file mode of the log file. Default file mode is '*', i.e. all accessed disks will be searched for the log file.

Only actual CONLOG files should be displayed in this way. Selection of other files is possible, but will lead to unpredictable results.

Caution: An explicit file mode is often specified because another user's Performance Toolkit log file is to be re-displayed (e.g. system operator's log). If such a log is still active, the corresponding minidisk should be re-accessed just before entering re-display mode, so that an updated version of the minidisk directory is used. Even so, you may expect read errors after the log has been updated again, and Performance Toolkit might even ABEND.

(SUPpress *n*
Indicates that one or more of the originally suppressed output line classes (controlled by FC PROCESS) are to be suppressed in redisplay mode. Specify the classes which are *not* to be shown. Any combination of the classes 1, 2 and/or 3 is accepted; they can be separated by blanks or entered as a single string. *None* of the data lines in the console log will be suppressed if the option is omitted.

Usage

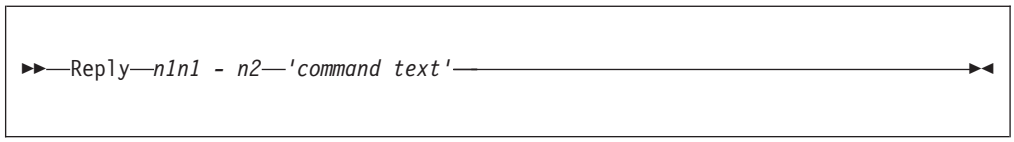
1. Re-display mode for the current log can also be entered by pressing PF2 or PF14.

REPLY

Purpose

The REPLY command resets the message or action message line specified so that it will be scrolled again (similar to the DELETE command) and then executes the command text specified.

Format



Parameters

n1 – n2
: Are the line numbers that are to be reset (maximum 2 characters long).

  When a range of numbers *n1 - n2* has been specified, all lines whose numbers are within the defined range will be reset. The first line number of a range *must* be one of the line numbers on the screen, while the second number can be any other number.

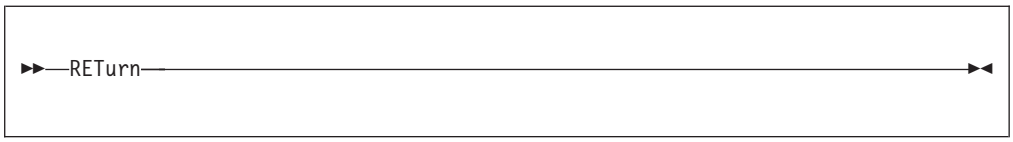
'*command text*'
: Is any valid command to be executed after resetting the screen lines specified (to be entered without apostrophes.). The command text is assumed to begin with the first argument that is not a valid screen line number.

RETURN

Purpose

A RETURN command entered in basic mode ends Performance Toolkit operation and returns the screen to standard VM console mode. It works exactly like the QUIT command.

Format



Parameters

No parameters are allowed or tested for.

Usage

1. The same function is performed if you press PF12.

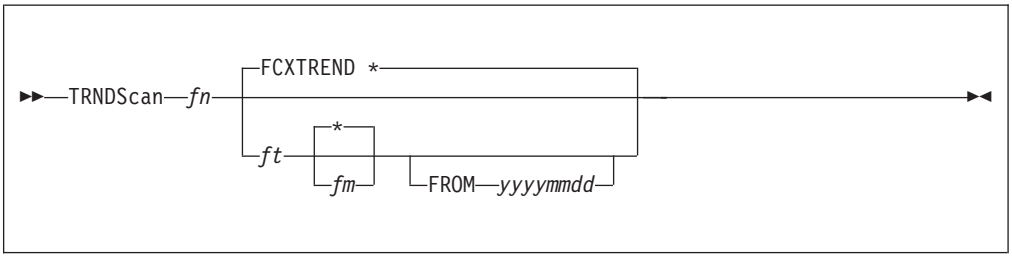
   Note: You will have to enter the RETURN command twice if permanent performance data collection has been activated (information message 192 will be shown after the first RETURN command). This is to prevent loss of accumulated performance data if the RETURN command has been accidentally entered (wrong PF-key pressed.).

TRNDSCAN

Purpose

The TRNDSCAN command allows selecting a Performance Toolkit extended trend file on disk as input for performance data analysis. When the specified file is found, a trend file scan mode is entered which looks very similar to the normal real-time monitoring mode and which allows you to browse through the accumulated trend file history data.

Format



Parameters

fn Is the file name of the extended trend data file (originally the system identification of the VM system where the trend file was created).

ft Is the file type of the extended trend data file. Default file type is 'FCXTREND', the original file type used by Performance Toolkit when writing the trend file.

fm Is the file mode of the extended trend data file. Default file mode is '*', i.e. all accessed disks will be searched for the specified file if the file mode is omitted.

FROM *yyyymmdd*
Allows specifying a start date which is to be searched for, where the date must be specified in exactly that format, i.e. 4 digits for the year and 2 digits each for months and days.

When found, the initial position for the data scan will be at the first batch of trend records which were created at or after the start date.

'ENTER'

Purpose

Pressing the 'ENTER'-key without any input in basic mode:

- Locks the screen if it was in scroll wait with 'auto scroll' set on.
- Frees and scrolls a screen which had previously been frozen either by pressing 'ENTER' in 'auto scroll' mode or because 'manual scroll' mode is active.
- Is ignored if the screen was not in scroll wait.

Redisplay Mode Subcommands

Only general subcommands and the following redisplay-specific subcommands are valid in redisplay mode. Entering any other command in this mode will cause the screen to be switched back into basic mode, and the command to be executed as CP/CMS command

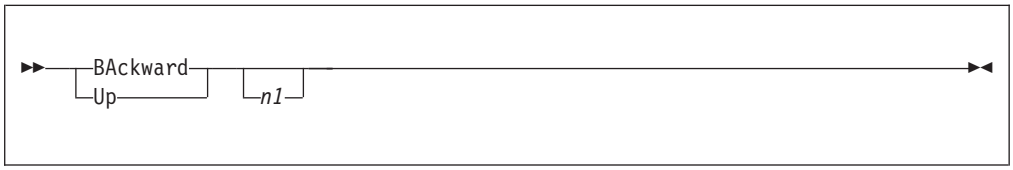
All references to PF-key assignments are based on the initial default settings. Different PF-keys may have to be used if the initial settings have been changed.

BACKWARD

Purpose

The BACKWARD command scrolls the console log backwards. i.e. towards the beginning of the file. UP is accepted as a synonym for the BACKWARD command.

Format



Parameters

n1 Specifies the number of lines to be shifted. The default scroll value is screen size minus one.

Usage

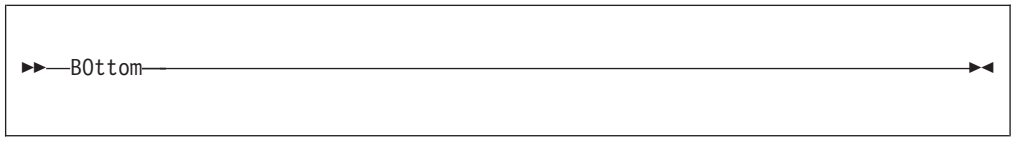
1. Pressing PF7 or PF19 will also scroll the log backwards for the default number of lines.

BOTTOM

Purpose

The BOTTOM command causes the end of the console log to be shown, which is the same as the initial screen upon entering redisplay mode.

Format



Usage

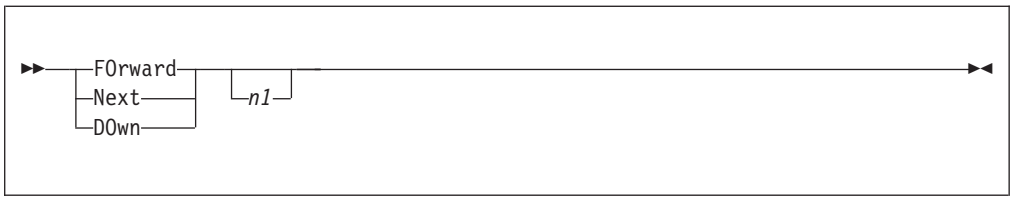
1. The end of the log file will also be shown after pressing PF5 or PF17.

FORWARD

Purpose

The FORWARD command scrolls the screen forward, i.e. towards the end of the console log, for the number of lines specified. NEXT and DOWN are accepted as synonyms for the FORWARD command.

Format



Parameters

n1 Indicates the number of lines by which the console log is to be moved. The default scroll value is screen size minus one.

Usage

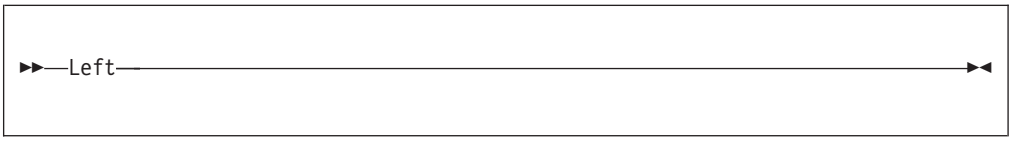
1. Pressing PF8 or PF20 will also scroll the log forward for the default number of lines.

LEFT

Purpose

The LEFT command displays the left side of the console log. This is also the initial setting after switching into redisplay mode.

Format



Usage

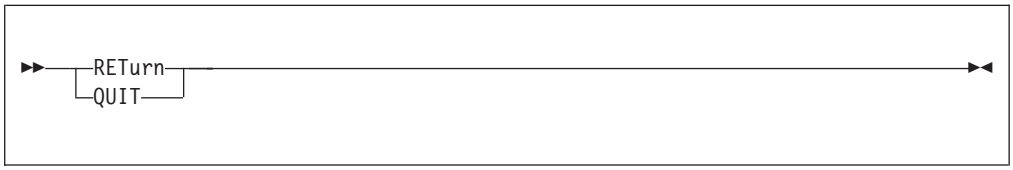
1. The same result can be achieved by pressing PF10.

RETURN

Purpose

The RETURN command, when entered in redisplay mode, exits redisplay mode and returns to basic mode.

Format



Usage

1. 'QUIT' is accepted as a synonym for the RETURN command.
2. The same function can also be performed by pressing PF12.

RIGHT

Purpose

The RIGHT command displays the right side of the console log.

Format

Usage

1. The same function can also be performed by pressing PF11.

TOP

Purpose

The TOP command displays the beginning of the console log.

Format

Usage

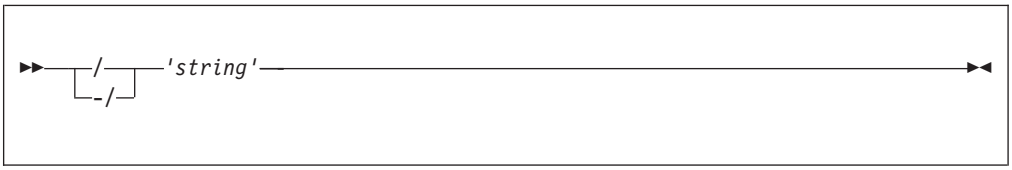
1. The beginning of the log will also be shown after pressing PF4 or PF16.

/ (LOCATE)

Purpose

The LOCATE command searches the console log for the character string specified.

Format



Parameters

/ Indicates a forward search. The search for the specified string starts with the current line + 1 and continues until either the string is found or the end of the log file is reached. 'Current line' is the top line for the first locate command, it is the line where the last string has been located for further locate commands that immediately follow a previous successful locate command.

-/ Indicates a backward search. The search starts with the current line - 1 and continues until either the string is found or the top of the log file is reached.

'*string*'
Is the character string to be located (do not enter the apostrophes unless they are part of the string.). The string and the console log records will be translated to upper case for the search. The output will be scrolled, if necessary, to show the first record containing this string which will then be placed at the top of the screen. The first string found in this record will be highlighted. It will be displayed with reverse video on screens that support extended highlighting, on other displays the display intensity will be changed. The log shown will be shifted right or left, if necessary, so that the beginning of the located string is always visible.

Usage

1. The search may be continued by just pressing the 'ENTER'-key again.

'ENTER'

Purpose

Pressing the 'ENTER'-key without any input will:

- Restart the search for the character string specified with the LOCATE command if the last command entered was a 'LOCATE', or it will
- Scroll the console log backward or forward for the default number of lines, depending upon whether a BACKWARD or FORWARD command (or the corresponding PF-key function) was executed last.

Performance Monitor Mode Subcommands

Only general Performance Toolkit subcommands and the following performance monitor-specific subcommands are valid in performance monitor mode.

Note that most of the selectable performance displays are based on CP monitor data: data can be calculated, and such screens selected, only if CP monitor data collection has previously been activated, and if Performance Toolkit has been set up to retrieve monitor data.

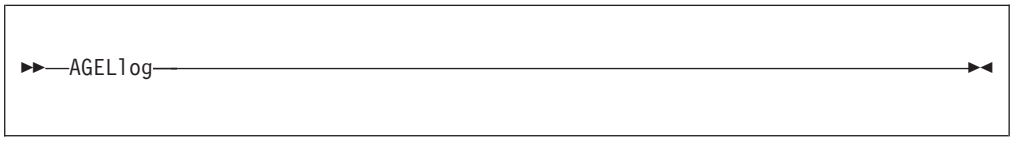
All references to PF-key assignments are based on the initial default settings. Different PF-keys may have to be used if the initial settings have been changed.

AGELLOG

Purpose

The AGELLOG subcommand causes the Age List Log screen (FCX297) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

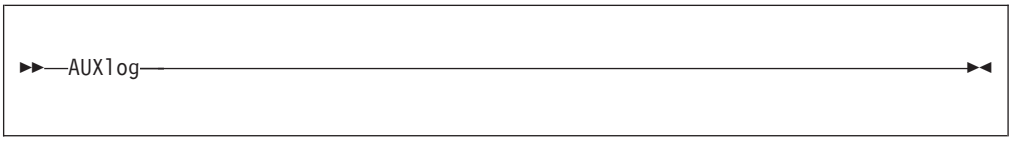
See “FCX297, Age List Log Screen – AGELLOG” on page 814.

AUXLOG

Purpose

The AUXLOG subcommand causes the Auxiliary Storage Log Screen (FCX146) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

See “FCX146, Auxiliary Storage Log Screen – AUXLOG” on page 507.

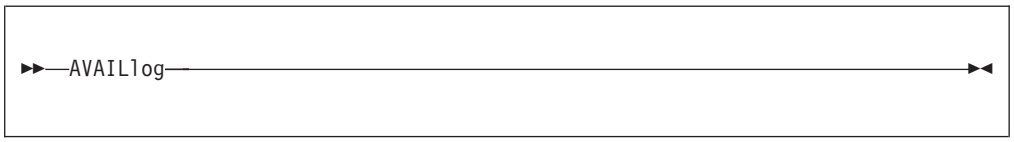
AVAILLOG

Purpose

The AVAILLOG command causes the Available List Log Screen (FCX254) to be displayed.

This command applies only to monitor data from V6.2 and earlier releases.

Format



Parameters

No parameters are allowed or tested for.

Results

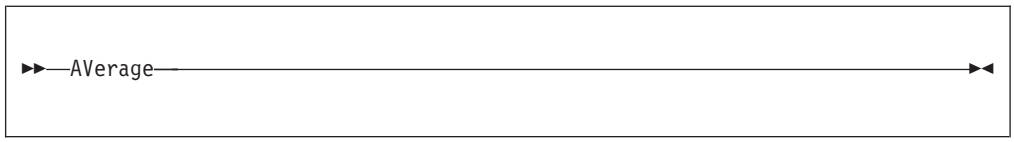
See “FCX254, Available List Log Screen – AVAILLOG” on page 735.

AVERAGE

Purpose

The AVERAGE subcommand allows many performance screens to be switched from a display of the last 'interim' interval's or the last sample's data to the display of averages based on all measurements made since the last RESET.

Format



Parameters

No parameters are allowed or tested for.

Usage

1. The AVERAGE subcommand affects *all* other performance displays that can show both current and average data.

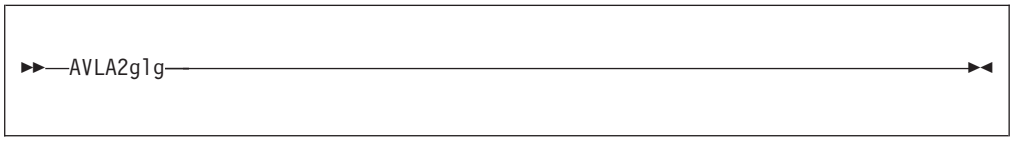
   Average data will be shown immediately on all screens which are based on CP monitor data, but average data for the other displays will be shown only when the next sample has been taken, so you may see no immediate effect of the subcommand having been executed.
2. See the CURRENT subcommand (“CURRENT” on page 165) for an explanation of how to set the screens back to their initial status, displaying 'current' data or the INTERIM subcommand “INTERIM” on page 199 for displaying 'interim' data.

AVLA2GLG

Purpose

The AVLA2GLG subcommand causes the Available List Data Above 2G screen (FCX295) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

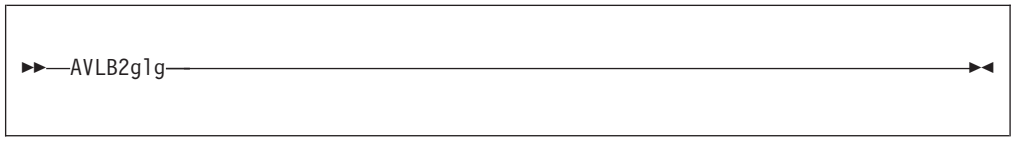
See “FCX295, Available List Data Above 2G Screen – AVLA2GLG” on page 810.

AVLB2GLG

Purpose

The AVLB2GLG subcommand causes the Available List Data Below 2G screen (FCX294) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

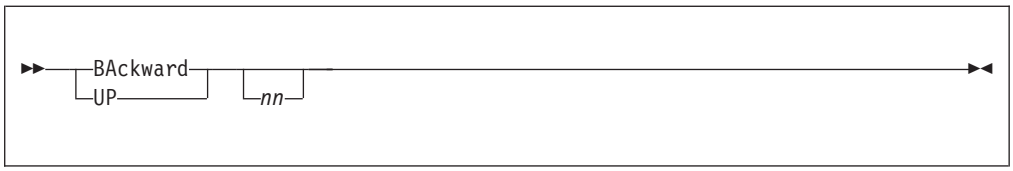
See “FCX294, Available List Data Below 2G Screen – AVLB2GLG” on page 808.

BACKWARD

Purpose

The BACKWARD subcommand scrolls the selected performance monitor display backwards, i.e. towards the top. UP is accepted as a synonym for the BACKWARD subcommand.

Format



Parameters

nn Specifies the number of lines to be shifted. The default scroll value is the number of performance data lines (excluding header lines) of the current monitor display minus one, i.e. it depends on the performance display being viewed.

Usage

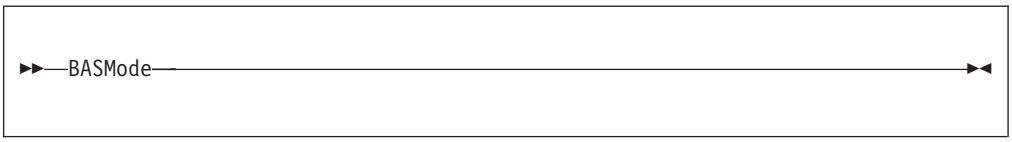
1. Pressing PF7 or PF19 will also scroll the data backwards for the default number of lines.

BASMODE

Purpose

The BASMODE subcommand causes the Remote Basic Mode Screen (FCX186) to be displayed. It is valid only for remote performance monitoring sessions using APPC/VM, and will be accepted only if the user has been given CMD authorization on the remote system.

Format



Parameters

No parameters are allowed or tested for.

Results

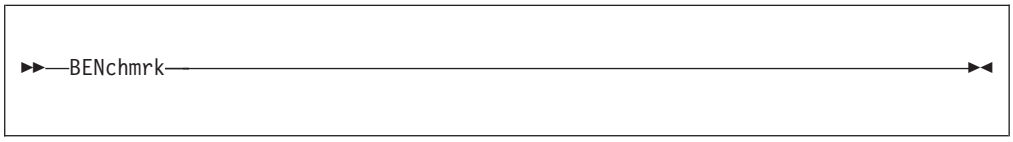
See “FCX186, Remote Basic Mode Screen – BASMODE” on page 584.

BENCHMRK

Purpose

The BENCHMRK subcommand causes the Benchmark Overview Menu (FCX173) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

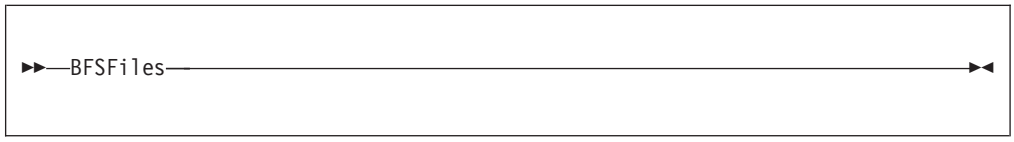
See the "Benchmarking Objects" section in the *z/VM: Performance Toolkit Guide* for more information on this screen.

BFSFILES

Purpose

The BFSFILES subcommand causes the Byte File System File Activity Log (FCX190) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

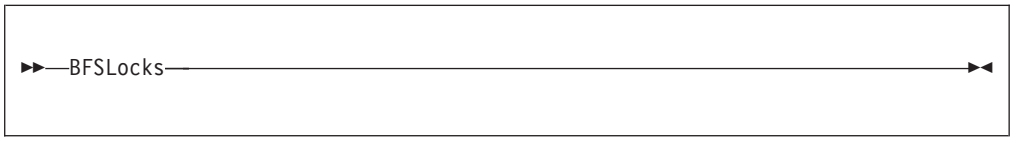
See “FCX190, Byte File System File Activity Log – BFSFILES” on page 591.

BFSLOCKS

Purpose

The BFSLOCKS subcommand causes the Byte File System Locking Activity Log (FCX192) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

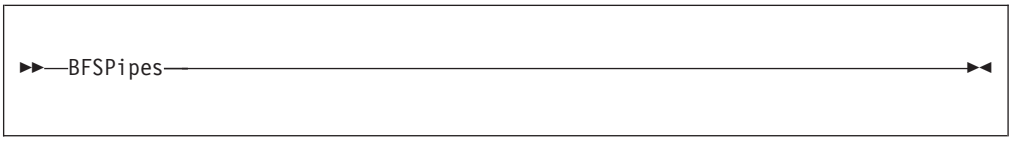
See “FCX192, Byte File System Locking Activity Log – BFSLOCKS” on page 597.

BFSPIPES

Purpose

The BFSPIPES subcommand causes the Byte File System PIPEs and Linking Activity Log (FCX191) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

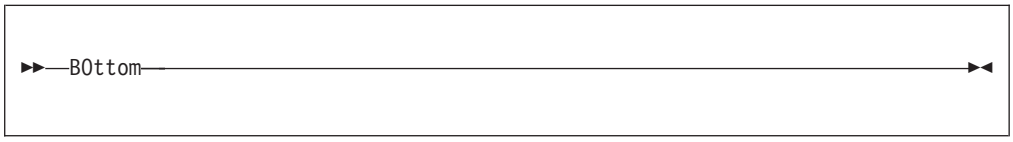
See “FCX191, Byte File System PIPEs and Linking Activity Log – BFSPIPES” on page 594.

BOTTOM

Purpose

The BOTTOM subcommand causes the last part of the selected performance monitor data to be shown.

Format



Usage

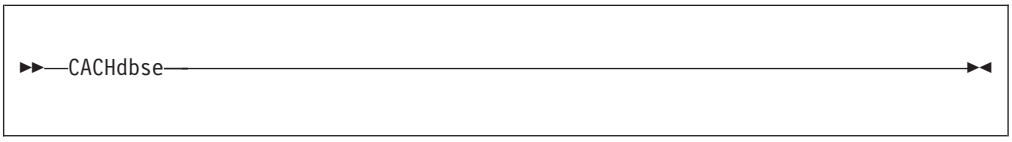
1. The bottom part of the current display's data will also be shown after pressing PF5 or PF17.

CACHDBSE

Purpose

The CACHDBSE subcommand causes the CU-Cached Disks Screen (FCX111) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Usage

1. The whole analysis is based on counters which are updated within the cached control units. These counters reflect the load and behavior of specific ***disks***, but they do not tell where the I/O came from. If several systems share a device, the ***total*** of all activity on the disk is displayed, and ***not*** just the I/Os from the system which is doing the analysis.

   The same problem exists for systems which are running second level – an analysis by the second level system will include any I/O activity to the same devices from the first level system.
2. Second level systems may face an additional problem: since they only have one path to each device, they will retrieve data only from one cached control unit director. If a device is connected to the first level system over two paths and two different control units (e.g. 3880-23), the first level system may pass the data retrieval request randomly to either of the two control unit directors. Figures obtained by the second level system in this way will tend to be reasonably correct in the long run, but cannot be relied on for single intervals.

Results

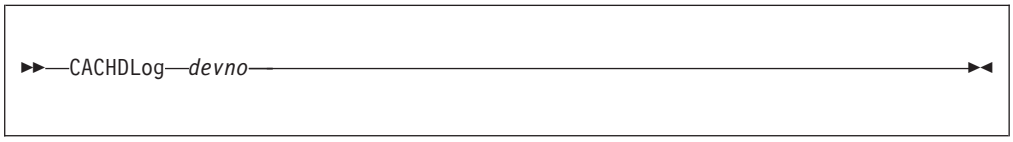
See “FCX111, CU-Cached Disks Screen – CACHDBSE” on page 417.

CACHDLOG

Purpose

The CACHDLOG subcommand causes the Control Unit Cache Log Screen (FCX169) to be displayed for the selected disk.

Format



Parameters

devno Is the device number of the disk for which the Control Unit Cache Log Screen (FCX169) is to be displayed.

Results

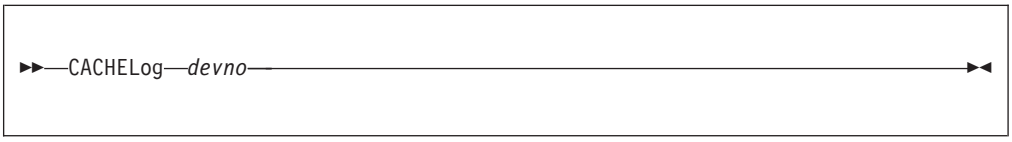
See "FCX169, Control Unit Cache Log Screen – CACHDLOG" on page 550.

CACHELOG

Purpose

The CACHELOG subcommand causes the Cache Extended Functions Log Screen (FCX184) to be displayed for the selected disk.

Format



Parameters

devno Is the device number of the disk for which the Cache Extended Functions Log Screen (FCX184) is to be displayed.

Results

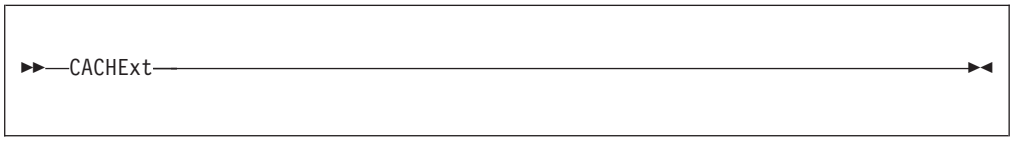
See "FCX184, Cache Extended Functions Log – CACHELOG" on page 581.

CACHEXT

Purpose

The CACHEXT subcommand causes the Cache Extended Functions Screen (FCX177) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Usage

1. The whole analysis is based on counters which are updated within the cached control units. These counters reflect the load and behaviour of specific ***disks***, but they do not tell where the I/O came from. If several systems share a device, the ***total*** of all activity on the disk is displayed, and ***not*** just the I/Os from the system which is doing the analysis.
2. The same problem exists for systems which are running second level. An analysis by the second level system will include any I/O activity to the same devices from the first level system.

Results

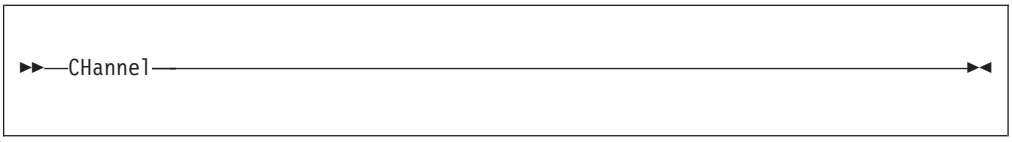
See "FCX177, Cache Extended Functions Screen – CACHEXT" on page 565.

CHANNEL

Purpose

The CHANNEL subcommand causes the Channel Load Screen (FCX107) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

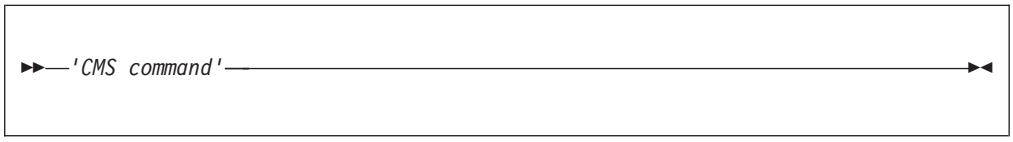
See “FCX107, Channel Load Screen – CHANNEL” on page 398.

CMS

Purpose

The CMS subcommand prefix must be used when entering a CMS command in performance monitor mode.

Format



Parameters

'CMS command'
Is any valid CMS command or EXEC name (do not enter the apostrophes).

Usage

1. The CMS subcommand prefix will cause an immediate switch back to basic mode where the command will be executed.

Results

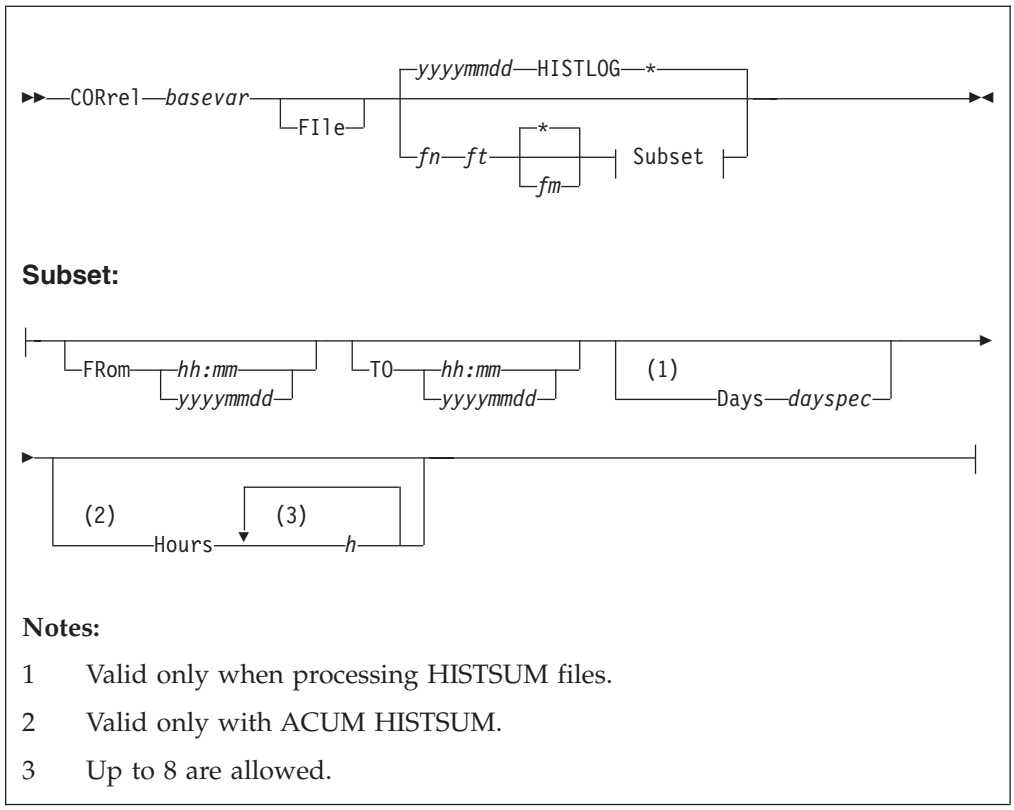
See the discussion of the CMS subcommand in basic mode (“CMS” on page 105).

CORREL

Purpose

The CORREL subcommand selects the Variable Correlation Screen (FCX194), with correlation coefficients based on the values of the variables found in the selected history log file.

Format



Notes:

1 Valid only when processing HISTSUM files.

2 Valid only with ACUM HISTSUM.

3 Up to 8 are allowed.

Parameters

basevar
Is the name of the variable that is to be used as the 'base' variable when calculating correlation coefficients.

FIle *fn ft fm*
Specifies the file ID of the HISTLOG/HISTSUM file to be processed. The current day's HISTLOG file will be used as input if the file specification is omitted.

fn Is the file name of the performance history file. The file name usually contains the file's creation date, in format *yyyymmdd*.

ft Is the file type of the log file. There is no default file type: If a file name has been entered, the file type is required too.

fm Is the file mode of the log file. Default file mode is '*', i.e. all accessed disks will be searched for the file.

FRom *hh:mm*
Defines the time stamp of the first record to be analyzed when a detailed

HISTLOG*n* file is used as input. The time entered must have exactly this format, i.e. two numbers each for hours and minutes, separated by a colon.

FRom *yyyymmdd*
Defines the date of the first record (year, month and day) to be analyzed when a summary HISTSUM file is used as input. The date entered must have exactly this format, i.e. four digits for the year, and two digits each for month and day, without any intervening blanks. The format *mmddyy* used in previous releases of the program is also accepted.

Analysis will begin with the first data record found if no 'FROM' date has been entered.

TO *hh:mm*
Defines the time stamp of the last record to be analyzed when a detailed HISTLOG*n* file is used as input.

TO *yyyymmdd*
Defines the last day for which data are to be included in the analysis when data from a condensed HISTSUM data file are to be analyzed.

Analysis will continue to the end of the file if the 'TO' argument is omitted.

Days *dayspec*
Defines a selection of weekdays for which data are to be analyzed, where *dayspec* can be a combination of the following strings:

ALL If all weekdays are to contribute to the analysis

M-F If only the normal workdays Monday to Friday are to contribute data

MON If all Mondays are to contribute data

TUE If all Tuesdays are to contribute data

WED If all Wednesdays are to contribute data

THU If all Thursdays are to contribute data

FRI If all Fridays are to contribute data

SAT If all Saturdays are to contribute data

SUN If all Sundays are to contribute data

The argument is valid only when analyzing a condensed summary data file ACUM HISTSUM; *all* data will be analyzed when it is omitted. When specified, only performance data collected for the selected weekdays are used in the correlation analysis. For example, specifying `'DAYS M-F SAT'` will cause data to be selected for the weekdays Monday to Saturday, excluding any data for Sundays.

HOURS *h1 h2 ... h8*
Defines a selection of up to eight one-hour intervals for which data are to be analyzed. The argument is valid only when analyzing a condensed summary data file ACUM HISTSUM. When specified, only performance data collected for the selected hours are used in the correlation analysis. For example, specifying `'HOURS 9 10 14 15'` will cause data to be selected for the periods of 09:00-10:59 and 14:00-15:59, for each of the days previously selected with the 'FROM' and 'TO' and/or 'DAYS' arguments.

All hours for which data are available will be included when the HOURS argument is not specified.

Usage

1. Only actual performance history files should be specified as input. Selection of other files may be possible if they pass some tests, but will lead to unpredictable results.

Results

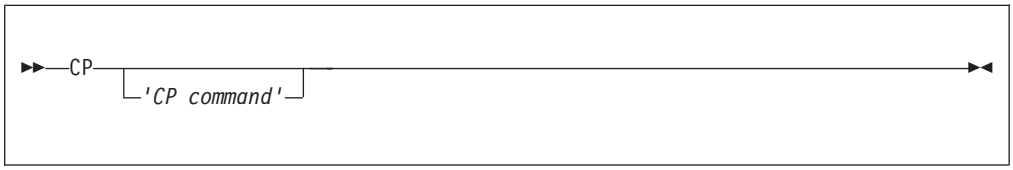
See “FCX194, Variable Correlation Screen – CORREL” on page 601.

CP

Purpose

The CP subcommand prefix must be used when entering a CP command in performance monitor mode.

Format



Parameters

'CP command'
Is any valid CP command (do not enter the apostrophes). When entered in performance monitoring mode, the CP subcommand prefix will cause an immediate switch back to basic mode where the command will be executed. Up to 4096 bytes of the command output (if any) will be returned when CP commands are executed from remote performance monitor mode.

Usage

1. CP MODE will be entered if no command follows, and VM's CP interface will then be disabled so that all command input and output is shown on the console as usual. Commands entered in this mode will not be contained in the toolkit's log.
2. Enter 'BEGIN' to switch back to Performance Toolkit-mode (required only if 'CP' has been entered without a command following it).

Results

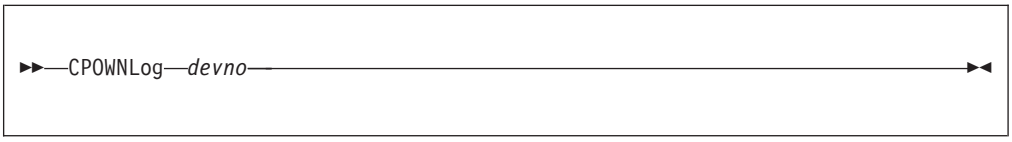
See the discussion of the CP subcommand in basic mode (“CP” on page 106).

CPOWNLOG

Purpose

The CPOWNLOG subcommand causes the CPOWNED Device Log Screen (FCX170) to be displayed for the selected disk.

Format



Parameters

devno Is the number of the disk for which the CPOWNED Device Log Screen (FCX170) is to be displayed.

Results

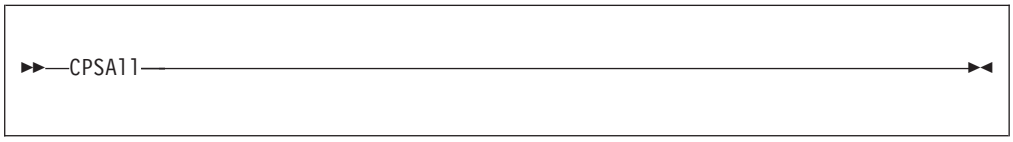
See "FCX170, CPOWNED Device Log Screen – CPOWNLOG" on page 551.

CPSALL

Purpose

The CPSALL subcommand causes the CP IUCV Services Log Screen (FCX139) for all communication activity to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

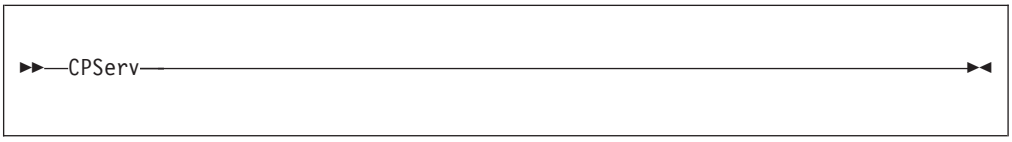
The CP IUCV Services Log Screen (FCX139/140/141/142) is shown after entering the CPSALL, CPSFAIL, CPSTOCP, or CPSTOVM subcommand. Note that the layout of these four displays is almost identical. See "FCX139/140/141/142, CP IUCV Services Log Screen – CPSALL, CPSTOCP, CPSTOVM, CPSFAIL" on page 494 for the sample CPSALL layout.

CPSERV

Purpose

The CPSERV subcommand causes the CP IUCV Services Screen (FCX106) to be displayed, with counts for IUCV and VMCF services.

Format



Parameters

No parameters are allowed or tested for.

Results

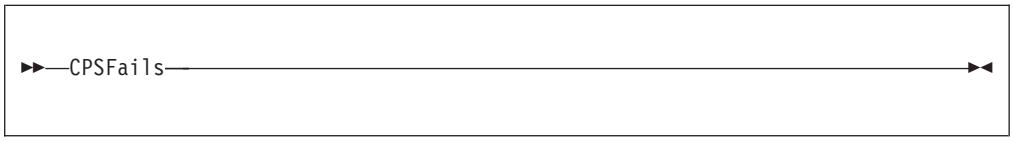
See “FCX106, CP IUCV Services Screen – CPSERV” on page 396.

CPSFAILS

Purpose

The CPSFAILS subcommand causes the CP IUCV Services Log Screen (FCX142) for failed communications to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

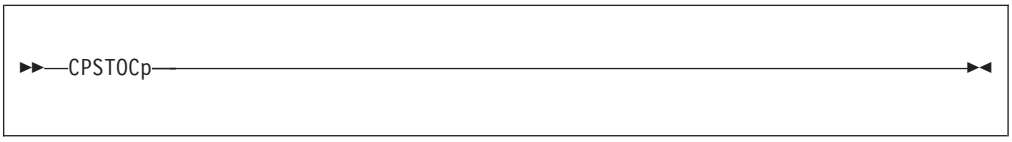
The CP IUCV Services Log Screen (FCX139/140/141/142) is shown after entering the CPSALL, CPSFAIL, CPSTOCP, or CPSTOVM subcommand. Note that the layout of these four displays is almost identical. See "FCX139/140/141/142, CP IUCV Services Log Screen – CPSALL, CPSTOCP, CPSTOVM, CPSFAIL" on page 494 for the sample CPSALL layout.

CPSTOCP

Purpose

The CPSTOCP subcommand causes the CP IUCV Services Log Screen (FCX140) for communications from a virtual machine to CP to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

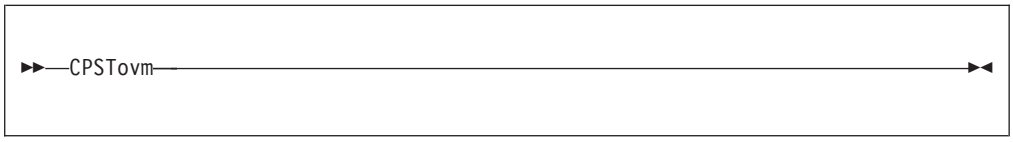
The CP IUCV Services Log Screen (FCX139/140/141/142) is shown after entering the CPSALL, CPSFAIL, CPSTOCP, or CPSTOVM subcommand. Note that the layout of these four displays is almost identical. See "FCX139/140/141/142, CP IUCV Services Log Screen – CPSALL, CPSTOCP, CPSTOVM, CPSFAIL" on page 494 for the sample CPSALL layout.

CPSTOVM

Purpose

The CPSTOVM subcommand causes the CP IUCV Services Log Screen (FCX141) for communications from CP to a virtual machine to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

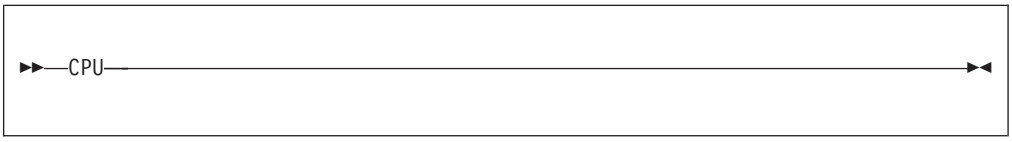
The CP IUCV Services Log Screen (FCX139/140/141/142) is shown after entering the CPSALL, CPSFAIL, CPSTOCP, or CPSTOVM subcommand. Note that the layout of these four displays is almost identical. See "FCX139/140/141/142, CP IUCV Services Log Screen – CPSALL, CPSTOCP, CPSTOVM, CPSFAIL" on page 494 for the sample CPSALL layout.

CPU

Purpose

The CPU subcommand causes the CPU Load and Transactions Screen (FCX100) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

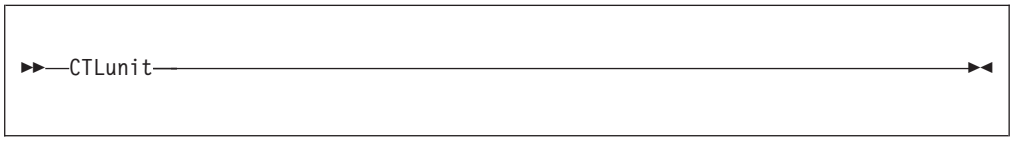
See “FCX100, CPU Load and Transactions Screen – CPU” on page 357.

CTLUNIT

Purpose

The CTLUNIT subcommand causes the Cached Control Units Screen (FCX176) to be displayed.

Format



Usage

1. The whole analysis is based on counters which are updated within the cached control units. These counters reflect the load and behaviour of specific ***disks***, but they do not tell where the I/O came from. If several systems share a control unit, the ***total*** of all activity on the control unit is displayed, and ***not*** just the I/Os from the system which is doing the analysis.
2. The same problem exists for systems which are running second level. An analysis by the second level system will include any I/O activity to the same control units from the first level system.
3. This report works correctly only if every logical control unit (LCU) to which your system is attached has a unique subsystem ID (SSID).

Parameters

No parameters are allowed or tested for.

Results

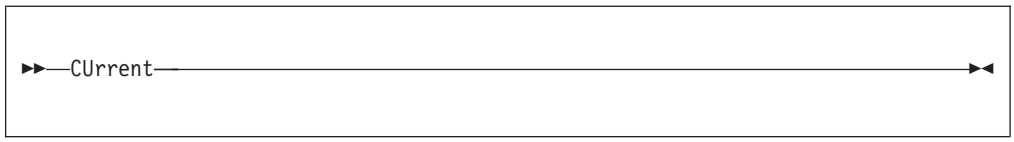
See "FCX176, Cached Control Units Screen – CTLUNIT" on page 562.

CURRENT

Purpose

The CURRENT subcommand causes data from the last measurement interval to be displayed. It is valid for all performance screens where the 'AVERAGE' subcommand can also be entered.

Format



Parameters

No parameters are allowed or tested for.

Usage

1. The CURRENT subcommand affects *all* other performance displays that can show both current and average data.

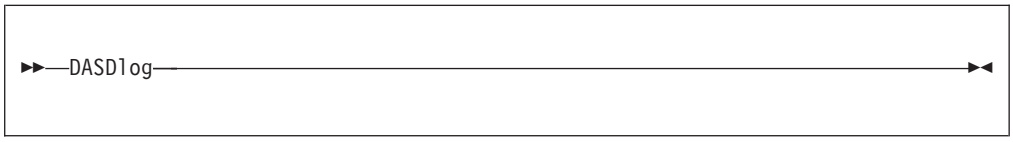
   Current data will be shown immediately on all screens which are based on CP monitor data, but current data for the other displays will be shown only when the next sample has been taken, so you may see no immediate effect of the subcommand having been executed.
2. See the AVERAGE (“AVERAGE” on page 137) and INTERIM (“INTERIM” on page 199) subcommands for an explanation of how to select averages for other periods.

DASDLOG

Purpose

The DASDLOG subcommand causes the DASD Performance Log Screen (FCX183) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

See “FCX183, DASD Performance Log Screen – DASDLOG” on page 580.

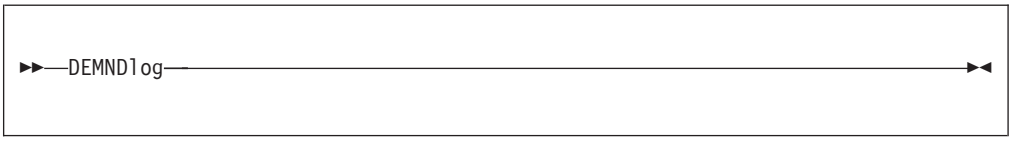
DEMNDLOG

Purpose

The DEMNDLOG command causes the Demand Scan Log Screen (FCX259) to be displayed.

This command applies only to monitor data from V6.2 and earlier releases.

Format



Parameters

No parameters are allowed or tested for.

Results

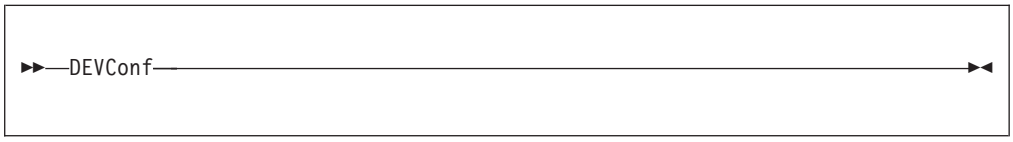
See “FCX259, Demand Scan Log Screen – DEMNDLOG” on page 744.

DEVCONF

Purpose

The DEVCONF subcommand causes the I/O Device Configuration Screen (FCX131) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

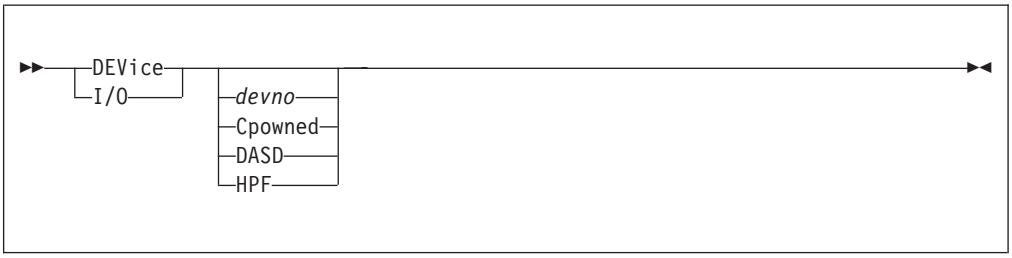
See “FCX131, I/O Device Configuration Screen – DEVCONF” on page 474.

DEVICE

Purpose

The DEVICE subcommand causes the I/O Device Details Screen (FCX110), the CP Owned Device Screen (FCX109), the General I/O Device Screen (FCX108), or the Device HPF Screen (FCX282) to be displayed, based on how you specify the subcommand. (See below.) 'I/O' is also accepted as a synonym for the DEVICE subcommand.

Format



Parameters

devno Displays the I/O Device Details Screen (FCX110) for the device with real device number *devno*.

Cpowned
Displays the CP Owned Device Screen (FCX109), which shows usage of system areas (paging, spooling, directory cylinders, T-disk space) and the paging and spooling activity on these areas.

DASD
Displays the General I/O Device Screen (FCX108), with only disks selected (instead of all devices) for which the monitor I/O domain has been enabled.

HPF Displays the HPF I/O Device Screen (FCX282) for all devices for which monitor I/O domain had been enabled.

If you specify the DEVICE subcommand with no parameters at all, the General I/O Device Screen (FCX108) will be displayed, for all devices.

Results

See "FCX108, General I/O Device Screen – DEVICE or DEVICE DASD" on page 400, if you specified DEVICE or DEVICE DASD.

See "FCX109, CP Owned Device Screen – DEVICE CPOWNED" on page 404, if you specified DEVICE CPOWNED.

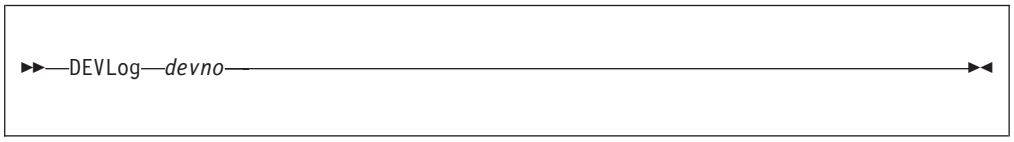
See "FCX110, I/O Device Details Screen – DEVICE *devno*" on page 408, if you specified DEVICE *devno*.

See "FCX282, HPF I/O Device Screen – DEVICE HPF" on page 789, if you specified DEVICE HPF .

DEVLOG

Purpose

The DEVLOG subcommand causes the General I/O Device Data Log Screen (FCX168) to be displayed for the selected I/O device.



Format

Parameters

devno Is the number of the I/O device for which the General I/O Device Data Log Screen (FCX168) is to be displayed.

Results

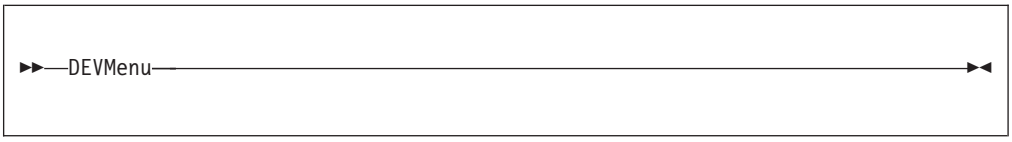
See "FCX168, General I/O Device Data Log Screen – DEVLOG" on page 549.

DEVMENU

Purpose

The DEVMENU subcommand causes the Device Report Selection Menu (FCX284) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

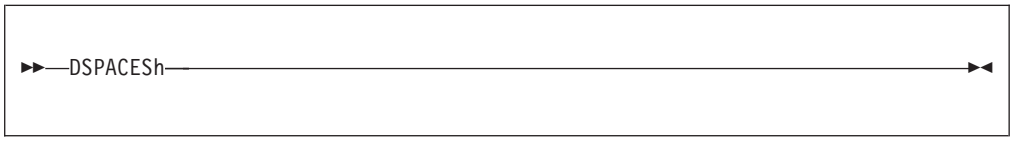
See “FCX284, I/O Device Data Selection Menu – DEVMENU” on page 792.

DSPACESH

Purpose

The DSPACESH subcommand causes the Shared Data Spaces Screen (FCX134) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

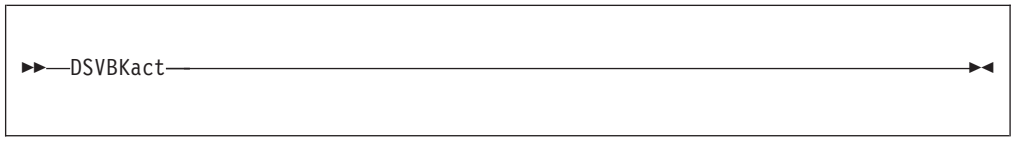
See “FCX134, Shared Data Spaces Screen – DSPACESH” on page 481.

DSVBKACT

Purpose

The DSVBKACT subcommand causes the Dispatch Vector Activity screen (FCX301) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

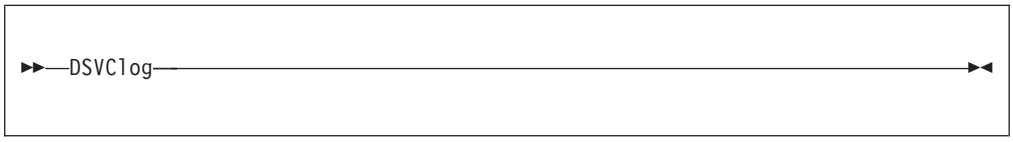
See “FCX301, Dispatch Vector Activity – DSVBKACT” on page 823.

DSVCLOG

Purpose

The DSVCLOG subcommand causes the Dispatch Vector Configuration Log screen (FCX300) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

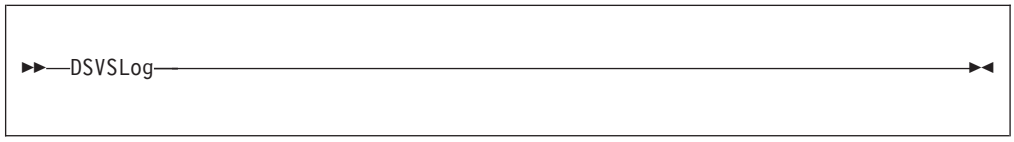
See “FCX300, Dispatch Vector Configuration Log – DSVCLOG” on page 821.

DSVSLOG

Purpose

The DSVSLOG subcommand causes the DSVBK Steals per Processor Log Screen (FCX303) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

See “FCX303, DSVBK Steals per Processor Log – DSVSLOG” on page 827.

EVNIC

Purpose

The EVNIC subcommand causes the Extended Virtual Network Device Activity Screen (FCX270) to be displayed. This screen pertains mostly to the array of OSA devices.

This screen will display performance data above and beyond that displayed by the VNIC subcommand. See "VNIC" on page 348 for more information.

For a summary of virtual network device definitions, see "GVNIC" on page 193.

Format

Parameters

No parameters are allowed or tested for.

Results

See "FCX270, Extended Virtual Network Device Activity Screen – EVNIC" on page 769.

EVSWITCH

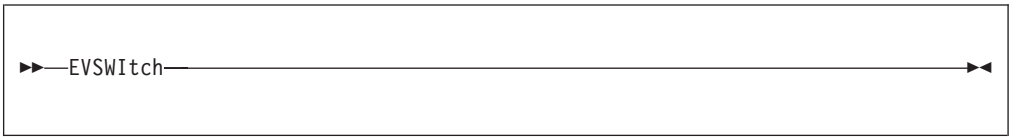
Purpose

The EVSWITCH subcommand causes the Extended Virtual Switch Activity Screen (FCX267) to be displayed.

This screen will display performance data above and beyond that displayed by the VSWITCH subcommand. See "VSWITCH" on page 349 for more information.

For a summary of VSWITCH definitions, see "GVSWITCH" on page 194.

Format



Parameters

No parameters are allowed or tested for.

Results

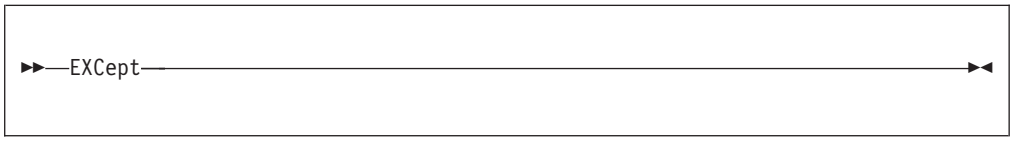
See "FCX267, Extended Virtual Switch Activity Screen – EVSWITCH" on page 762.

EXCEPT

Purpose

The EXCEPT subcommand causes the Exception Log Screen (FCX153) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

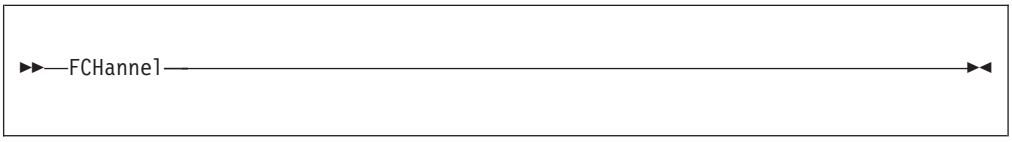
See “FCX153, Exception Log Screen – EXCEPT” on page 523.

FCHANNEL

Purpose

The FCHANNEL subcommand causes the FICON Channel Load Screen (FCX215) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

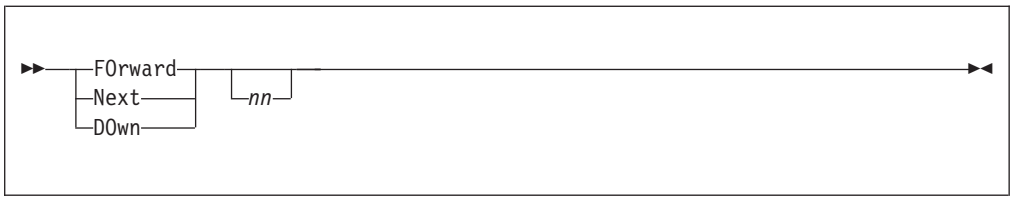
See “FCX215, FICON Channel Load Screen – FCHANNEL” on page 659.

FORWARD

Purpose

The FORWARD subcommand scrolls the selected performance monitor display forward, i.e. towards the end of the data. NEXT and DOWN are accepted as synonyms for the FORWARD subcommand.

Format



Parameters

nn Indicates the number of lines to be moved. The default scroll value is equal to the number of performance data lines (excluding header lines) on the current monitor display minus one, i.e. it depends on the performance screen being viewed.

Usage

1. Pressing PF8 or PF20 will also scroll the data forward for the default number of lines.

GRAPHDET / PLOTDET

Purpose

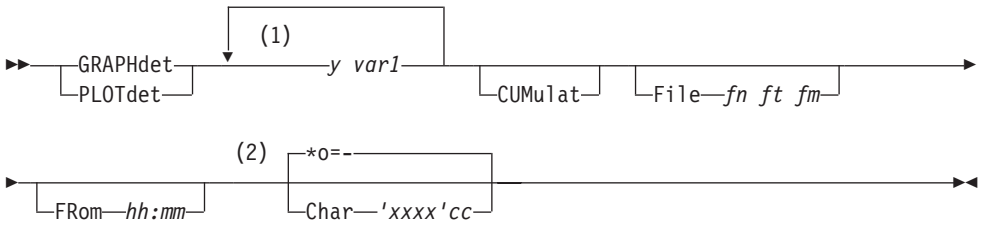
The GRAPHDET and PLOTDET subcommands allow displaying selected parts of the performance data accumulated in the monitor redisplay buffer or in one of the detailed history data logs in the form of history graphics or plots.

Both subcommands will create *detailed* history displays where elapsed time is plotted on the horizontal x-axis, while the corresponding values of up to four performance variables are plotted on the vertical y-scale. Data will be plotted for up to 140 measurements, where each plot position is determined by the average value of two consecutive measurements if the default monitor interval of 60 seconds is used. Only one measurement will be shown per plot position if the monitor interval is two minutes or more.

Two display modes are possible:

- The GRAPHDET subcommand requires GDDM services (Graphical Data Display Manager V.2 or 3) and a display terminal with graphics capability for generating and displaying real graphics output. It cannot operate without these prerequisites.
- The PLOTDET subcommand uses the same data, but it generates a simple plot using ordinary display characters for the output. It will work on any display terminal, and it has no additional software prerequisites.

Format



Notes:

1 Up to 4 times.

2 Valid with PLOTdet only, there is no effect when used with GRAPHdet.

Parameters

y-var1, y-var2, ...
define the variables whose values are to be plotted on the vertical y-axis.

All y-var names define performance variables from either the monitor redisplay screen (default), from a HISTLOG or PERFLOG file with general system performance data, or from an object's benchmark log file on disk.

See “REDISP” on page 260 (PERF*xxx* files), “REDHIST” on page 259 (HIST*xxx* files) for a list of performance variables and their description, or

see the description of the selected benchmark log display for information on the selectable performance variables (note that only numerical fields with load data can be selected).

You must enter the full variable names exactly as shown (no abbreviations allowed), except for the case of the maximum user fields ('Max. CPU', 'Max. Vector', ...) of PERFLOG and HISTLOG files where the first eight characters only need be entered. Do not enter the apostrophes: they have been included only to indicate that two words are required for selecting these values.

In addition to these basic performance variables you can also specify the names of any 'user variables' which you previously defined by means of the FC USERVAR subcommand.

CUMulat
Indicates that the y-variable values are to be plotted cumulatively, i.e. each value added to the previous one. The string '`Cumul.`' will be inserted above the y-axis when a cumulative display has been selected.

File *fn ft fm*
Describes the input file to be analyzed, when specified. Current REDISP data in storage will be assumed as input if no input file is specified.

The input file can be a detailed system performance log file (HISTLOG, PERFLOG or RMONLOG), a user benchmark log file (such as MTUSRLG, USERLOG, etc.), or one of the supported I/O device benchmark log files (CACHELG, DEVLOG, etc.).

Char *'xxxx'cc*
Defines the four plot characters to be used for the selected variables. This argument is intended for use with the PLOTDET subcommand only, it has no effect when used with GRAPHDET. Strings specified between apostrophes (') are interpreted as hexadecimal representation of special characters, i.e. the specification of `'f1f2f3'*` would result in the characters `123*` being used. Specification of plot characters in hex format allows the use of special graphic symbols for plotting, provided they are supported by the hardware. (Some terminal emulators used with work stations allow display of special symbols from the currently active code page, and some of these graphic symbols make very nice bar charts.) The default setting is '*o=-'. If less than four characters are defined, the corresponding default characters will be inserted for the remaining variables.

FRom *hh:mm*
Defines the starting time for plotting. If the specified time is not within the time frame of the measurements currently available in the redisplay buffer, the oldest measurements will be shown (first entries in buffer).

Results

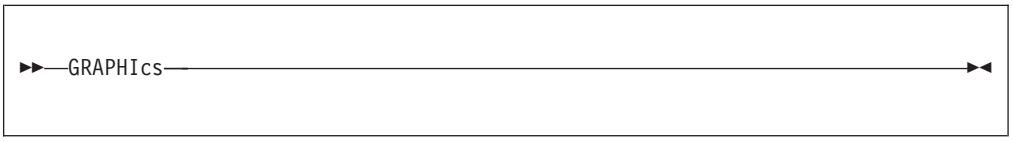
See “Detailed Performance History Display” on page 896 for more information on the specific displays caused by this subcommand, and Appendix A, “Graphical Displays of Performance History Data,” on page 889 for more general information.

GRAPHICS

Purpose

The GRAPHICS subcommand causes the Graphics Selection Menu (FCX128) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

See "Graphics Selection Menu" on page 892 for more information on this specific display, and Appendix A, "Graphical Displays of Performance History Data," on page 889 for more general information.

GRAPHSUM / PLOTSUM

Purpose

The GRAPHSUM and PLOTSUM subcommands allow selected parts of the performance data accumulated in the monitor redisplay buffer (default) or in one of the history data files to be displayed graphically.

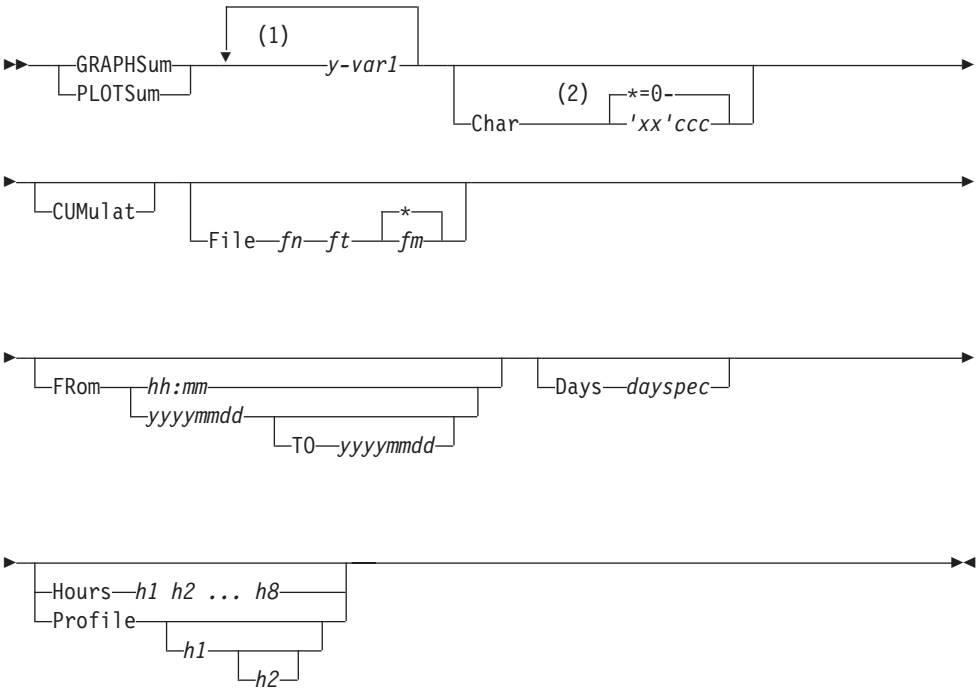
Both subcommands will create *summary* history displays where elapsed time is plotted on the horizontal x-axis, while the corresponding values of up to four performance variables are plotted on the vertical y-scale. The period for which data can be plotted depends on the source of the data:

- If data from the redisplay buffer (default), or from a detailed HISTLOG*n*, PERFLOG*n* or RMONLOG*n* file, or from an object's benchmark log file are plotted, each plot position represents the average of a 10-minute interval, and data for periods of up to 12 hours can be displayed on one screen.
- If data from a HISTSUM, PERFHIST or FCXTREND file are to be displayed, any desired period can be selected, and the x-scale will automatically be adapted to the number of days to be shown. Data for at least one day will be shown per plot position.

Two display modes are possible:

- The GRAPHSUM subcommand requires GDDM services (Graphical Data Display Manager V.2 or 3) and a display terminal with graphics capability for generating and displaying real graphics displays. It cannot operate without these prerequisites.
- The PLOTSUM subcommand uses the same data, but it generates a simple plot using ordinary display characters for the output. It will work on any display terminal, and it has no additional software prerequisites.

Format



Notes:

1 Specify up to 4 times.

2 Valid with PLOTSum only, there is no effect when used with GRAPHSum.

Parameters

y-var1 Defines the variables whose values are to be plotted on the vertical y-axis.

All y-var names define performance variables from the monitor redisplay screen (default), from PERFLOG/PERFHIST, HISTLOG/HISTSUM or FCXTREND files with general system performance data, or from an object's benchmark log file on disk.

Char *'xx'ccc*

Defines the four plot characters to be used for the selected variables. This argument is intended for use with the PLOTSUM subcommand only, it has no effect when used with GRAPHSUM. Strings specified between apostrophes (') are interpreted as hexadecimal representation of special characters, i.e. the specification of `'f1f2f3'*` would result in the characters `123*` being used. Specification of plot characters in hex format allows the use of special graphic symbols for plotting, provided they are supported by the hardware. (Some terminal emulators used with work stations allow display of special symbols from the currently active code page, and some of these graphic symbols make very nice bar charts.) The default setting is '*o=-'. If less than four characters are defined, the default characters will be inserted for the remaining variables.

CUMulat
Indicates that the y-variable values are to be plotted cumulatively, i.e. each value added to the previous one. The string '`Cumul.`' will be inserted above the y-axis when a cumulative display has been selected.

File *fn ft*
Describes the input file to be analyzed. The input file can be a detailed system performance log file (HISTLOG, PERFLOG or RMONLOG), a summary system performance data file 'ACUM HISTSUM' (new format) or 'ACUM PERFHIST' (old format), with one record per hour, or a trend file '*systemid* FCXTREND'. User benchmark log files (such as MTUSRLG, USERLOG, etc.), or one of the supported I/O device benchmark log files (CACHELG, DEVLOG, etc.) can also be processed. *The current redisplay buffer will be used as source if no disk file is specified as input.*

fm Defines the file mode of the source file. It is required only if several files with identical file names and file types are currently accessed on different disks.

FRom *hh:mm*
Defines the starting time for plotting when either a detailed performance log file is used as source data, or when data from the current redisplay buffer are to be analyzed. The time entered must have exactly this format, i.e. two numbers each for hours and minutes, separated by a colon.

FRom *yyyymmdd*

Defines the starting date (year, month and day) for data analysis when data from a condensed summary data file (HISTSUM, PERFHIST or FCXTREND) are to be analyzed. The date entered must have exactly this format, i.e. four digits for the year, and two digits each for month and day, without any intervening blanks. The format *mmddyy* used in previous releases of the program is also accepted.

Analysis will begin with the first data record found if no 'FROM' date has been entered.

TO *yyyymmdd*
Defines the last day for which data are to be included in the analysis when data from a condensed summary data file (HISTSUM, PERFHIST or FCXTREND) are to be analyzed. Analysis will continue to the end of the file if the 'TO' argument is omitted.

Days *dayspec*
Defines a selection of weekdays for which data are to be analyzed, where *dayspec* can be a combination of the following strings:

ALL If all weekdays are to contribute to the analysis

M-F If only the normal workdays Monday to Friday are to contribute data

MON If all Mondays are to contribute data

TUE If all Tuesdays are to contribute data

WED If all Wednesdays are to contribute data

THU If all Thursdays are to contribute data

FRI If all Fridays are to contribute data

SAT If all Saturdays are to contribute data

SUN If all Sundays are to contribute data

The argument is valid only when analyzing a condensed summary data file (HISTSUM or PERFHIST) or an FCXTREND file; *all* data will be analyzed when it is omitted.

When specified, only performance data collected for the selected weekdays are used for calculating the averages which will eventually be plotted.

For example, specifying 'DAYS M-F SAT' will cause data to be selected for the weekdays Monday to Saturday, excluding any data for Sundays.

Hours *h1 h2 ... h8*
Defines a selection of up to eight one-hour intervals for which data are to be analyzed. The argument is valid only when analyzing a condensed summary data file (HISTSUM, PERFHIST or FCXTREND).

When specified, only performance data collected for the selected hours are used for calculating the averages which will eventually be plotted.

For example, specifying 'HOURS 9 10 14 15' will cause data to be selected for the periods of 09:00-10:59 and 14:00-15:59, for each of the days previously selected with the 'FROM' and 'TO' arguments.

All hours for which data are available will be included when the HOURS argument is not specified.

Profile {*h1* {*h2*}}
Specifies that the accumulated data are to be plotted in the form of a performance 'profile' which shows how system load varied during an average day of the period selected with the 'FROM' and 'TO' arguments. The argument is valid only when analyzing a condensed summary data file (HISTSUM, PERFHIST or FCXTREND).

h1 **and** *h2*
When specified, define the first and last hours of the day for which data are to be plotted. The default is 0 to 23, i.e. system load will be inserted for all 24 hours of the day.

The PROFILE and HOURS arguments are mutually exclusive.

Usage

1. See “REDISP” on page 260 (PERF*xxx* files), “REDHIST” on page 259 (HIST*xxx* files) or Appendix G, “Trend File Variables Selection,” on page 923 (*systemid* FCXTREND files) for a list of performance variables and their description that are available with these files, and see the description of the selected benchmark log display for information on the selectable performance variables (note that only numerical fields with load data can be selected).
2. You must enter the full variable names exactly as shown (no abbreviations allowed), except for the case of the maximum user fields ('Max. CPU', 'Max. Vec', ...) of PERFLOG and PERFHIST files where the first eight characters only need be entered. Do not enter the apostrophes, they have been included only to indicate that two words are required for selecting these values.
3. In addition to these basic performance variables you can also specify the names of any 'user variables' which you previously defined by means of the FC USERVAR subcommand.

Results

See “Summary Performance History Display” on page 898 for more information on the specific displays caused by this subcommand, and Appendix A, “Graphical Displays of Performance History Data,” on page 889 for more general information.

GRAPHVAR / PLOTVAR

Purpose

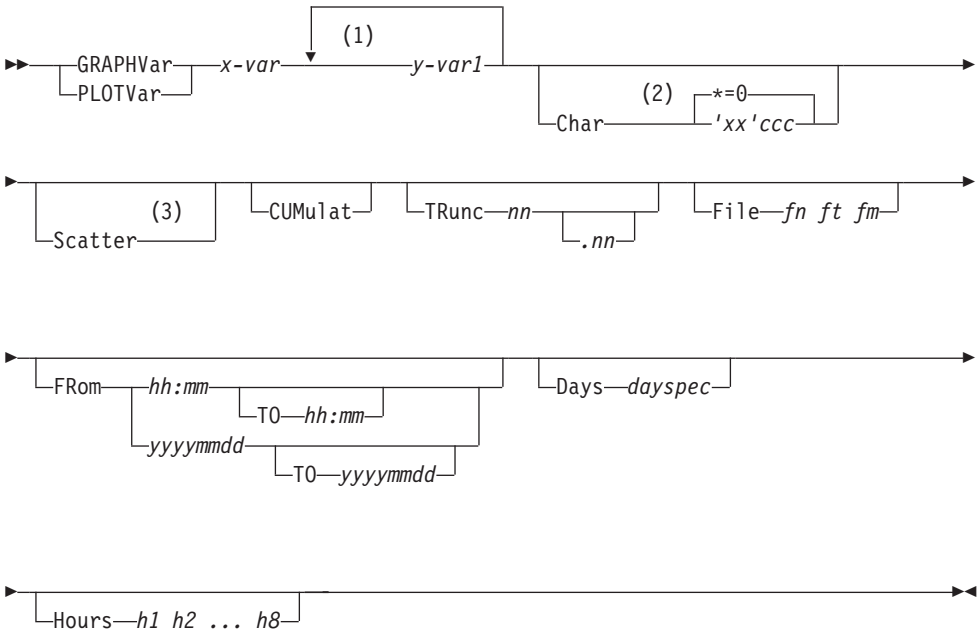
The GRAPHVAR and PLOTVAR subcommands allow selected parts of the performance data accumulated in the monitor redisplay buffer (default) or in one of the history data files on disk to be displayed graphically in the form of variable correlation graphics.

Both subcommands will generate correlation graphics which show how different performance variables depend on each other: any of the performance variables can be selected to be plotted on the horizontal x-axis, and up to three other variables can then be selected as y-variables and their average values plotted for the corresponding value of the x-variable.

Two display modes are possible:

- The GRAPHVAR subcommand requires a display terminal with graphics capability and GDDM services (Graphical Data Display Manager V.2 or 3) for generating and displaying real graphics displays. It cannot operate without these prerequisites.
- The PLOTVAR subcommand uses the same data, but it generates a simple plot using ordinary display characters for the output. It will work on any display terminal, and it has no additional software prerequisites.

Format



Notes:

1 Up to 3 times is allowed.

2 Valid with PLOTVar only, there is no effect when used with GRAPHVar.

3 This is only valid with GRAPHVar.

Parameters

Most of the arguments which can be used with the GRAPHVAR and PLOTVAR subcommands are identical to the ones used with GRAPHSUM and PLOTSUM. Only an abbreviated overview is given for these arguments, please refer to "GRAPHSUM / PLOTSUM" on page 184 for a more detailed description.

x-var Defines the variable whose values are to be plotted on the horizontal x-axis.

y-var1 Define the variables whose values are to be plotted on the vertical y-axis.

Char *'xxxx'cc*

Defines the four plot characters to be used for the selected variables. This argument is intended for use with the PLOTVAR subcommand only, it has no effect when used with GRAPHVAR.

Scatter

Specifies that a 'scatter plot' type of graphics is to be generated, showing *all* measured values, and not just grouped averages. The argument is valid only if a single y-variable has been selected, and only for GDDM graphics (GRAPHVAR subcommand).

CUMulat
Indicates that the y-variable values are to be plotted cumulatively, i.e. each value added to the previous one. The string '`Cumul.`' will be inserted above the y-axis when a cumulative display has been selected.

TRunc *nn*{**.***nn*}
Defines the max. x-scale value to be used for plotting.

The x-scale is automatically adapted to show the majority of the data in a reasonable scale, with the highest few x-values ignored, if necessary. The TRUNC argument is intended for overriding this default logic where it does not yield good results, because some very high x-values would still cause the x-scale to be compressed until the bulk of the really relevant data can no longer be adequately displayed.

The actual scale used will usually still include x-values which are a bit higher than the TRUNC value.

File *fn ft*
Describes the input file to be analyzed, when specified. You can choose from the same files that can also serve as input for the GRAPHSUM subcommand.

The current redisplay buffer will be used as source if no disk file is specified as input.

fm Defines the filemode of the source file.

FRom *hh:mm*
Defines the starting time for plotting when either a detailed performance log file is used as source data, or when data from the current redisplay buffer are to be analyzed. The time entered must have exactly this format, i.e. two numbers each for hours and minutes, separated by a colon.

To *hh:mm*
Defines the time stamp of the last record to be used for data analysis. This format is valid only when either a detailed performance log file is used as source data, or when data from the current redisplay buffer are to be analyzed.

FRom *yyyymmdd*
Defines the starting date (year, month and day) when data from a condensed summary data file (ACUM HISTSUM or ACUM PERFHIST) or from a trend file '*systemid* FCXTREND' are to be analyzed.

The date entered must have exactly this format, i.e. four digits for the year, and two digits each for month and day, without any intervening blanks. The format *mmddyy* used in previous releases of the program is also accepted. Analysis will begin with the first data record found if no 'FROM' date has been entered.

To *yyyymmdd*
Defines the last day for which data are to be included in the analysis. This format is valid only when data from a condensed summary data file (ACUM HISTSUM or ACUM PERFHIST) or from a trend file '*systemid* FCXTREND' are to be analyzed. Analysis will continue to the end of the history file if the 'TO' argument is omitted.

Days *dayspec*
Defines a selection of weekdays for which data are to be analyzed, where *dayspec* can be a combination of the following strings:

ALL If all weekdays are to contribute to the analysis

M-F If only the normal workdays Monday to Friday are to contribute data

MON If all Mondays are to contribute data

TUE If all Tuesdays are to contribute data

WED If all Wednesdays are to contribute data

THU If all Thursdays are to contribute data

FRI If all Fridays are to contribute data

SAT If all Saturdays are to contribute data

SUN If all Sundays are to contribute data

The argument is valid only when analyzing a condensed summary data file (HISTSUM or PERFHIST) or a trend file '*systemid* FCXTREND'; *all* data will be analyzed when it is omitted. When specified, only performance data collected for the selected weekdays are used for calculating the averages which will eventually be plotted.

For example, specifying `'DAYS M-F SAT'` will cause data to be selected for the weekdays Monday to Saturday, excluding any data for Sundays.

Hours *h1 h2 ... h8*

Defines a selection of up to eight one-hour intervals for which data are to be analyzed. This argument is valid only when data from a condensed summary data file (ACUM HISTSUM or ACUM PERFHIST) or from a trend file '*systemid* FCXTREND' are to be analyzed.

All hours for which data are available will be included when the HOURS argument is not specified.

Note that the purpose of creating variable correlation plots is usually to show such correlations over a wide range of x-variable values. Restricting analysis to selected hours only is not normally conducive to this result, and the HOURS argument should be used only after careful evaluation (e.g. to eliminate specific periods from analysis where system load is atypical because of some special tasks, such as saves, being performed).

Results

See “Variable Correlation Display with Simple Plot” on page 901 and “Variable Correlation Display Using GDDM Graphics” on page 902 for more information on the specific displays caused by this subcommand, and Appendix A, “Graphical Displays of Performance History Data,” on page 889 for more general information.

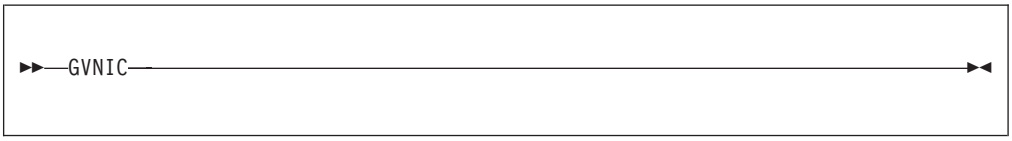
GVNIC

Purpose

The GVNIC subcommand causes the General Virtual Network Device Description Screen (FCX268) to be displayed.

To see performance data for virtual network devices, see "VNIC" on page 348 and "EVNIC" on page 176.

Format



Parameters

No parameters are allowed or tested for.

Results

See "FCX268, General Virtual Network Device Description Screen – GVNIC" on page 764.

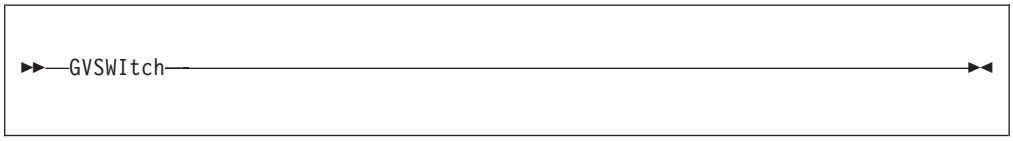
GVSWITCH

Purpose

The GVSWITCH subcommand causes the General Virtual Switch Description Screen (FCX266) to be displayed.

To view performance data for VSWITCH, see "VSWITCH" on page 349 and "EVSWITCH" on page 177.

Format



Parameters

No parameters are allowed or tested for.

Results

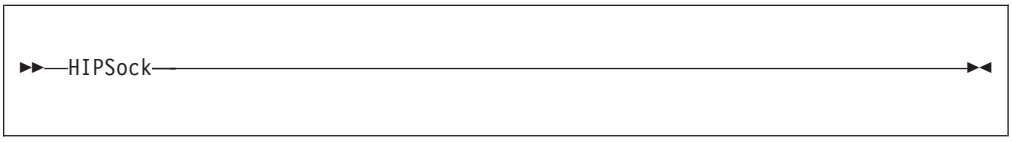
See "FCX266, General Virtual Switch Description Screen – GVSWITCH" on page 759.

HIPSOCK

Purpose

The HIPSOCK subcommand causes the Hipersocket Channel Activity Screen (FCX231) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

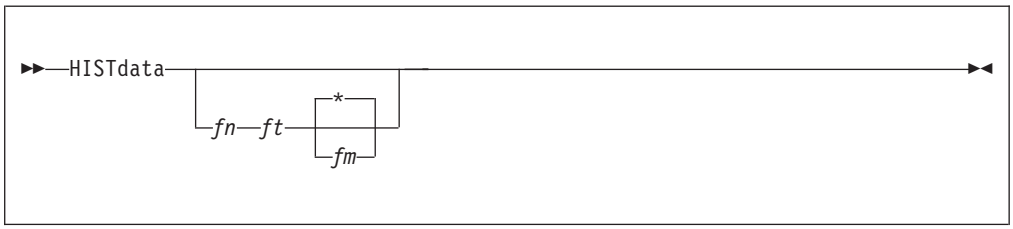
See “FCX231, Hipersocket Channel Activity Screen – HIPSOCK” on page 696.

HISTDATA

Purpose

The HISTDATA subcommand causes the History Data Selection Menu (FCX160) to be displayed. This menu will list all (or a subset) of the detailed and summary performance history files created by Performance Toolkit which you have access to. It can be entered not only in MONITOR mode but also in basic mode.

Format



Parameters

fn Is the file name of the performance history file(s).

ft Is the file type of the performance history file(s). Default file types which will be selected are the general history files FCXTREND, HISTLOG*, HISTSUM, PERFLOG*, RMONLOG* and PERFHIST, and also any object's benchmark log files with default file types.

Note: Specific file types can be selected to display a subset of all history files, but you can only select files whose file types match the original naming conventions. For example, if anything other than the appended generation number of log files is changed in the file type, the file will no longer be included in the display.

fm Is the file mode of the performance history file(s).

Usage

1. Asterisks can be used in the same way as for the CMS LISTFILE command when specifying the file name, file type and file mode.

Results

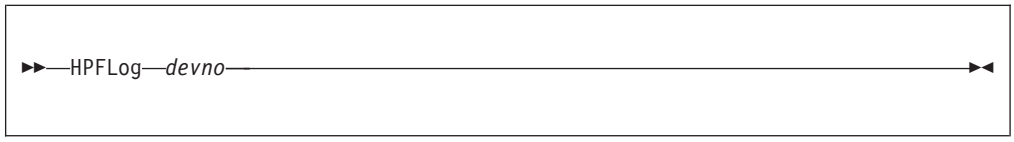
See the "Viewing Performance History Data" section in the *z/VM: Performance Toolkit Guide* for more information on the History Data Selection Menu.

HPFLOG

Purpose

The HPFLOG subcommand causes HPF I/O Device Data Log Screen (FCX283) to be displayed for the selected I/O device.

Format



Parameters

devno Is the real device number for which information should be displayed on the HPF I/O Device Data Log Screen (FCX283).

Results

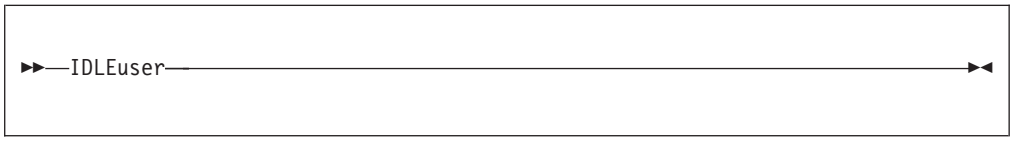
See "FCX283, HPF I/O Device Performance Log Screen – HPFLOG" on page 791.

IDLEUSER

Purpose

The IDLEUSER subcommand causes the Idle Users Screen (FCX238) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

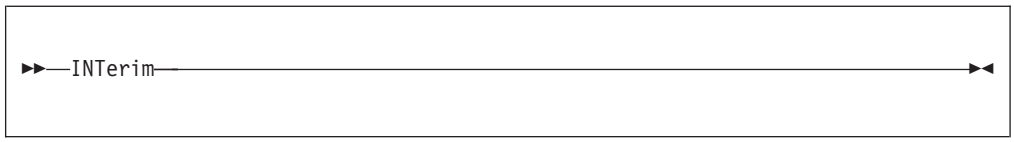
See “FCX238, Idle Users Screen – IDLEUSER” on page 709.

INTERIM

Purpose

The INTERIM subcommand allows many performance screens to be switched from a display of the last intervals or overall average data to the display of 'interim' averages based on all measurements made during the current 'interim' period.

Format



Parameters

No parameters are allowed or tested for.

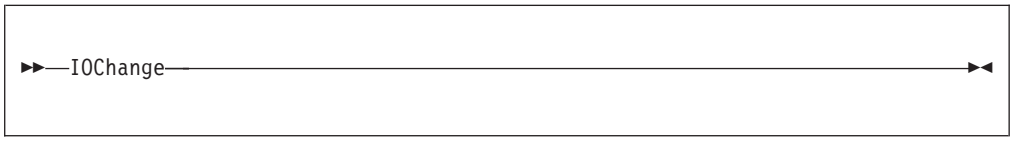
See the “CURRENT” on page 165 and “AVERAGE” on page 137 subcommands for an explanation of how to select averages for other periods.

IOCHANGE

Purpose

The IOCHANGE subcommand causes the I/O Configuration Changes Screen (FCX185) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Usage

1. The user identification shown for the 'attach' and 'detach' cases is not provided as part of the I/O event records. It is extracted from the next normal I/O sample record for the device – in other words:
   - The userid insertion may be delayed
   - A valid userid cannot be inserted if the I/O device is attached and detached within the same sample interval.

   A string of eight question marks will then be shown instead of the virtual machine's user identification.

Results

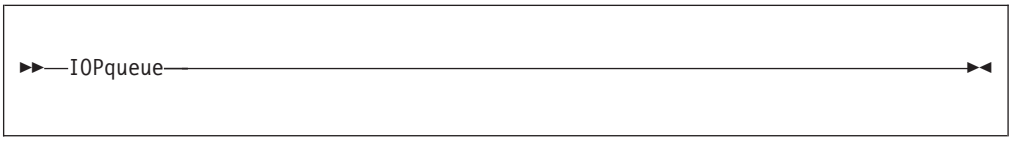
See “FCX185, I/O Configuration Changes Screen – IOCHANGE” on page 582.

IOPQUEUE

Purpose

The IOPQUEUE subcommand causes the I/O Priority Queueing Screen (FCX237) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

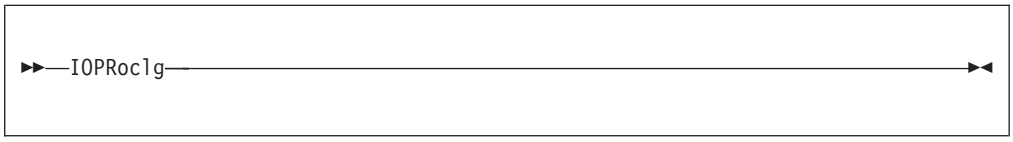
See “FCX237, I/O Priority Queueing Screen – IOPQUEUE” on page 707.

IOPROCLG

Purpose

The IOPROCLG subcommand causes the I/O Processor Log Screen (FCX232) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

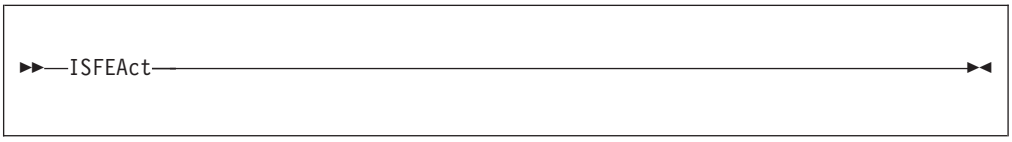
See “FCX232, I/O Processor Log Screen – IOPROCLG” on page 698.

ISFEACT

Purpose

The ISFEACT subcommand causes the ISFC End Point activity screen (FCX273) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

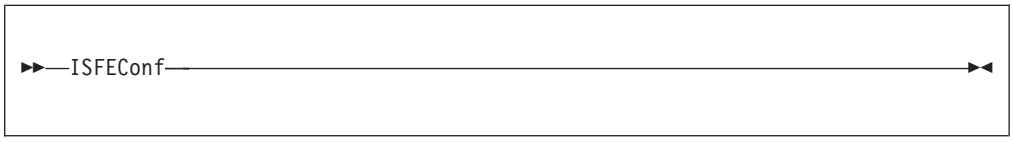
See “FCX273, ISFC End Point Activity – ISFEACT” on page 775.

ISFECONF

Purpose

The ISFECONF subcommand causes the ISFC End Point configuration screen (FCX272) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

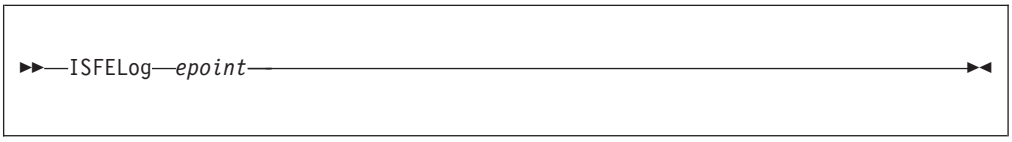
See “FCX272, ISFC End Point Configuration – ISFECONF” on page 772.

ISFELOG

Purpose

The ISFELOG *epoint* subcommand causes the ISFC End Point Activity Log Screen (FCX279) to be displayed for a selected ISFC end point.

Format



Parameters

epoint Is the ISFC end point hexadecimal number for which the ISFC End Point Activity Log Screen (FCX279) is to be displayed.

Results

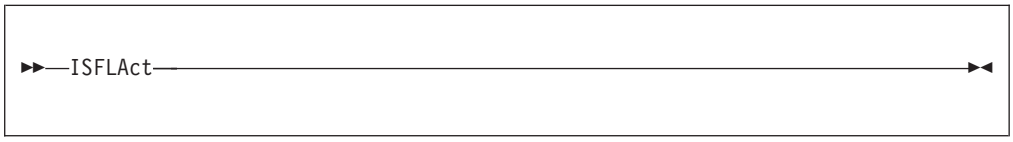
See "FCX279, ISFC End Point Activity Log – ISFELOG *epoint*" on page 786.

ISFLACT

Purpose

The ISFLACT subcommand causes the ISFC Logical Link activity screen (FCX274) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

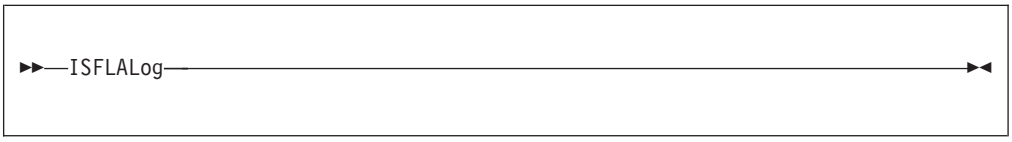
See “FCX274, ISFC Logical Link Activity – ISFLACT” on page 777.

ISFLALOG

Purpose

The ISFLALOG subcommand causes the ISFC Logical Link Activity Log Screen (FCX281) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

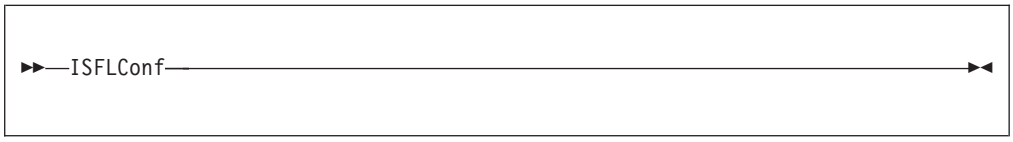
See “FCX281, ISFC Logical Link Activity By-Time Log – ISFLALOG” on page 788.

ISFLCONF

Purpose

The ISFLCONF subcommand causes the ISFC Logical Link configuration screen (FCX275) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

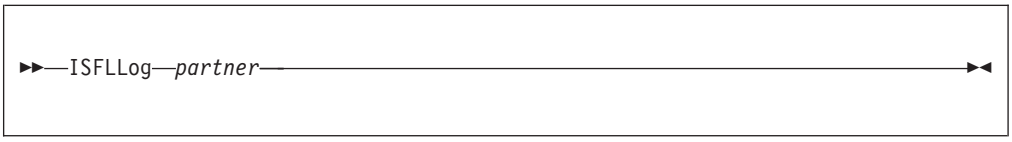
See “FCX275, ISFC Logical Link Configuration – ISFLCONF” on page 779.

ISFLLOG

Purpose

The ISFLLOG subcommand causes the ISFC Logical Link Activity Log Screen (FCX280) to be displayed for a selected ISFC logical link.

Format



Parameters

partner
: Is the ISFC logical link identification for which the ISFC Logical Link Activity Log Screen (FCX280) is to be displayed.

Results

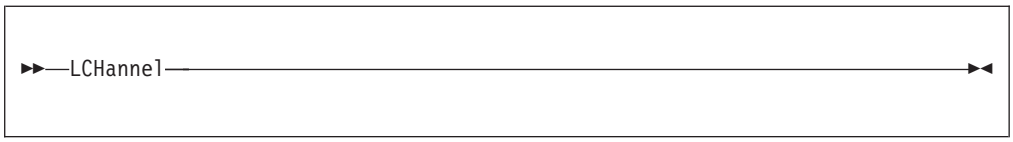
See "FCX280, ISFC Logical Link Activity Log – ISFLLOG *partner*" on page 787.

LCHANNEL

Purpose

The LCHANNEL subcommand causes the LPAR Channel Load Screen (FCX161) to be displayed, which, on an LPAR system, shows channel load caused by your own logical partition.

Format



Parameters

No parameters are allowed or tested for.

Results

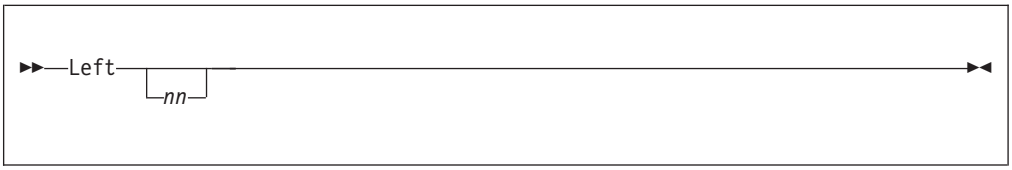
See “FCX161, LPAR Channel Load Screen – LCHANNEL” on page 541.

LEFT

Purpose

The LEFT subcommand moves the display window of the performance monitor re-display screen and of the PLOTDET screen to the left.

Format



Parameters

nn Indicates the number of columns by which data are to be moved. The default shift value is 40 for the REDISPLAY screen and 60 measurements (approximately one hour) for the PLOTDET display.

Usage

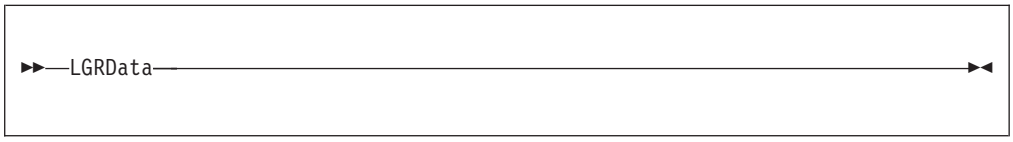
1. Pressing PF10 or PF22 will also shift the display window left by the default number of columns.

LGRDATA

Purpose

The LGRDATA subcommand causes the LGR Data Screen (FCX286) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

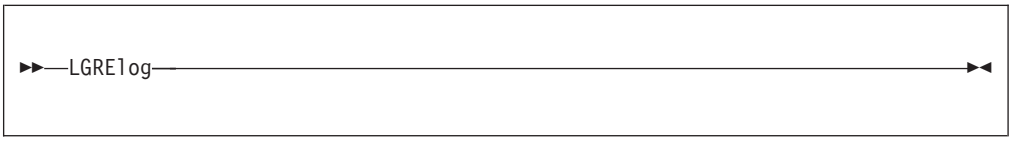
See “FCX286, LGR Data Screen – LGRDATA” on page 796.

LGRELOG

Purpose

The LGRELOG subcommand causes the LGR Event Log Screen (FCX285) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

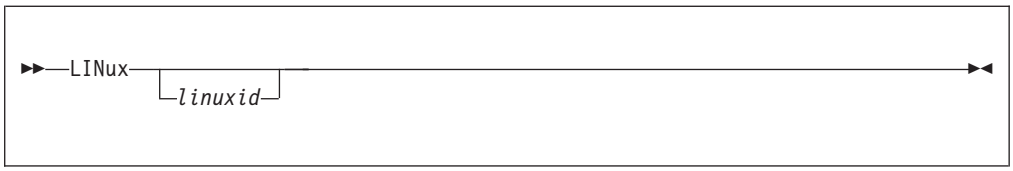
See “FCX285, LGR Event Log Screen – LGRELOG” on page 793.

LINUX

Purpose

The LINUX subcommand causes either the Linux Details Selection Screen (FCX224) or the Linux Systems Selection Screen (FCX223) to be displayed, based on whether you specify a *linuxid*.

Format



Parameters

linuxid

Is the identification of a Linux system for which performance data are to be displayed. The Linux Details Selection Screen (FCX224) will be shown for the selected Linux system.

The Linux Systems Selection Screen (FCX223) will be shown if you enter the LINUX subcommand with no *linuxid*.

Usage

1. In the Linux Systems Selection Screen (FCX223), the appearance of highlighted Linux guests is based on the definitions made in the FCONX LINUXUSR file. This does *not* guarantee that the RMF PM interface required for detail data retrieval is available for these Linux guests. To prevent misleading entries, users should include only those RMF PM interface IP addresses of Linux guests whose interfaces are always up and running while the guests are logged on.

Results

See "FCX223, Linux Systems Selection Screen – LINUX" on page 679 if you specified LINUX.

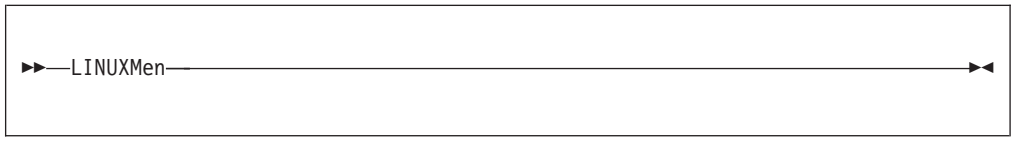
See "FCX224, Linux Details Selection Screen – LINUX *linuxid*" on page 680 if you specified LINUX *linuxid*.

LINUXMEN

Purpose

The LINUXMEN subcommand causes the Linux Data Selection Menu (FCX242) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

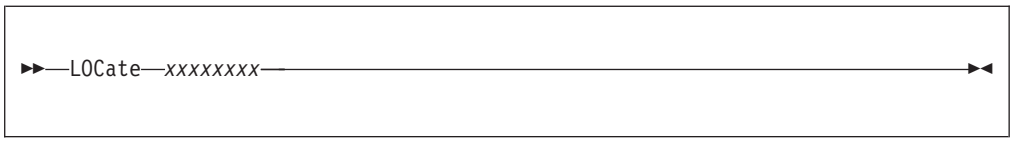
See “FCX242, Linux Data Selection Menu – LINUXMEN” on page 716.

LOCATE

Purpose

The LOCATE subcommand causes DIAG X'90' to be issued for locating the entry point specified. When found, its address will be displayed with message FCXCMD380I.

Format



Parameters

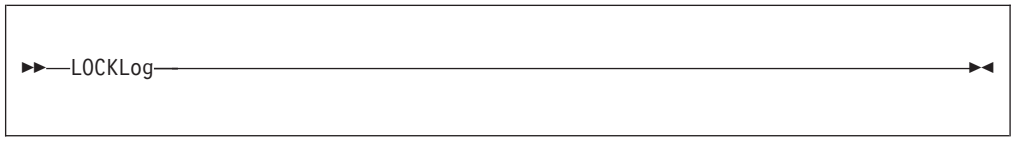
xxxxxxxx
Is the name of the CP module's entry point.

LOCKLOG

Purpose

The LOCKLOG command causes the Spin Lock Log Screen (FCX265) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

See “FCX265, Spin Lock Log Screen – LOCKLOG” on page 757.

LPAR

Purpose

The LPAR subcommand causes the LPAR Load Screen (FCX126) to be displayed.

Format

Parameters

No parameters are allowed or tested for.

Results

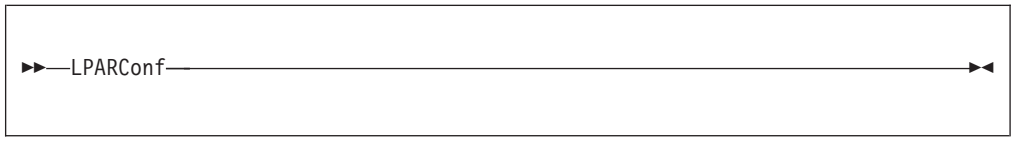
See “FCX126, LPAR Load Screen – LPAR” on page 463.

LPARCONF

Purpose

The LPARCONF subcommand causes the LPAR Configuration Log Screen (FCX235) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

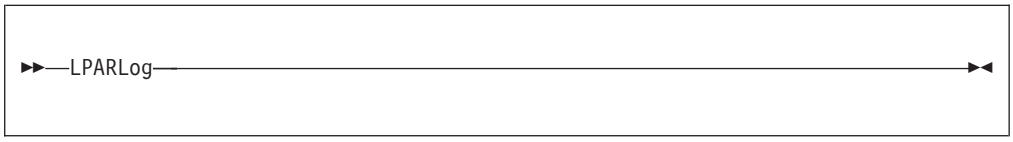
See “FCX235, LPAR Configuration Log Screen – LPARCONF” on page 704.

LPARLOG

Purpose

The LPARLOG command causes the LPAR Load Log Screen (FCX202) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

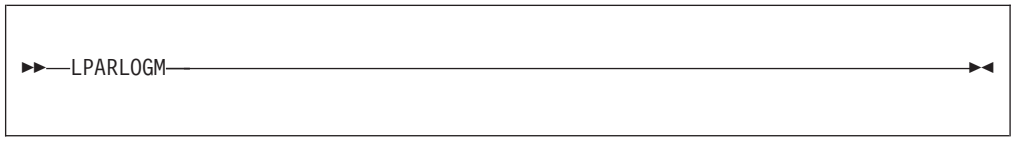
See “FCX202, LPAR Load Log Screen – LPARLOG” on page 630.

LPARLOGM

Purpose

The LPARLOGM subcommand causes the Logical Partition Logs Selection Menu (FCX307) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

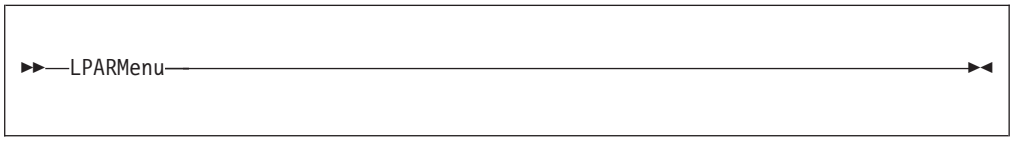
See “FCX307, Logical Partition Logs Menu – LPARLOGM” on page 835.

LPARMENU

Purpose

The LPARMENU subcommand causes the LPAR Activity Data Selection Menu (FCX305) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

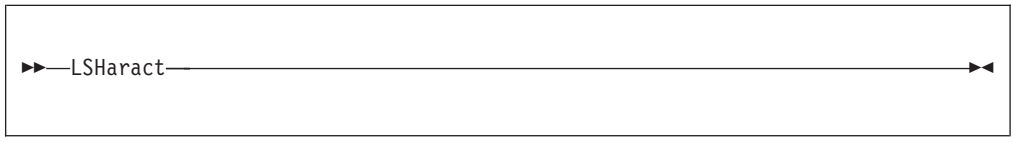
See “FCX305, Logical Partition Activity Menu – LPARMENU” on page 832.

LSHARACT

Purpose

The LSHARACT subcommand causes the Logical Partition Share Screen (FCX306) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

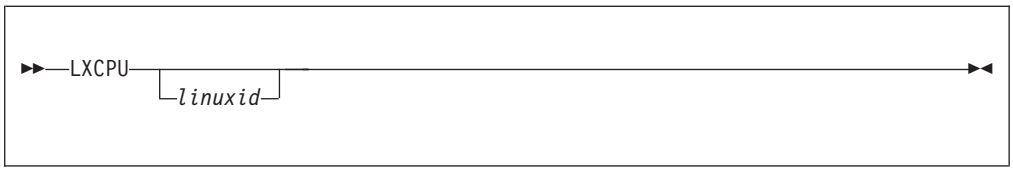
See “FCX306, Logical Partition Share Screen – LSHARACT” on page 833.

LXCPU

Purpose

The LXCPU subcommand causes either the Linux CPU Utilization Screen (FCX230) or the General Linux CPU Utilization Screen (FCX243) to be displayed, based on whether you specify a *linuxid*.

Format



Parameters

linuxid

Is the identification of a Linux system for which the detailed RMF PM data gatherer-based Linux CPU Utilization Screen (FCX230) is to be displayed.

The General Linux CPU Utilization Screen (FCX243) will be shown if you enter the LXCPU subcommand with no *linuxid*.

Usage

1. Please be aware that Linux internal data collection is not synchronized with CP's data collect activity, i.e. the Linux internal data will usually have been obtained for a different period than that used for collecting other VM data. This may lead to discrepancies between the internal Linux values and the VM activity seen from the outside.
2. Linux systems determine CPU utilization in the form of statistical data, as the number of times a processor was found in a certain state when sampled. This sampling logic does not work correctly for current Linux kernels when running under control of VM where the time during which a guest is 'suspended' (attempting to run, but not being dispatched) is not correctly accounted for, and this can lead to an apparent 'CPU utilization' that may be far too high, especially on CPU constrained systems. See "FCX112, User Resource Usage Screen – USER" on page 420 for accurate real CPU utilization numbers, as seen by VM.
3. In the General Linux CPU Utilization Screen (FCX243), the appearance of highlighted Linux guests is based on the definitions made in the FCONX LINUXUSR file. This does *not* guarantee that the RMF PM interface required for detail data retrieval is available for these Linux guests. To prevent misleading entries, users should include only those RMF PM interface IP addresses of Linux guests whose interfaces are always up and running while the guests are logged on.

Results

See "FCX243, General Linux CPU Utilization Screen – LXCPU" on page 717 if you specified LXCPU.

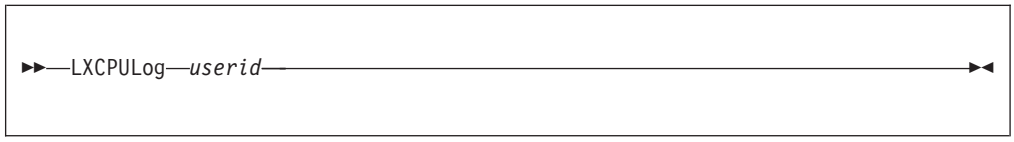
See "FCX230, Linux CPU Utilization Screen – LXCPU *linuxid*" on page 694 if you specified LXCPU *linuxid*.

LXCPULOG

Purpose

The LXCPULOG subcommand causes the Linux CPU Load Log (FCX246) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the Linux guest machine for which the Linux CPU Load Log (FCX246) is to be displayed.

Results

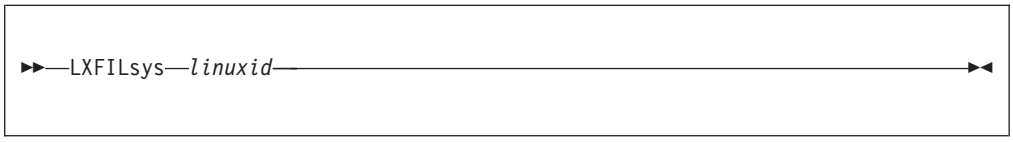
See "FCX246, Linux CPU Load Log Screen – LXCPULOG" on page 724.

LXFILSYS

Purpose

The LXFILSYS subcommand causes the Linux Filesystem Usage Screen (FCX228) to be displayed.

Format



Parameters

linuxid
: Is the identification of a Linux system for which detailed RMF PM data gatherer based Linux Filesystem Usage Screen (FCX228) is to be displayed.

Results

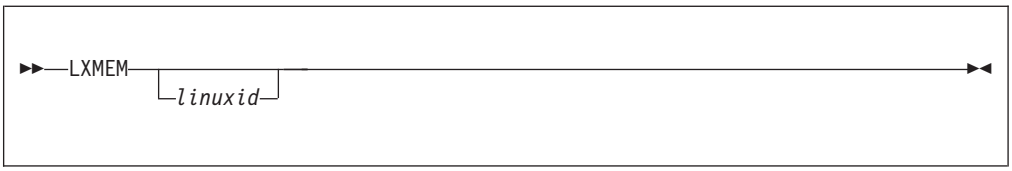
See "FCX228, Linux Filesystem Usage Screen – LXFILSYS" on page 689.

LXMEM

Purpose

The LXMEM subcommand causes either the Linux Memory Utilization and Activity Screen (FCX229) or the General Linux Memory Utilization Screen (FCX244) to be displayed, based on whether you specify a *linuxid*.

Format



Parameters

linuxid

Is the identification of a Linux system for which the detailed RMF PM data gatherer-based Linux Memory Utilization and Activity Screen (FCX229) is to be displayed.

The General Linux Memory Utilization Screen (FCX244) will be shown if you enter the LXMEM subcommand with no *linuxid*.

Usage

1. Please be aware that Linux internal data collection is not synchronized with CP's data collect activity, i.e. the Linux internal data will usually have been obtained for a different period than that used for collecting other VM data. This may lead to discrepancies between the internal Linux values and the VM activity seen from the outside.
2. In the General Linux Memory Utilization Screen (FCX244), the appearance of highlighted Linux guests is based on the definitions made in the FCONX LINUXUSR file. This does *not* guarantee that the RMF PM interface required for detail data retrieval is available for these Linux guests. To prevent misleading entries, users should include only those RMF PM interface IP addresses of Linux guests whose interfaces are always up and running while the guests are logged on.

Results

See "FCX244, General Linux Memory Utilization Screen – LXMEM" on page 719 if specified LXMEM.

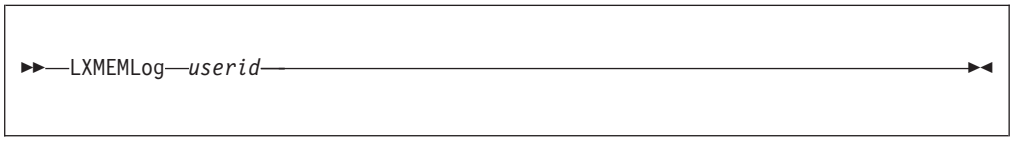
See "FCX229, Linux Memory Utilization and Activity Screen – LXMEM *linuxid*" on page 691 if specified LXMEM *linuxid*.

LXMEMLOG

Purpose

The LXMEMLOG subcommand causes the Linux Memory Utilization Log Screen (FCX247) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the Linux guest machine for which the Linux Memory Utilization Log Screen (FCX247) is to be displayed.

Results

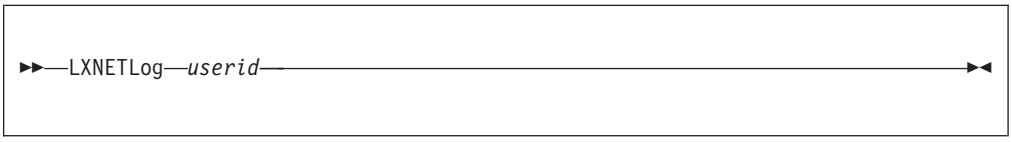
See "FCX247, Linux Memory Utilization Log Screen – LXMEMLOG" on page 725.

LXNETLOG

Purpose

The LXNETLOG subcommand causes the Linux Network Activity Log Screen (FCX248) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the Linux guest machine for which the summary network activity log is to be displayed.

Results

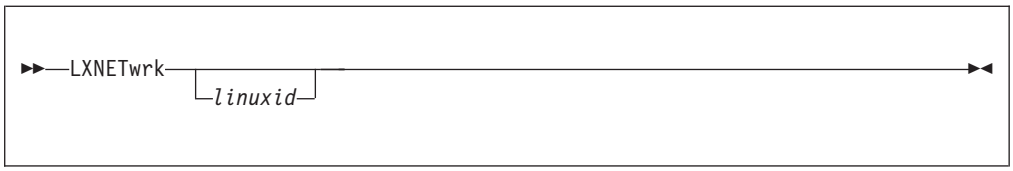
See "FCX248, Linux Network Activity Log Screen – LXNETLOG" on page 726.

LXNETWRK

Purpose

The LXNETWRK subcommand causes either the Linux Network Activity Screen (FCX227) or the General Linux Networking Activity Screen (FCX245) to be displayed, based on whether you specify a *linuxid*.

Format



Parameters

linuxid

Is the identification of a Linux system for which the detailed RMF PM data gatherer-based Linux Network Activity Screen (FCX227) is to be displayed.

The General Linux Networking Activity Screen (FCX245) will be shown if you enter the LXNETWRK subcommand with no *linuxid*.

Usage

- Please be aware that Linux internal data collection is not synchronized with CP's data collect activity, i.e. the Linux internal data will usually have been obtained for a different period than that used for collecting other z/VM data. This may lead to discrepancies between the internal Linux values and the z/VM activity seen from the outside.
- In the General Linux Networking Activity Screen (FCX245), the appearance of highlighted Linux guests is based on the definitions made in the FCONX LINUXUSR file. This does *not* guarantee that the RMF PM interface required for detail data retrieval is available for these Linux guests. To prevent misleading entries, users should include only those RMF PM interface IP addresses of Linux guests whose interfaces are always up and running while the guests are logged on.

Results

See "FCX245, General Linux Networking Activity Screen – LXNETWRK" on page 722 if you specified LXNETWRK.

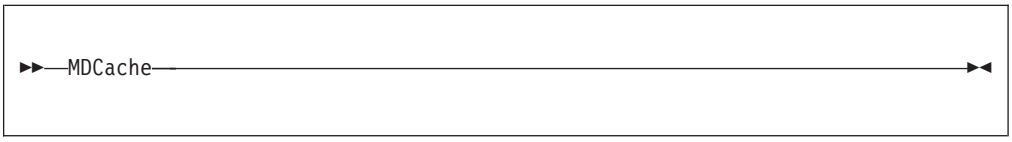
See "FCX227, Linux Network Activity Screen – LXNETWRK *linuxid*" on page 687 if you specified LXNETWRK *linuxid*.

MDCACHE

Purpose

The MDCACHE subcommand causes the Minidisk Cache Log Screen (FCX138) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

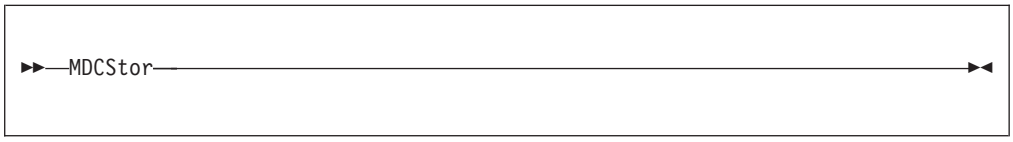
See “FCX138, Minidisk Cache Log Screen – MDCACHE” on page 491.

MDCSTOR

Purpose

The MDCSTOR subcommand causes the Minidisk Cache Storage Log Screen (FCX178) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

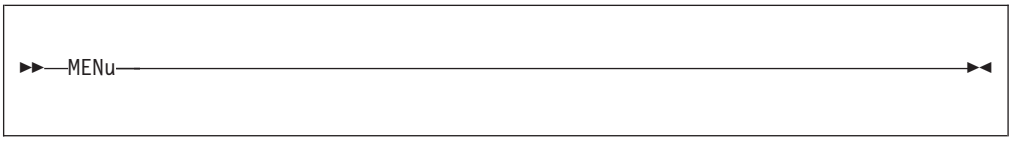
See “FCX178, Minidisk Cache Storage Log Screen – MDCSTOR” on page 569.

MENU

Purpose

The MENU subcommand causes the Performance Data Selection Menu (FCX124) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

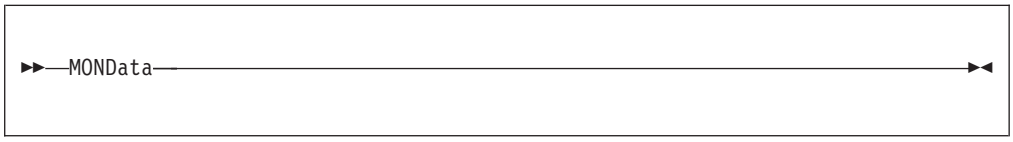
See the "Operation in Performance Monitor Mode" chapter in the *z/VM: Performance Toolkit Guide* for more information on the Performance Data Selection Menu.

MONDATA

Purpose

The MONDATA subcommand causes the Monitor Data Statistics Screen (FCX155) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

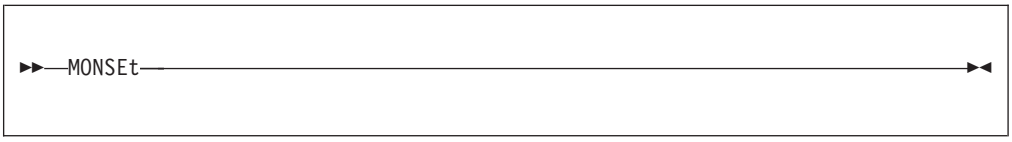
See “FCX155, Monitor Data Statistics Screen – MONDATA” on page 529.

MONSET

Purpose

The MONSET subcommand causes the Monitor Settings Screen (FCX149) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

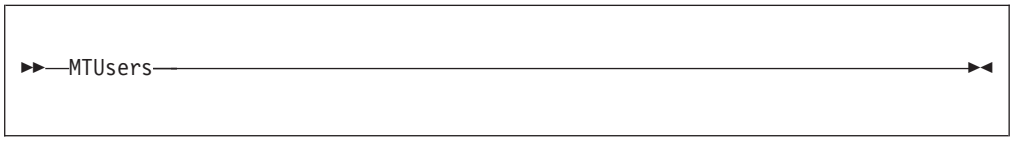
See “FCX149, Monitor Settings Screen – MONSET” on page 513.

MTUSERS

Purpose

The MTUSERS subcommand causes the Multitasking Users Screen (FCX188) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

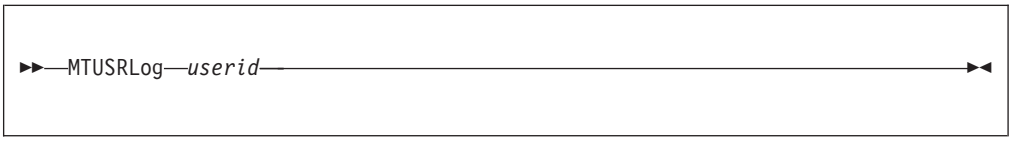
See “FCX188, Multitasking Users Screen – MTUSERS” on page 588.

MTUSRLOG

Purpose

The MTUSRLOG subcommand causes the Multitasking User Log Screen (FCX189) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the virtual machine for which the Multitasking User Log Screen (FCX189) is to be displayed.

Results

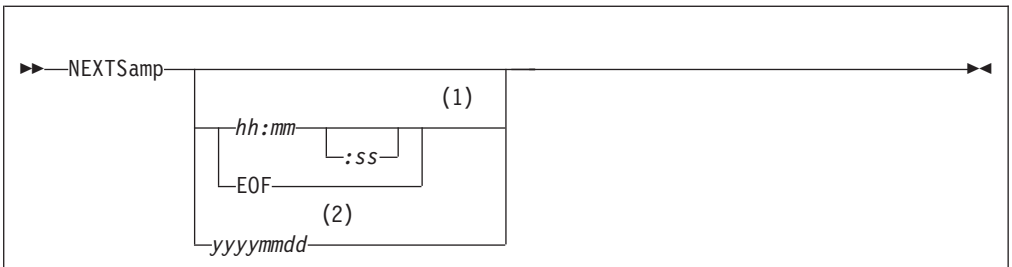
See "FCX189, Multitasking User Log Screen – MTUSRLOG" on page 590.

NEXTSAMP

Purpose

The NEXTSAMP subcommand is valid in monitor and trend file scan mode only. It lets records be processed which correspond to one or multiple sample intervals, up to a time or date specified.

Format



Notes:

1 Valid for monitor data files only.

2 Valid for trend files only.

Parameters

hh:mm:ss
: Specifies the time, in hours and minutes, up to which the CP monitor disk file is to be processed. The time must be specified exactly as shown, i.e. with two digits each for hours and minutes, separated by a colon. Specifying seconds is optional.

EOF
: Specifies that the CP monitor disk file is to be processed up to the physical end of file.

yyyymmdd
: Specifies the date, in years, months and days, up to which the Performance Toolkit trend file is to be processed. The date must be specified exactly as shown, i.e. with four digits for the year and two digits each for month and days.

Usage

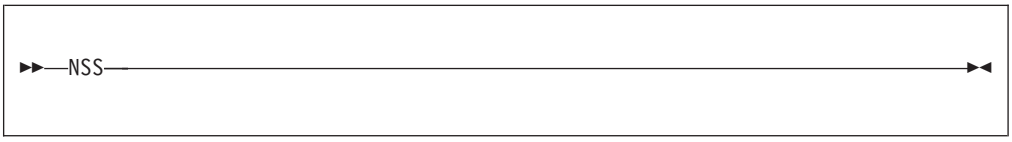
1. Processing continues until data have been processed which have a time stamp equal to or higher than the specified value. Data for one interval will be processed if no end time or date is specified with the subcommand. For the EOF parameter, processing continues to the end of the CP monitor disk file.

NSS

Purpose

The NSS subcommand causes the Shared Segments Screen (FCX133) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Usage

1. No information on segment members is available from monitor records; the fields shown are obtained by means of a Q NSS NAME ..... MAP subcommand to tell you what the segment spaces are used for. Because no performance data for these members are available, the member information will *always* be inserted immediately after the output line for the segment space, regardless of the sort sequence.

Results

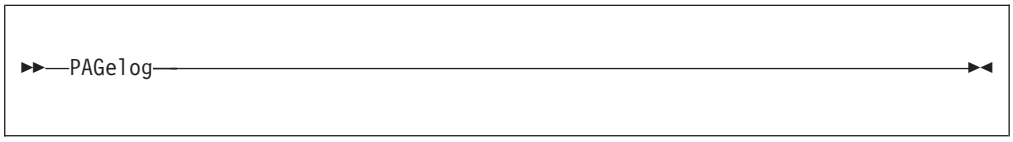
See “FCX133, Shared Segments Screen – NSS” on page 479.

PAGELOG

Purpose

The PAGELOG subcommand causes the Paging Log Screen (FCX143) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

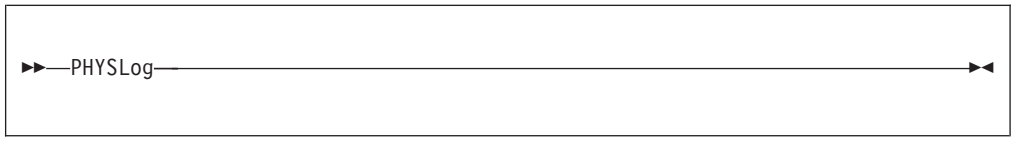
See “FCX143, Paging Log Screen – PAGELOG” on page 497.

PHYSLOG

Purpose

The PHYSLOG subcommand causes the Real CPU Utilization Log Screen (FCX302) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

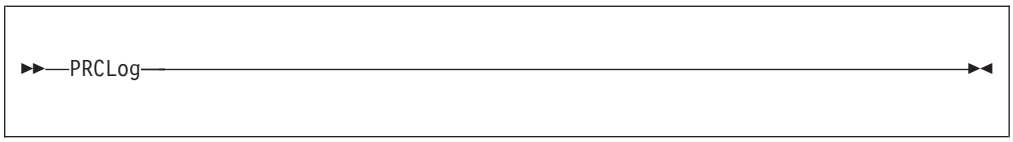
See “FCX302, Real CPU Utilization Log – PHYSLOG” on page 825.

PRCLOG

Purpose

The PRCLOG subcommand causes the Processor Log Screen (FCX304) to be displayed. This subcommand can be used only with monitor data from z/VM release 6.3.0 and later releases. For prior data, use the PROCLOG subcommand.

Format



Parameters

No parameters are allowed or tested for.

Results

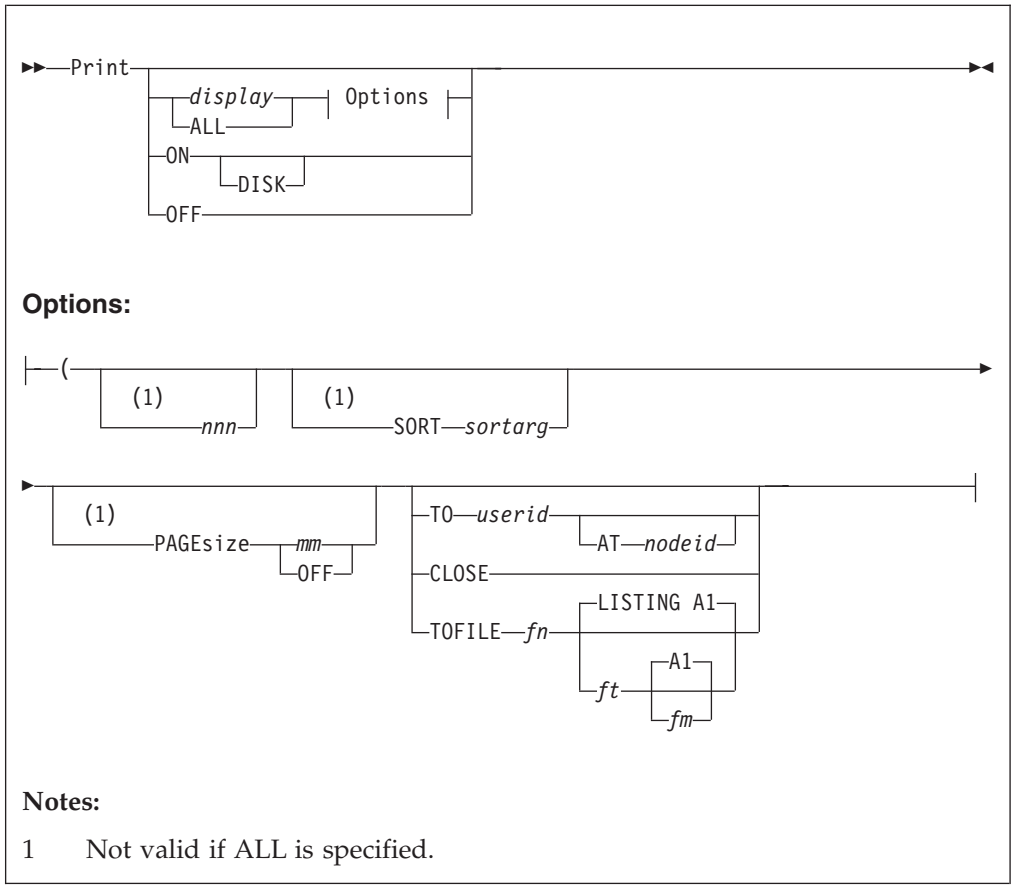
See “FCX304, Processor Log – PRCLOG” on page 829.

PRINT

Purpose

The PRINT subcommand controls the writing of performance monitoring output to a virtual printer or to disk.

Format



Notes:

1 Not valid if ALL is specified.

Parameters

The PRINT subcommand without any arguments causes *all* data to be printed which are available for the *current* display. In the case of the REDISPLAY screen, each display line may extend over up to three print lines (print width limited to 130 characters, regardless of actual output device).

This mode of operation was chosen to allow printing multiple reports in a single print file.

display Can be any display that is to be printed.

ALL Causes a collection of different performance reports to be printed. The reports to be printed must previously be defined in file FCONX REPORTS (see "FCONX REPORTS File" in the *z/VM: Performance Toolkit Guide* for a detailed description).

ON Causes all performance data displayed on the screen to be also written to a virtual printer for later reference. Data extending beyond the screen will *not* be included.

This type of printing remains active until a 'PRINT OFF' subcommand is entered, i.e. you will get a complete log of all the data which you looked at on the screen.

OFF Causes continuous printing of monitor output to be stopped, and the virtual printer to be closed. Make sure of the printer output routing before issuing the 'PRINT OFF' subcommand!

DISK Causes the performance output data to be written to disk file 'FCONMON LISTING' instead of virtual printer. A carriage control character is included in the first column of each record, so that the file may still be printed using the 'CC'-option of the CMS 'PRINT' subcommand.

Once a 'PRINT ON DISK' subcommand has been entered, *all* monitor print output will be written to disk until a 'PRINT OFF' subcommand is received.

Options:

nnn Can be used to define the maximum number of print lines *nnn* to be created. It is valid only for limiting the number of output lines of actual performance data displays. This option is useful especially to reduce the output size of the USER or DEVICE displays on large systems. (Make sure the lines are SORTed so that the meaningful information is contained in the first part of the display.)

Note: This option is supported for single displays only, i.e. it cannot be used if ALL is specified.

SORT *sortarg*
Indicates that the report is to be sorted as defined by the sort argument *sortarg*. The SORT option is valid only for reports that also support sorting in monitor mode, i.e. which are supported by the SORT subcommand. The same sort arguments can be used as with the SORT subcommand (see "SORT" on page 287 for a detailed description).

Note: This option is supported for single displays only, i.e. it cannot be used if ALL is specified.

PAGEsize
Defines the number of lines to be printed consecutively before a skip to a new page is forced, and the header lines printed again at the top of the page.

mm The maximum number of lines to printed.

OFF Forces continuous printing, without insertion of intermediate header lines even if the print output extends over several pages.

Note: This option is supported for single displays only, i.e. it cannot be used if ALL is specified.

TO *userid* **{AT** *nodeid***}**
Sets the destination address for the print output, where

userid Is the user identification of the target virtual machine where the output is to be sent

AT *nodeid*

Specifies the node identification *nodeid* of the system where the destination user *userid* is located.

The destination ID is assumed to be defined on the same VM system if the 'AT *nodeid*' specification is omitted.

The print file will be closed automatically when a specific destination ID has been entered with the 'TO' option, i.e. the CLOSE option is implied and needs not be entered separately.

CLOSE
Lets the print file be closed when complete.

TOFILE *fn* {*ft* {*fm*}}
Indicates that the 'print' file is to be written to disk, where

fn Is the file name of the disk file

ft Is the file type of the disk file. A file type of `LISTING` will be used when no explicit file type is entered.

fm Is the file mode of the disk file. A file mode of `A1` will be used when no explicit file mode is entered.

Usage

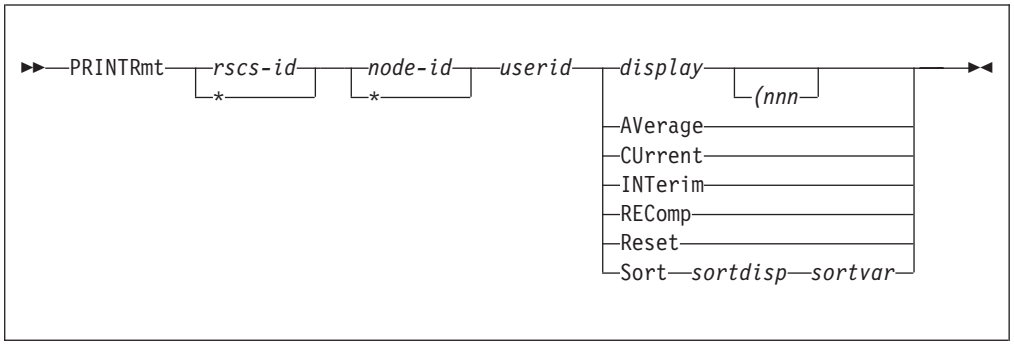
1. The data printed will always be the same as what you see on your screen. Usually you will see data from the last interval unless an 'AVERAGE' subcommand has previously been entered to force calculation of average load figures.
2. The print file will not be closed automatically when the output is directed to the virtual printer. Use any one of the following methods to close the printer when you are done:
   - 'CLOSE' option of the PRINT subcommand
   - 'TO *userid*' option of the PRINT subcommand
   - 'PRINT OFF' subcommand
   - 'CP CLOSE PRT' subcommand
3. REDHist prints one screen's worth of the selected extended history file's data, or the full benchmark log on disk if an object's benchmark log has been selected. The file name, file type and file mode of a history file on disk can be specified with additional arguments *fn ft fm*; the current day's HISTLOG file is used as input if no further arguments are entered. Since these HISTLOG files can be very large, only a small subset - enough to fill a screen - will be printed.
4. REDisp causes all CPU redisplay data in storage to be printed. The file name, file type and file mode of a history file on disk can be specified with additional arguments *fn ft fm*; the performance redisplay data in storage are displayed if no further arguments are entered.

PRINTRMT

Purpose

The PRINTRMT subcommand is intended for use with the remote performance data retrieval (FCONRMT mode). It will print the selected performance monitor display data in a special format which includes highlighting attribute information (as strings '"Y' for highlighting, and '"-' for display in normal intensity), and it will send the data to the node and userid specified with the subcommand. Special header and trailer lines will be added which help the receiving program to handle the data correctly.

Format



Parameters

The first three arguments are required to define the target user's address where the print output is to be sent.

rscs-id Is the userid of the RSCS machine where the print output is to be sent. An asterisk '*' indicates that the PRINTRMT request is for a local user.

node-id
Is the node-ID by which the target user's system is known to the RSCS machine. An asterisk '*' indicates that the PRINTRMT request is for a local user.

userid Is the userid of the target user who is to receive the print data.

display Can be any allowable type of performance data which is to be sent to the selected user.

(*nnn* Can be used to define the maximum number of print lines *nnn* to be created. It is valid only for limiting the number of output lines of actual performance data displays. This option is useful especially to reduce the output size of the USER or DEVICE displays on large systems. (You obviously must have SORTed the data previously so that the meaningful information is contained in the first part of the display.)

The remaining arguments allow some additional control over the target machine:

AVerage
Switches the performance monitor to calculate and display *average* load for the overall reporting period.

CUrrent
Switches the performance monitor to calculate and display *current* load at the end of the current measuring interval.

INTerim
Switches the performance monitor to calculate and display *average* load for the current interim period.

REComp
Collects new data and recomputes the performance data for all the permanently updated general screens which are based on data extraction from CP control blocks.

Note that collection of MONITOR SAMPLE data can not be forced out of turn in this way. You will have to wait for the end of the current monitor sample interval before updated information can be shown for displays which are based on the analysis of CP MONITOR data.

Reset Resets the cumulative counters to zero, and sets the current time as new start time for calculating averages.

Sort *sortdispsortvar*
Allows changing the current sorting sequence for a selected performance display. Note that the extended format of the SORT subcommand must be used, where the first argument defines the display and the second argument the variable which is to be used for sorting. See "SORT" on page 287 for a detailed description of the subcommand.

Usage

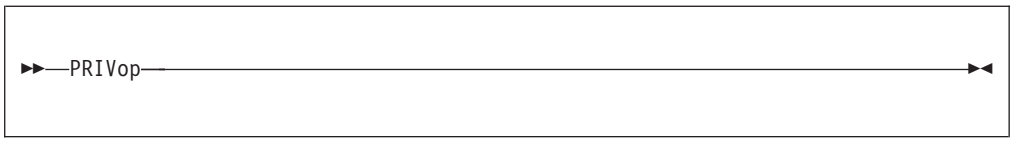
1. REDHist prints one screen's worth of a selected extended history file's data, or the full benchmark log on disk if an object's benchmark log has been selected. The file name, file type and file mode of a history file on disk can be specified with additional arguments *fn ft fm*; the current day's HISTLOG file is used as input if no further arguments are entered. Since HISTLOG files can be very large, only a small subset - enough to fill a screen - will be printed.
2. REDisp causes all CPU redisplay data in storage to be printed. The file name, file type and file mode of a history file on disk can be specified with additional arguments *fn ft fm*; the performance redisplay data in storage are displayed if no further arguments are entered.

PRIVOP

Purpose

The PRIVOP subcommand causes the Privileged Operations Screen (FCX104) to be displayed, with information on the utilization of some privileged commands and diagnose instructions.

Format



Parameters

No parameters are allowed or tested for.

Results

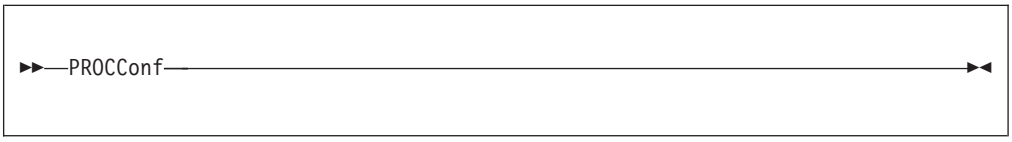
See “FCX104, Privileged Operations Screen – PRIVOP” on page 388.

PROCCONF

Purpose

The PROCCONF subcommand causes the Processor Configuration Log Screen (FCX234) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

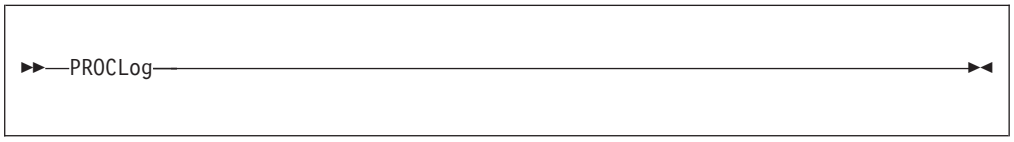
See “FCX234, Processor Configuration Log Screen – PROCCONF” on page 702.

PROCLOG

Purpose

The PROCLOG subcommand causes the Processor Log Screen (FCX144) to be displayed. This report is available for z/VM release 6.2.0 and earlier releases.

Format



Parameters

No parameters are allowed or tested for.

Results

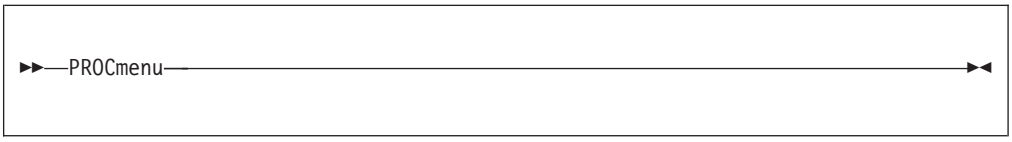
See “FCX144, Processor Log Screen – PROCLOG” on page 500.

PROCMENU

Purpose

The PROCMENU subcommand causes the Processor Load and Configuration Logs Menu (FCX236) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

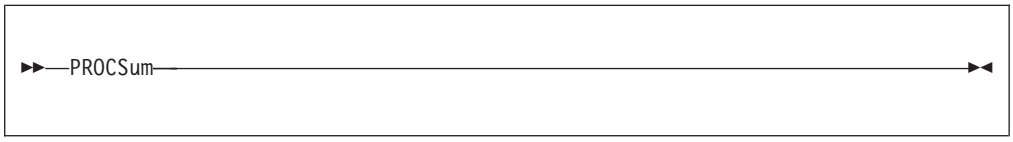
See “FCX236, Processor Load and Configuration Logs Menu – PROCMENU” on page 706.

PROCSUM

Purpose

The PROCSUM subcommand causes the Processor Summary Log Screen (FCX239) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

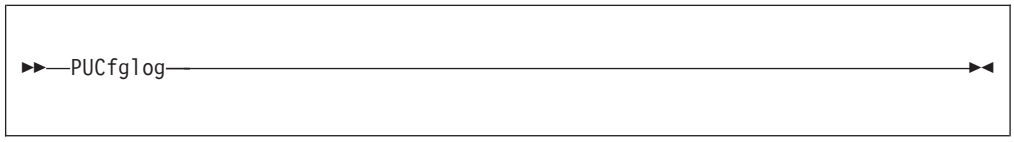
See “FCX239, Processor Summary Log Screen – PROCSUM” on page 710.

PUCFGLOG

Purpose

The PUCFGLOG subcommand causes the Logical PU Configuration Log screen (FCX299) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

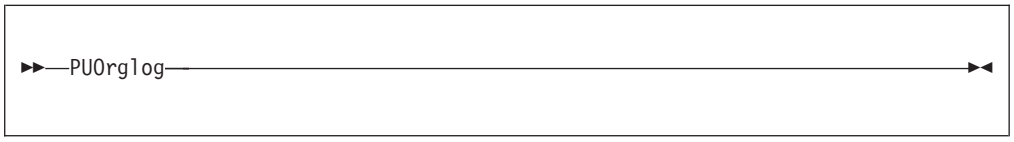
See “FCX299, Logical PU Configuration Log – PUCFGLOG” on page 818.

PUORGLOG

Purpose

The PUORGLOG subcommand causes the Logical PU Organization Log (FCX298) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

See “FCX298, Logical PU Organization Log – PUORGLOG” on page 816.

QDIO

Purpose

The QDIO command causes the QDIO Activity Screen (FCX251) to be displayed.

Format

Parameters

No parameters are allowed or tested for.

Results

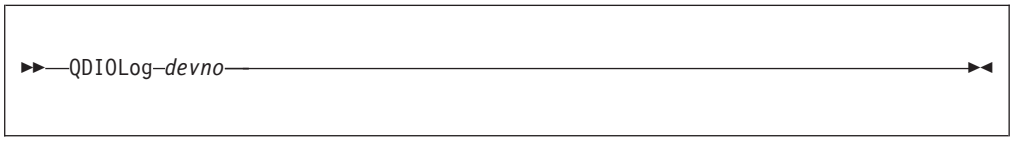
See “FCX251, QDIO Activity Screen – QDIO” on page 729.

QDIOLOG

Purpose

The QDIOLOG command causes the QDIO Activity Log (FCX252) to be displayed for the selected QDIO device.

Format



Parameters

devno Is the I/O device number of the QDIO device for which the QDIO Activity Log (FCX252) is to be displayed.

Results

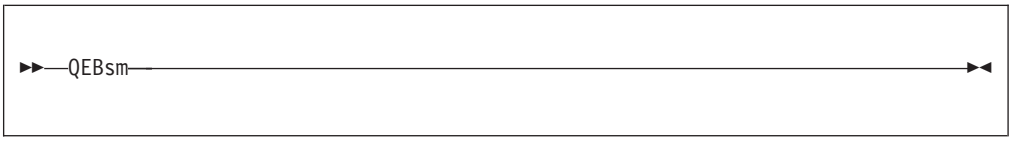
See "FCX252, QDIO Activity Log – QDIOLOG" on page 732.

QEBSM

Purpose

The QEBSM command causes the QEBSM Activity Screen (FCX255) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

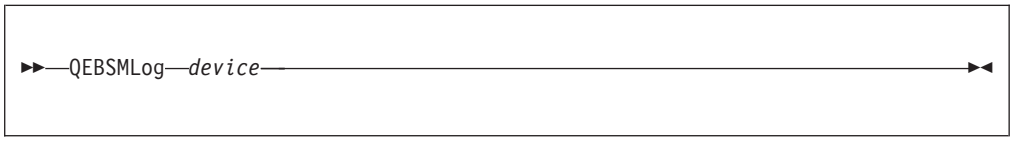
See “FCX255, QEBSM Activity Screen – QEBSM” on page 738.

QEBSMLOG

Purpose

The QEBSMLOG command causes the QEBSM Activity Log (FCX256) to be displayed for the selected device.

Format



Parameters

device is the I/O device number of the QEBSM device for which the QEBSM Activity Log (FCX256) is to be displayed.

Results

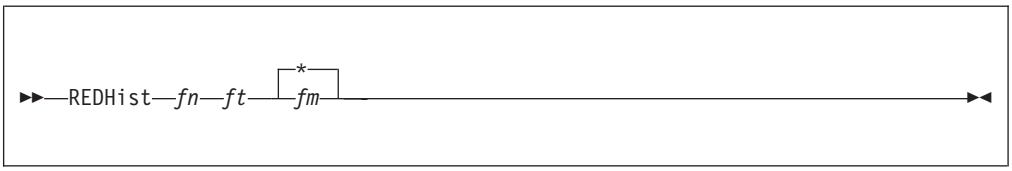
See "FCX256, QEBSM Activity Log – QEBSMLOG" on page 740.

REDHIST

Purpose

The REDHIST subcommand allows browsing through history data log files on disk. It can process both the extended new file format (HISTLOG and HISTSUM files), the old format (PERFLOG and PERFHIST files), and also an object's benchmark log files on disk.

Format



Parameters

fn Is the file name of the performance history file. The file name usually contains the file's creation date, in format *yyyymmdd* for HISTLOG/HISTSUM files, or format *mmddyy* for PERFLOG/PERFHIST files.

ft Is the file type of the log file. Default file types are HISTLOG (for current file), or HISTLOG1, HISTLOG2 for previous log generations when an extended history data log is to be browsed, or PERFLOG, PERFLOG1 and PERFLOG2 respectively for history logs in the old format.

Enter the complete file type when browsing benchmark log files.

The condensed history files have default names of 'ACUM HISTSUM' for the new file format, and 'ACUM PERFHIST' for the old format.

Please note that the file type of condensed history files in the old format (default name 'ACUM PERFHIST') *must* be `PERFHIST` when viewing them with the REDHIST subcommand. You can keep backup copies of this file under another file name, but they cannot be displayed with the REDHIST subcommand if the file type was changed too.

fm Is the file mode of the log file. Default file mode is '*', i.e. all accessed disks will be searched for the file.

Usage

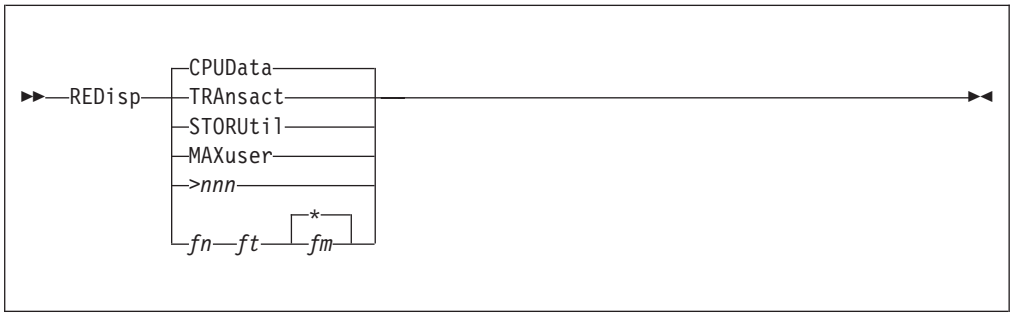
1. The current day's detailed HISTLOG file will be selected for display if the subcommand is entered without any arguments.
2. Only actual performance history files should be displayed in this way. Selection of other files may be possible if they pass some tests, but will lead to unpredictable results.
3. An explicit file mode is often specified because another user's performance history file is to be redisplayed. If the current day's history file is to be viewed, the file will probably still be active, and the corresponding disk should be re-accessed just before displaying the file, so that an updated version of the minidisk directory is used. If the file has been updated again, read errors may occur or invalid data could be shown, and cause the PERFKIT to end abnormally.

REDISP

Purpose

The REDISP subcommand enters performance monitoring redisplay mode, displaying key system performance indicators from the last measuring intervals.

Format



Parameters

CPUData
Causes the redisplay data to be positioned so that the CPU load information will be shown. This is the default.

TRAnsact
Positions the redisplay data so that user activity and queue statistics information will be shown

STORUtil
Positions the redisplay data so that storage utilization data will be shown

MAXuser
Positions the redisplay data so that the area with the user performance extremes will be shown

>*nnn* Positions the redisplay data so that the area at a position *nnn* columns to the right will be shown

fn Is the file name of the performance history file. The file name usually contains the file's creation date, in format *mmddyy* for PERFLOG/ PERFHIST files.

ft Is the file type of the log file. Default file types are PERFLOG, PERFLOG1 and PERFLOG2 respectively for history logs in the old format. The condensed history files have default names of 'ACUM PERFHIST' for the old format.

fm Is the file mode of the log file. Default file mode is '*', i.e. all accessed disks will be searched for the file.

Usage

1. The CPUDATA, TRANSACT, STORUTIL and MAXUSER arguments can also be entered separately, once the performance redisplay screen has been selected, to re-position the data shown on the screen. (The minimum abbreviations shown for these arguments are actually valid when entering them in this way; a shorter format may be accepted when entering them together with the REDISP subcommand.)

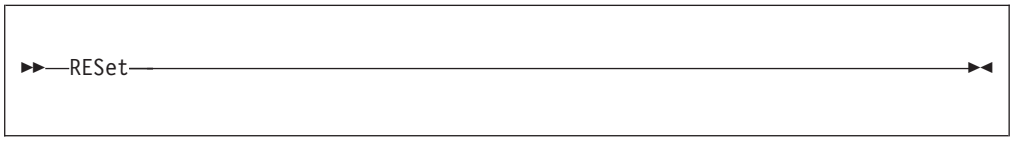
2. Performance data from your current redisplay buffer (in storage) will be displayed.

RESET

Purpose

The RESET subcommand causes all cumulative counters (used for calculation of average load values) to be reset to zero.

Format



Parameters

No parameters are allowed or tested for.

Usage

1. An automatic RESET is performed at midnight, but you may choose to reset these counters also at other times, e.g. before periods of exceptionally high system load, so that the averages calculated give a better indication of bottlenecks under high load. See the RESET argument of the 'FC MONCOLL' subcommand (“FCONTROL MONCOLL” on page 52) for information on how to cause automatic resets at pre-defined times.

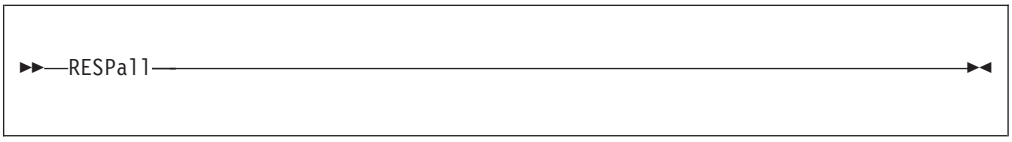
   For more information, see also the “Resetting Performance Data/Defining Periods” section in the *z/VM: Performance Toolkit Guide*.

RESPALL

Purpose

The RESPALL subcommand causes the Response Time Log (All) Screen (FCX136) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

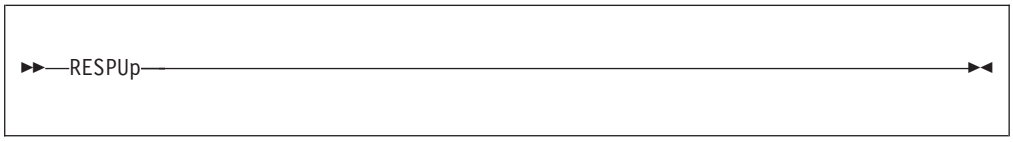
See “FCX136, Response Time Log (All) Screen – RESPALL” on page 486.

RESPUP

Purpose

The RESPUP subcommand causes the Response Time Log (UP) Screen (FCX137) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

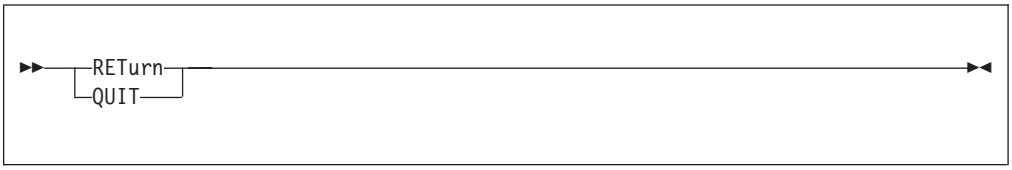
See “FCX137, Response Time Log (UP) Screen – RESPUP” on page 489.

RETURN

Purpose

The RETURN subcommand, if entered from the performance data selection menu, exits performance monitor mode and returns to basic mode. If entered from any of the general performance screens, the performance data selection menu will be displayed again, and if entered from one of the detailed displays (e.g. user resource details, I/O device details) you will return to the screen from which the detailed display had been selected. Several RETURN subcommands may be necessary to return back to basic mode.

Format



Usage

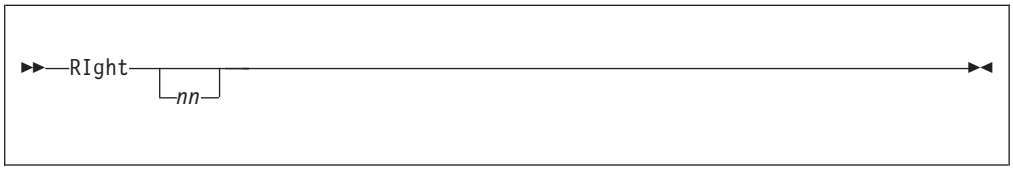
1. 'QUIT' is accepted as a synonym for the RETURN subcommand.
2. The same function can also be performed by pressing PF12.

RIGHT

Purpose

The RIGHT subcommand moves the display window of the performance monitor re-display screen or of the PLOTDET display to the right.

Format



Parameters

nn Indicates the number of columns by which data are to be be moved. The default shift value is 40 for the REDISPLAY screen and 60 measurements (approximately one hour) for the PLOTDET display.

Usage

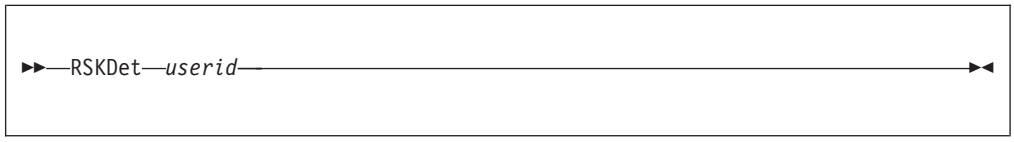
1. Pressing PF11 or PF23 will also shift the window to the right for the default number of columns.

RSKDET

Purpose

The RSKDet subcommand causes the Reusable Server Kernel Performance Details Screen (FCX217) to be displayed.

Format



Parameters

userid Is the user identification of the RSK server machine for the Reusable Server Kernel Performance Details Screen (FCX217) is to be displayed.

Results

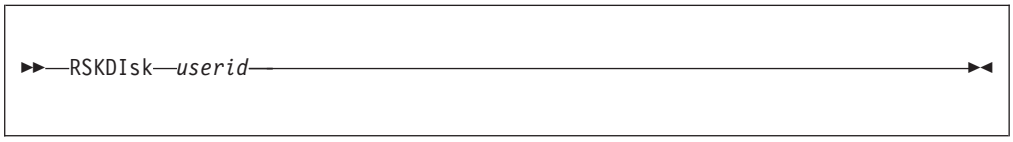
See "FCX217, Reusable Server Kernel Performance Details Screen – RSKDET" on page 662.

RSKDISK

Purpose

The RSKDISK subcommand causes the Reusable Server Kernel Disk Performance Log Screen (FCX219) to be displayed.

Format



Parameters

userid Is the user identification of the RSK server machine for which the Reusable Server Kernel Disk Performance Log Screen (FCX219) is to be displayed.

Results

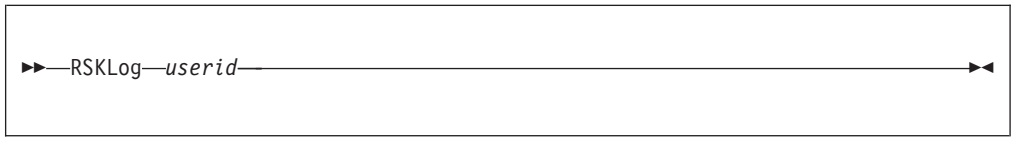
See "FCX219, Reusable Server Kernel Disk Performance Log Screen – RSKDISK" on page 670.

RSKLOG

Purpose

The RSKLOG subcommand causes the Reusable Server Kernel Performance Log Screen (FCX218) to be displayed.

Format



Parameters

userid Is the user identification of the RSK server machine for which the Reusable Server Kernel Performance Log Screen (FCX218) is to be displayed.

Results

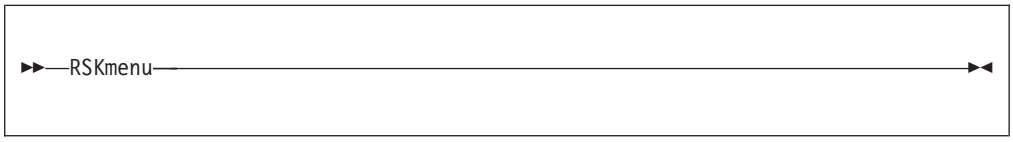
See "FCX218, Reusable Server Kernel Performance Log Screen – RSKLOG" on page 668.

RSKMENU

Purpose

The RSKMENU subcommand causes the Reusable Server Kernel Performance Data Menu (FCX216) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

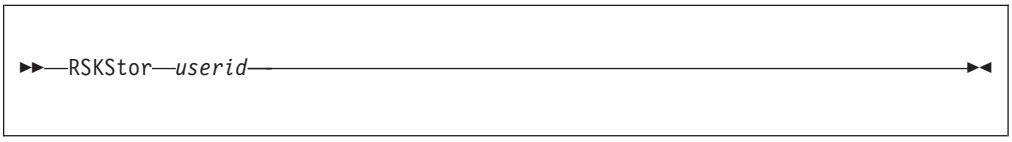
See “FCX216, Reusable Server Kernel Performance Data Menu – RSKMENU” on page 661.

RSKSTOR

Purpose

The RSKSTOR subcommand causes the Reusable Server Kernel Storage Log Screen (FCX220) to be displayed.

Format



Parameters

userid Is the user identification of the RSK server machine for which the Reusable Server Kernel Storage Log Screen (FCX220) is to be displayed.

Results

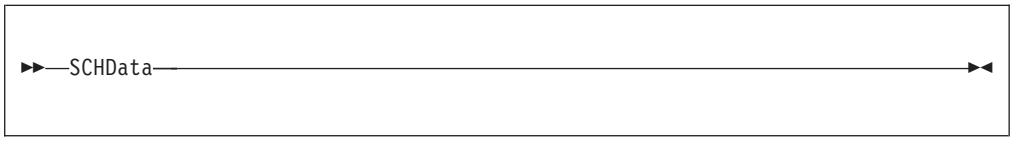
See "FCX220, Reusable Server Kernel Storage Log Screen – RSKSTOR" on page 673.

SCHDATA

Purpose

The SCHDATA subcommand causes the Scheduler Data Log Screen (FCX175) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

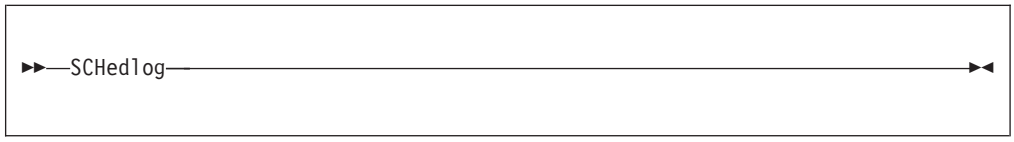
See “FCX175, Scheduler Data Log Screen – SCHDATA” on page 560.

SCHEDLOG

Purpose

The SCHEDLOG subcommand causes the Scheduler Queue Log Screen (FCX145) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

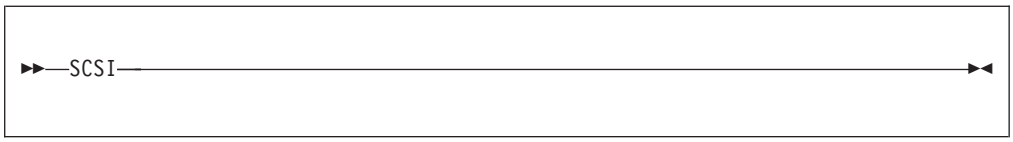
See “FCX145, Scheduler Queue Log Screen – SCHEDLOG” on page 504.

SCSI

Purpose

The SCSI subcommand causes the SCSI Device Screen (FCX249) for the emulated FBA devices (EDEV) to be displayed. These devices must have been previously defined by the CP SET EDEV command.

Format



Parameters

No parameters are allowed or tested for.

Results

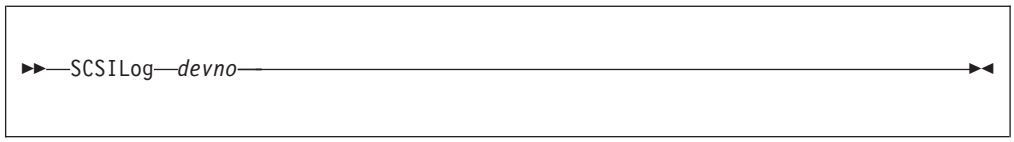
See “FCX249, SCSI Device Screen – SCSI” on page 727.

SCSILOG

Purpose

The SCSILOG subcommand causes the SCSI Resource Utilization Log Screen (FCX250) to be displayed for the selected emulated FBA device (EDEV). This device must have been previously defined by the CP SET EDEV command.

Format



Parameters

devno Is the emulated FBA device number for which the SCSI Resource Utilization Log Screen (FCX250) is to be displayed.

Results

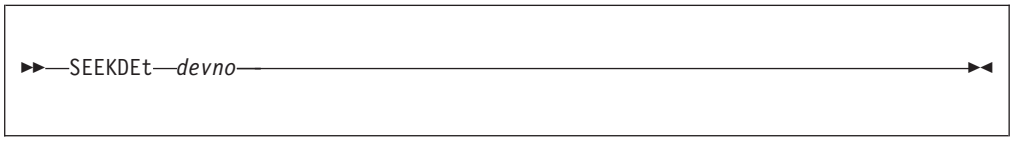
See "FCX250, SCSI Resource Utilization Log Screen – SCSILOG" on page 728.

SEEKDET

Purpose

The SEEKDET subcommand causes the DASD Seeks Details Screen (FCX158) to be displayed.

Format



Parameters

devno Specifies the device number of the disk for which the DASD Seeks Details Screen (FCX158) is to be displayed.

Usage

1. When entered in real-time monitoring mode, a:

   ```
   MONITOR EVENT ENABLE SEEKS DEVICE xxxx
   ```

   command is automatically executed for the selected disk. If SEEKS domain data for that disk had not previously been enabled, message:

   ```
   FCXSED451I SEEKS EVENT data collection started for device xxxx
   ```

   will be shown to make you aware of the fact. *Note that seeks data collection for the disk will not be disabled again when you leave the display.* You will have to explicitly enter the subcommand:

   ```
   MONITOR EVENT DISABLE SEEKS DEVICE xxxx
   ```

   for disabling seeks data collection for a single disk, or the subcommand:

   ```
   MONITOR EVENT DISABLE SEEKS ALL
   ```

   for disabling seeks data collection for all disks.
2. The `Volume serial` and `Disc. time (msec)` information is obtained from I/O domain SAMPLE records. It can not be inserted before at least one (for `Volume serial`) or two (for `Disc. time (msec)`) sample intervals have elapsed.

Results

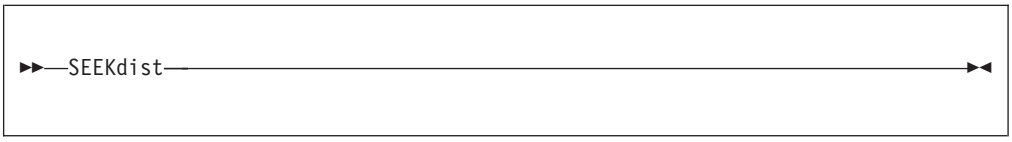
See “FCX158, DASD Seeks Details Screen – SEEKDET” on page 537.

SEEKDIST

Purpose

The SEEKDIST subcommand causes the DASD Seeks Distances Screen (FCX157) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Usage

1. Seeks data collection and analysis for disk packs with a high I/O activity causes considerable overhead. Seeks EVENT data should, therefore, be enabled only for limited periods of time, and/or for a restricted number of disks.
2. The `Volume Serial` and `Disc Time msec` information is obtained from I/O domain SAMPLE records. It can not be inserted before at least one (for `Volume Serial`) or two (for `Disc Time msec`) sample intervals have elapsed.

Results

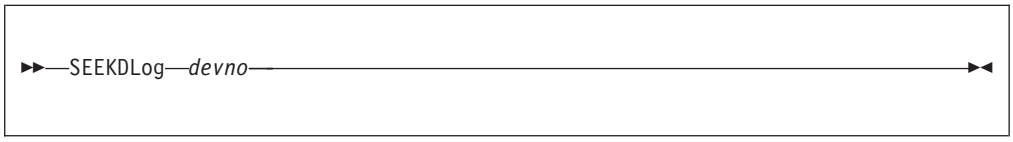
See “FCX157, DASD Seeks Distances Screen – SEEKDIST” on page 534.

SEEKDLOG

Purpose

The SEEKDLOG subcommand causes the DASD Seeks Distances Log Screen (FCX172) to be displayed for the selected disk.

Format



Parameters

devno Is the number of the disk for which the DASD Seeks Distances Log Screen (FCX172) is to be displayed.

Results

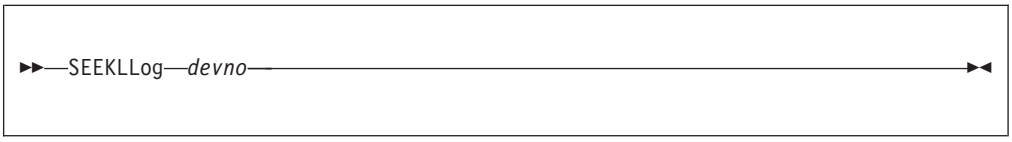
See "FCX172, DASD Seeks Distances Log Screen – SEEKDLOG" on page 553.

SEEKLLOG

Purpose

The SEEKLLOG subcommand causes the DASD Seeks Locations Log Screen (FCX171) to be displayed for the selected disk.

Format



Parameters

devno Is the number of the disk for which the DASD Seeks Locations Log Screen (FCX171) is to be displayed.

Results

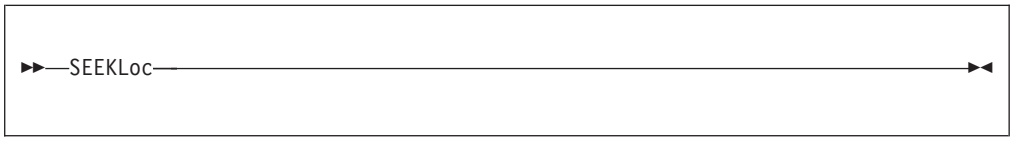
See "FCX171, DASD Seeks Locations Log Screen – SEEKLLOG" on page 552.

SEEKLOC

Purpose

The SEEKLOC subcommand causes the DASD Seeks Locations Screen (FCX156) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Usage

1. Seeks data collection and analysis for disk packs with a high I/O activity causes considerable overhead. Seeks EVENT data should, therefore, be enabled only for limited periods of time, and/or for a restricted number of disks.
2. The `Volume Serial` and `Disc Time msec` information is obtained from I/O domain SAMPLE records. It can not be inserted before at least one (for `Volume Serial`) or two (for `Disc Time msec`) sample intervals have elapsed.

Results

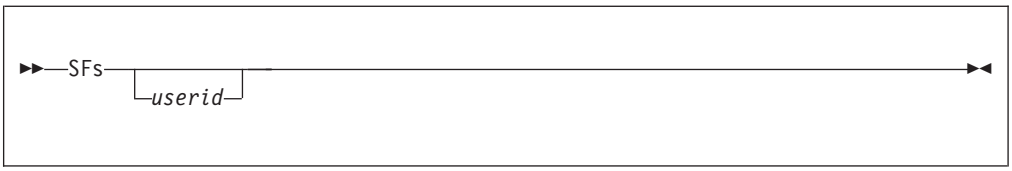
See "FCX156, DASD Seeks Locations Screen – SEEKLOC" on page 531.

SFS

Purpose

The SFS subcommand causes either the Shared File System Server Screen (FCX116) or the Shared File System Server Details (FCX117) to be displayed, based on whether a specific *userid* is specified.

Format



Parameters

userid Is the identification of a shared file system server for which detailed performance data are to be displayed. A Shared File System Server Details Screen (FCX117) will be shown with performance information for the selected user only.

The Shared File System Server Screen (FCX116), which shows summary performance data for all Shared File System server machines, will be shown if you enter the SFS subcommand with no *userid*.

Usage

1. The analysis of SFS server performance is based on both APPLDATA and USER domain records of the CP MONITOR. No data can be shown when the APPLDATA records are missing, but Performance Toolkit will attempt to show as much information as possible even when the user data records are not available. Dots will then be inserted into the fields which could not be calculated. This situation will *always* occur during the very first full interval. Data extraction from the relevant user records will start only once the SFS server machines have been identified by their APPLDATA records, i.e. the fields based on USER records (page wait state, CPU consumption) can be calculated only one cycle later.

Results

See "FCX116, Shared File System Server Screen – SFS" on page 446 if you specified SFS.

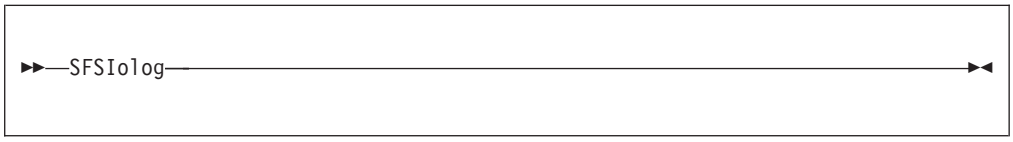
See "FCX117, Shared File System Server Details Screen – SFS *userid*" on page 448 if you specified SFS *userid*.

SFSIOLOG

Purpose

The SFSIOLOG subcommand causes the Shared File System I/O Log Screen (FCX151) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

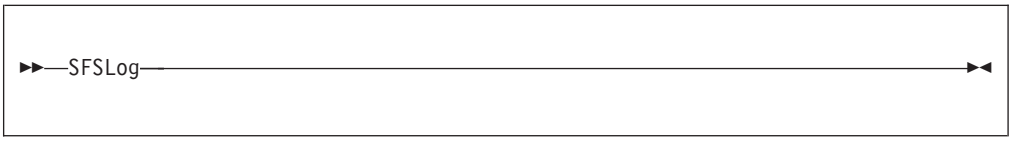
See “FCX151, Shared File System I/O Log Screen – SFSIOLOG” on page 518.

SFSLOG

Purpose

The SFSLOG subcommand causes the Shared File System Log Screen (FCX150) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

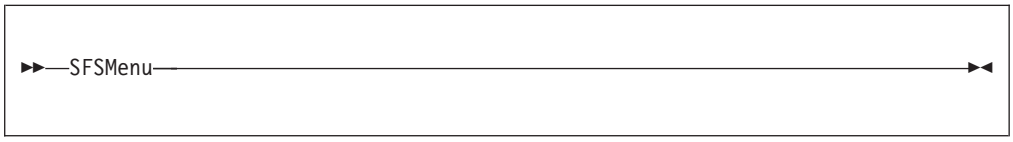
See “FCX150, Shared File System Log Screen – SFSLOG” on page 516.

SFSMENU

Purpose

The SFSMenu subcommand causes the SFS and BFS Logs Selection Menu (FCX221) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

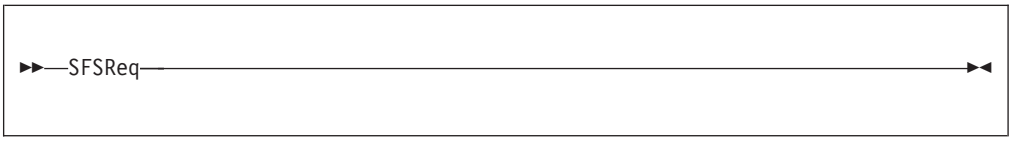
See “FCX221, SFS and BFS Logs Selection Menu – SFSMENU” on page 676.

SFSREQ

Purpose

The SFSREQ subcommand causes the Shared File System Requests Log Screen (FCX152) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

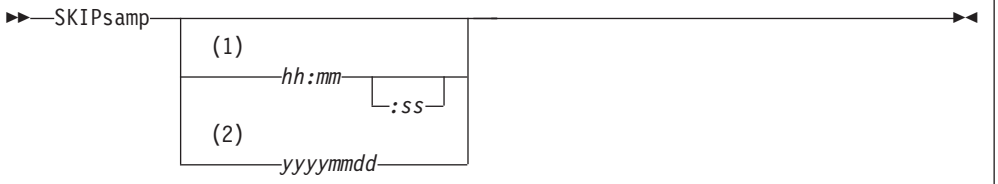
See “FCX152, Shared File System Requests Log Screen – SFSREQ” on page 521.

SKIPSAMP

Purpose

The SKIPSAMP subcommand is valid in monitor and trend file scan mode only. It will skip a number of records until a set of records is found which was collected at a specific time or date.

Format



Notes:

1 Valid for monitor data files only.

2 Valid for trend files only.

Parameters

hh:mm:ss
: Specifies the time, in hours and minutes, of the next batch of monitor sample data you are interested in. The time must be specified exactly as shown, i.e. with two digits each for hours and minutes, separated by a colon. Specifying seconds is optional.

yyyymmdd
: Specifies the date, in years, months and days, up to which the intermediate trend file records are to be skipped. The date must be specified exactly as shown, i.e. with four digits for the year and two digits each for month and days.

Usage

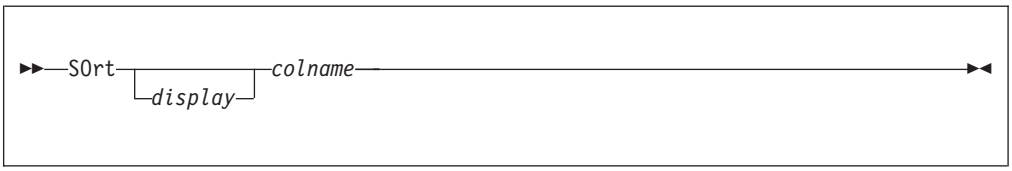
1. The file will be scanned until sample data are found which have been collected at a time equal to or higher than the specified value. If entered without a target time or date, only the next interval will be processed, just as if a NEXTSAMP subcommand had been entered. Note that the intermediate data will *not* be processed. The subcommand is intended to allow skipping to a specific point of time in the collected data with a minimum of overhead. Use the NEXTSAMP subcommand for skipping if all intermediate data should also be processed, thus creating a complete set of 'by time' log displays, and also allowing correct averages to be calculated for monitor data.

SORT

Purpose

The SORT subcommand causes output lines on certain screens to be sorted according to the selected criteria. Note that sorting is possible only for those fields showing a dot above the header line for that data column. Screens with no such indicators above any of the header lines cannot be selected for sorting.

Format



Parameters

display Describes the display that is to be sorted. The argument is required only for setting the sorting sequence on a display other than the one currently being viewed. It is identical to the subcommand required for selecting the targeted display for viewing.

The field selected for sorting will be indicated by underscore characters ('____') inserted above the corresponding header information.

colname

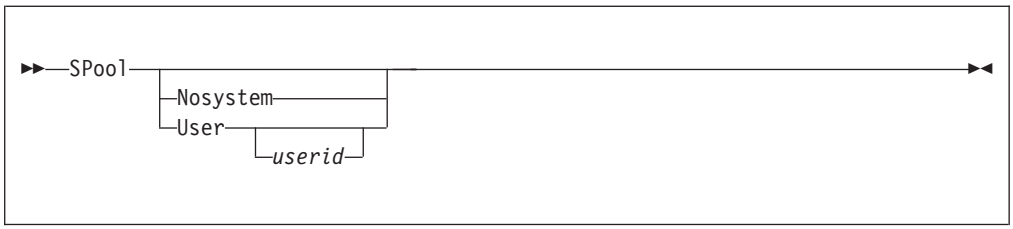
Describes the data column to be used for sorting. The character string in the lowest of the header lines for the data column must be entered as a sort argument.

SPOOL

Purpose

The SPOOL subcommand causes the SPOOL File User Details Screen (FCX121), SPOOL File User Summary Screen (FCX120), or the SPOOL File Summary Screen (FCX119) to be displayed, based on how you specify the subcommand. (See below.)

Format



Parameters

userid Displays the SPOOL File User Details Screen (FCX121) for the specified *userid*.

User (Without further argument) displays the SPOOL File User Summary Screen (FCX120), with the total SPOOL space utilization for all users.

Nosystem
Displays the SPOOL File Summary Screen (FCX119) for the 100 largest SPOOL files, but will exclude system files (for example, NSS files) from the display.

If you specify the SPOOL subcommand with no parameters at all, the SPOOL File Summary Screen (FCX119) will be displayed for the 100 largest SPOOL files.

Usage

Usage Note: Scanning a large number of SPOOL files can cause considerable overhead. The display is therefore not automatically updated in the usual 1-minute intervals.

You are shown an updated display in the following instances:

- After initially entering a SPOOL display from any other type of performance display
- After pressing the ENTER-key without input

Results (For Selected User)

See "FCX119, SPOOL File Summary Screen – SPOOL or SPOOL NOSYSTEM" on page 452 if specified SPOOL or SPOOL NOSYSTEM.

See "FCX120, SPOOL File User Summary Screen – SPOOL USER" on page 455 if specified SPOOL USER.

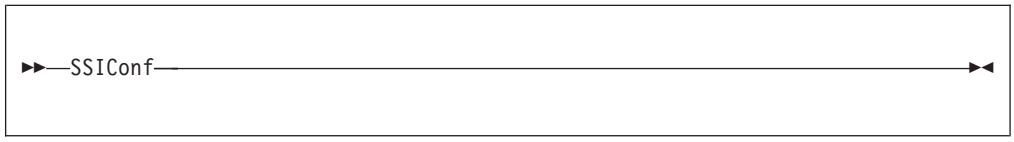
See "FCX121, SPOOL File User Details Screen – SPOOL *userid*" on page 457 if specified SPOOL *userid*.

SSICONF

Purpose

The SSICONF subcommand causes the SSI configuration screen (FCX276) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

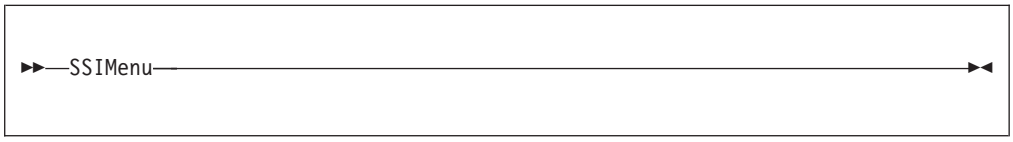
See “FCX276, SSI Configuration – SSICONF” on page 781.

SSIMENU

Purpose

The SSIMenu subcommand causes the SSI and ISFC Selection Menu (FCX271) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

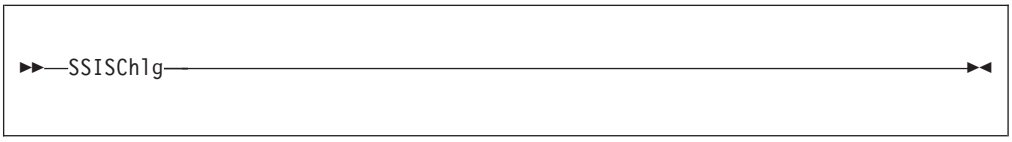
See “FCX271, SSI Data Menu – SSIMENU” on page 771.

SSISCHLG

Purpose

The SSISCHLG subcommand causes the SSI State Change Synchronization Activity log screen (FCX277) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

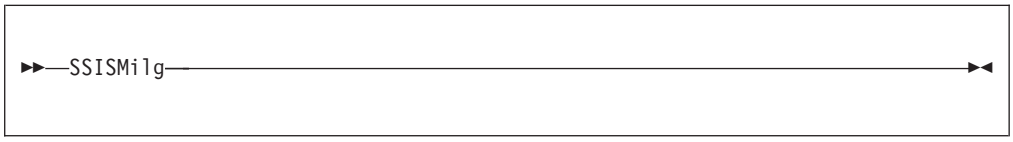
See “FCX277, SSI State Change Synchronization Activity Log – SSISCHLG” on page 783.

SSISMILG

Purpose

The SSISMILG subcommand causes the SSI State/Mode Information log screen (FCX278) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

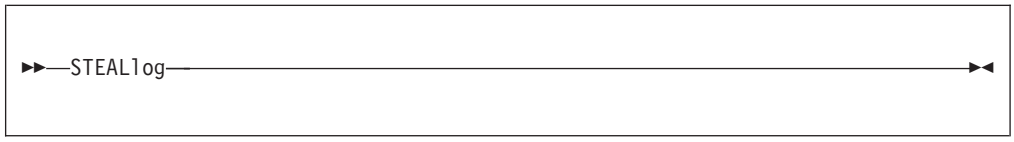
See “FCX278, SSI State/Mode Information Log – SSISMILG” on page 784.

STEALLOG

Purpose

The STEALLOG subcommand causes the Steal Statistics screen (FCX296) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

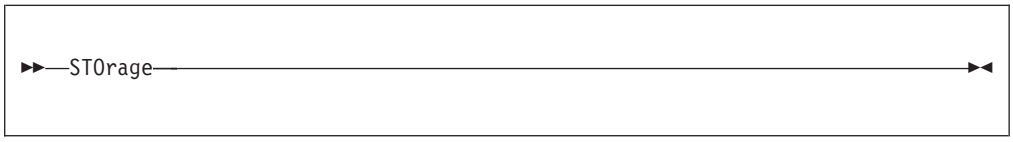
See “FCX296, Steal Statistics Screen – STEALLOG” on page 811.

STORAGE

Purpose

The STORAGE subcommand causes the Storage Utilization Screen (FCX103) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

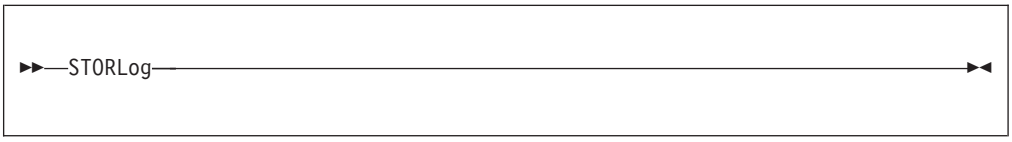
See “FCX103, Storage Utilization Screen – STORAGE” on page 381.

STORLOG

Purpose

The STORLOG command causes the Storage Utilization Log Screen (FCX253) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

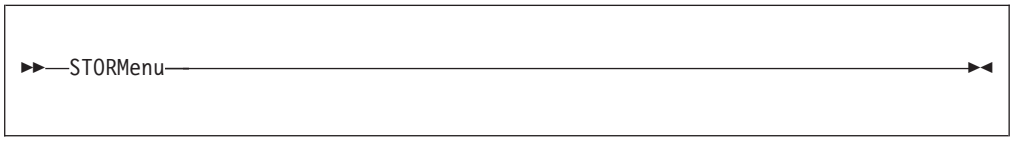
See “FCX253, Storage Utilization Log Screen – STORLOG” on page 733.

STORMENU

Purpose

The STORMENU command displays the Storage Management Logs Menu (FCX260).

Format



Parameters

No parameters are allowed or tested for.

Results

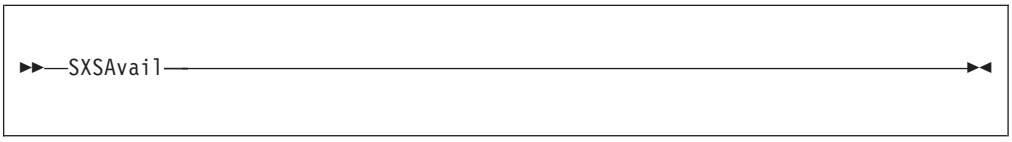
See “FCX260, Storage Management Logs Menu – STORMENU” on page 747.

SXSAVAIL

Purpose

The SXSAVAIL command causes the SXS Available Page Queues Management Log Screen (FCX261) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

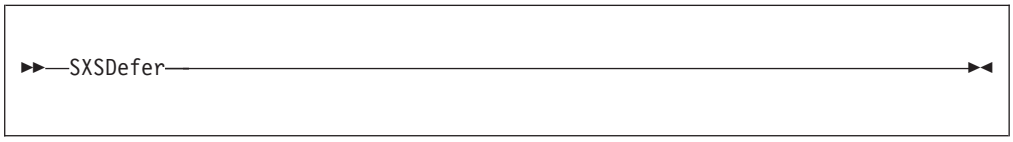
See “FCX261, SXS Available Page Queues Management Log Screen – SXSAVAIL” on page 748.

SXSDEFER

Purpose

The SXSDEFER command causes the SXS Deferred Tasks Management Log Screen (FCX263) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

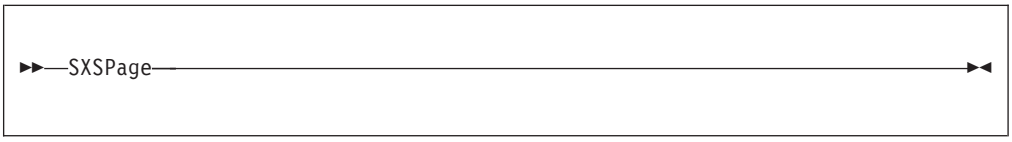
See “FCX263, SXS Deferred Tasks Management Log Screen – SXSDEFER” on page 753.

SXSPAGE

Purpose

The SXSPAGE command causes the SXS Page Management Log Screen (FCX262) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

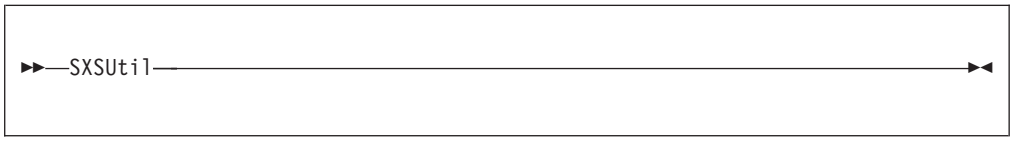
See “FCX262, SXS Page Management Log Screen – SXSPAGE” on page 751.

SXSUTIL

Purpose

The SXSUTIL command causes the SXS Storage Utilization Log Screen (FCX264) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

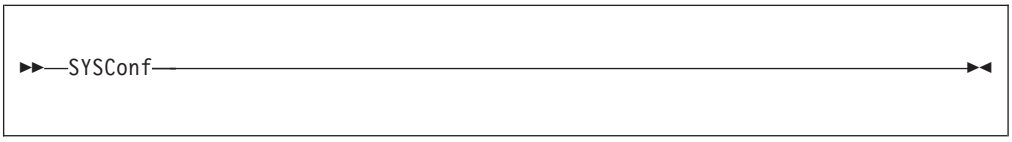
See “FCX264, SXS Storage Utilization Log Screen – SXSUTIL” on page 755.

SYSCONF

Purpose

The SYSCONF subcommand causes the System Configuration Screen (FCX180) screen to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

See “FCX180, System Configuration Screen – SYSCONF” on page 573.

SYSLOAD

Purpose

The SYSLOAD subcommand causes the System Load Overview Screen (FCX198) to be displayed when entered while in an APPC/VM session via an APPC/VM store and forward server that is also acting as central data collector machine.

This subcommand is not valid in native monitor mode. Note that the System Load Overview Screen (FCX198) can also be displayed by issuing the FCONRMT command in basic mode. See the "Remote Performance Monitoring Facility" section in the “FCONRMT” on page 109 for a detailed description of remote performance monitoring.

Format

Parameters

No parameters are allowed or tested for.

Results

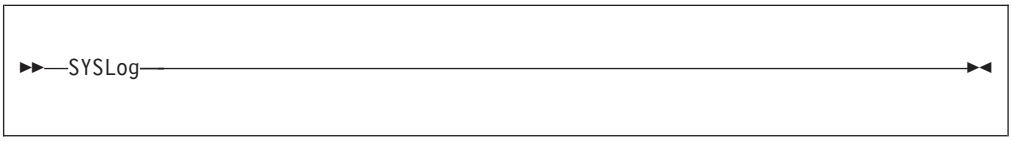
See the "Connecting to an S&F Server for Remote Connections" section in the *z/VM: Performance Toolkit Guide* for more information on the SYSMENU System Selection Menu and the SYSLOAD System Load Overview Screen.

SYSLOG

Purpose

The SYSLOG subcommand causes the System Facilities Log Screen (FCX179) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

See “FCX179, System Facilities Log Screen – SYSLOG” on page 571.

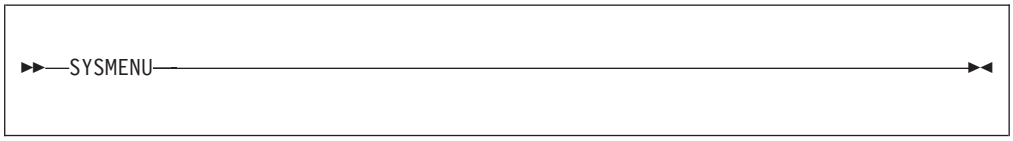
SYSMENU

Purpose

The SYSMENU subcommand causes the System Selection Menu (FCX193) be displayed when entered while in an APPC/VM session via an APPC/VM store and forward server.

This subcommand is not valid in native monitor mode.

Format



Parameters

No parameters are allowed or tested for.

Results

See the "Connecting to an S&F Server for Remote Connections" section in the *z/VM: Performance Toolkit Guide* for more information on the SYSMENU System Selection Menu and the SYSLOAD System Load Overview Screen.

SYSSET

Purpose

The SYSSET subcommand causes the System Settings Screen (FCX154) to be displayed.

Format

Parameters

No parameters are allowed or tested for.

Results

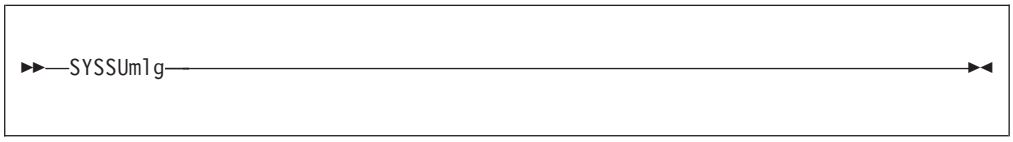
See “FCX154, System Settings Screen – SYSSET” on page 525.

SYSSUMLG

Purpose

The SYSSUMLG subcommand causes the System Summary Log Screen (FCX225) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

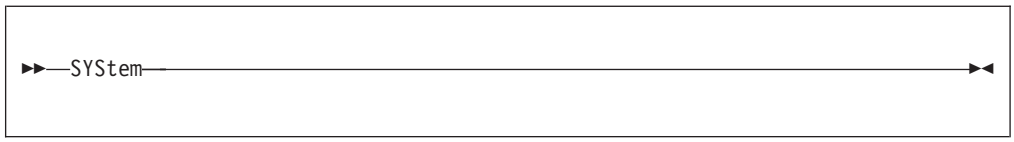
See “FCX225, System Summary Log Screen – SYSSUMLG” on page 682.

SYSTEM

Purpose

The SYSTEM subcommand causes the System Counters Screen (FCX102) to be displayed, with information on the system's management of storage, paging, and the minidisk cache.

Format



Parameters

No parameters are allowed or tested for.

Results

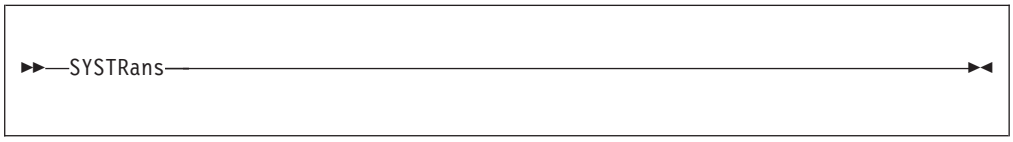
See “FCX102, System Counters Screen – SYSTEM” on page 372.

SYSTRANS

Purpose

The SYSTRANS subcommand causes the System Transaction Statistics Screen (FCX130) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

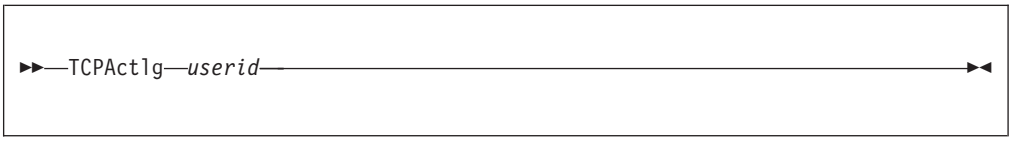
See “FCX130, System Counters Screen – SYSTRANS” on page 472.

TCPACTLG

Purpose

The TCPACTLG subcommand causes the General TCP/IP Activity Log Screen (FCX204) to be displayed.

Format



Parameters

userid Is the user identification of the TCP/IP server machine for which the general activity log is to be displayed.

Results

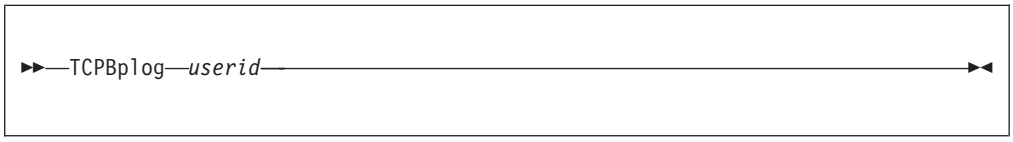
See "FCX204, General TCP/IP Activity Log Screen – TCPACTLG" on page 636.

TCPBPLOG

Purpose

The TCPBPLOG subcommand causes the TCP/IP Buffer Pools Log Screen (FCX210) to be displayed.

Format



Parameters

userid Is the user identification of the TCP/IP server machine for which the TCP/IP Buffer Pools Log Screen (FCX210) is to be displayed.

Results

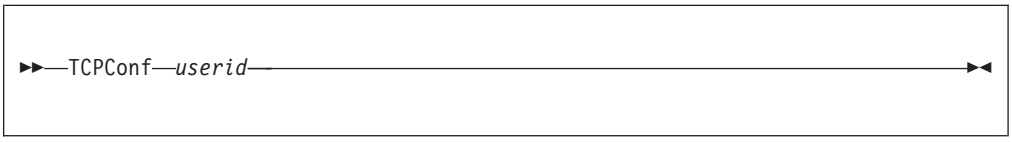
See "FCX210, TCP/IP Buffer Pools Log Screen – TCPBPLOG" on page 648.

TCPCONF

Purpose

The TCPCONF subcommand causes the TCP/IP Server Configuration Screen (FCX212) to be displayed.

Format



Parameters

userid Is the user identification of the TCP/IP server machine for which the TCP/IP Server Configuration Screen (FCX212) is to be displayed.

Results

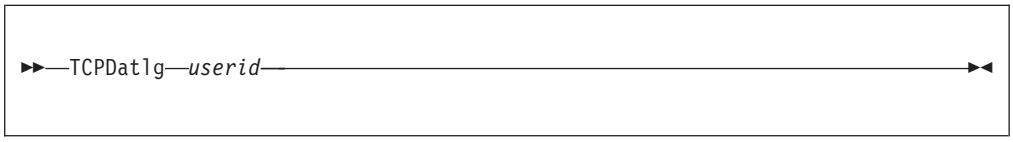
See "FCX212, TCP/IP Server Configuration Screen – TCPCONF" on page 651.

TCPDATLG

Purpose

The TCPDATLG subcommand causes the General TCP/IP Data Transfer Log Screen (FCX205) to be displayed.

Format



Parameters

userid Is the user identification of the TCP/IP server machine for which the General TCP/IP Data Transfer Log Screen (FCX205) is to be displayed.

Results

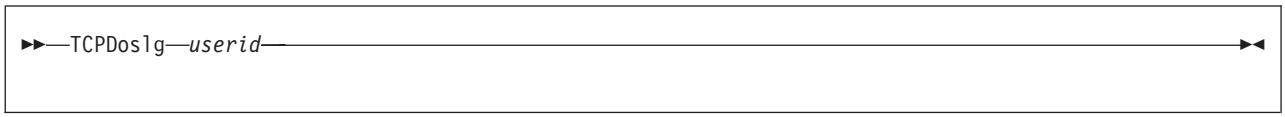
See "FCX205, General TCP/IP Data Transfer Log Screen – TCPDATLG" on page 638.

TCPDOSLG

Purpose

The TCPDOSLG command lets the TCP/IP Denial of Service Log Screen (FCX233) be displayed.

Format



Parameters

userid Is the user identification of the TCP/IP server machine for which the TCP/IP Denial of Service Log Screen (FCX233) is to be displayed.

Results

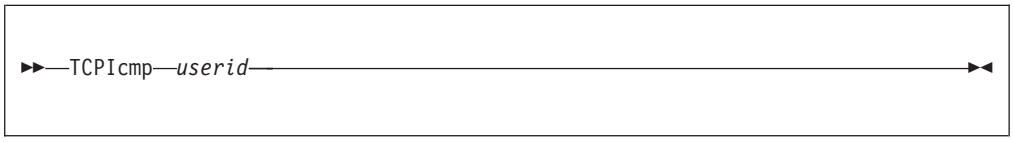
See "FCX233, TCP/IP Denial of Service Log Screen – TCPDOSLG" on page 700.

TCPICMP

Purpose

The TCPICMP subcommand causes the TCP/IP ICMP Messages Log Screen (FCX206) to be displayed.

Format



Parameters

userid Is the user identification of the TCP/IP server machine for which the TCP/IP ICMP Messages Log Screen (FCX206) is to be displayed.

Results

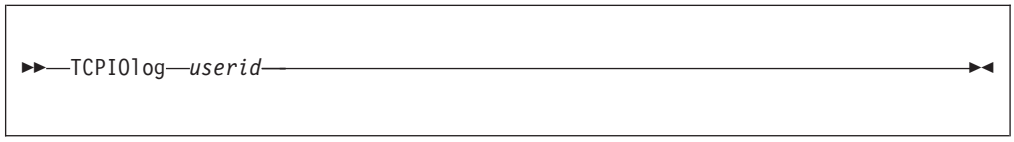
See "FCX206, TCP/IP ICMP Messages Log Screen – TCPICMP" on page 641.

TCPIOLOG

Purpose

The TCPIOLOG command lets the TCP/IP I/O Activity Log Screen (FCX222) be displayed.

Format



Parameters

userid
Is the user identification of the TCP/IP server machine for which the TCP/IP I/O Activity Log Screen (FCX222) is to be displayed.

Results

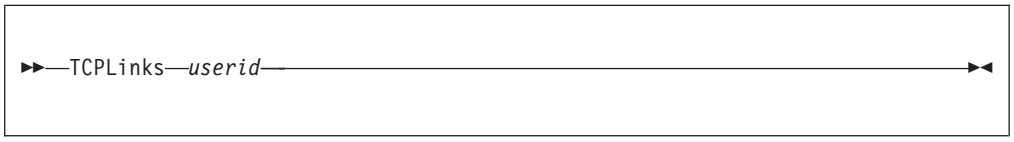
See "FCX222, TCP/IP I/O Activity Log Screen – TCPIOLOG" on page 677.

TCPLINKS

Purpose

The TCPLINKS subcommand causes the TCP/IP Links Activity Log Screen (FCX208) to be displayed.

Format



Parameters

userid Is the user identification of the TCP/IP server machine for which the TCP/IP Links Activity Log Screen (FCX208) is to be displayed.

Results

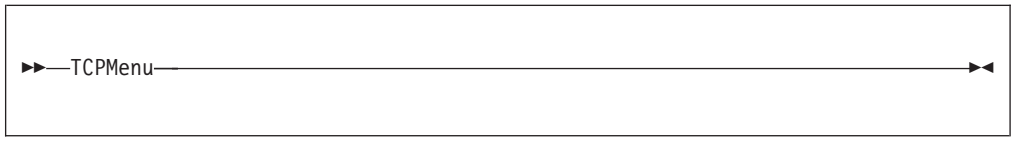
See "FCX208, TCP/IP Links Activity Log Screen – TCPLINKS" on page 646.

TCPMENU

Purpose

The TCPMENU subcommand causes the TCP/IP Performance Data Menu (FCX203) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

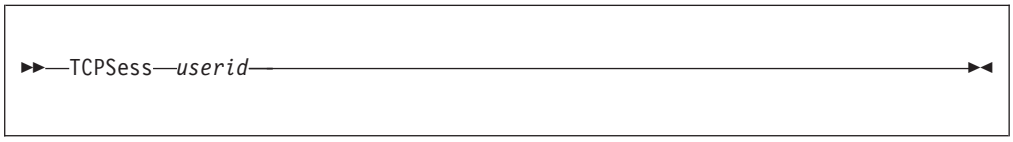
See "FCX203, TCP/IP Performance Data Menu – TCPMENU" on page 634.

TCPSESS

Purpose

The TCPSESS subcommand causes the TCP/IP TCP and UDP Sessions Log Screen (FCX207) to be displayed.

Format



Parameters

userid Is the user identification of the TCP/IP server machine for which the TCP/IP TCP and UDP Sessions Log Screen (FCX207) is to be displayed.

Results

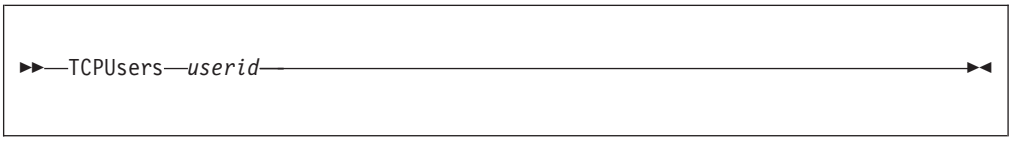
See "FCX207, TCP/IP TCP and UDP Sessions Log Screen – TCPSESS" on page 644.

TCPUSERS

Purpose

The TCPUSERS subcommand causes the TCP/IP Users Activity Log Screen (FCX214) to be displayed.

Format



Parameters

userid Is the user identification of the TCP/IP server machine for which the TCP/IP Users Activity Log Screen (FCX214) is to be displayed.

Usage

1. Once a virtual machine has shown any TCP/IP activity, its ID will be shown in the log for each interval at least up to the next 'reset', even while inactive. At reset time users that did not show any activity (i.e. did not produce any OPEN/CLOSE records) during the previous reset interval and that do not have an open session will be removed from the internal tables, and they will no longer be included in the log.

Results

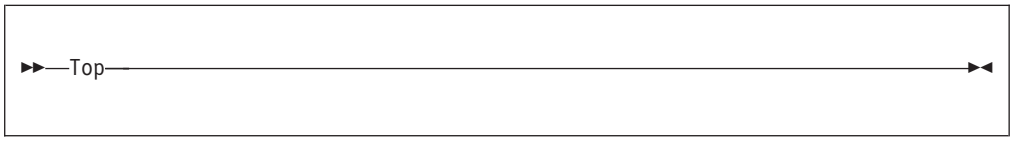
See “FCX214, TCP/IP TCP and UDP Sessions Log Screen – TCPUSERS” on page 657.

TOP

Purpose

The TOP subcommand displays the beginning of the current selection of performance data.

Format



Parameters

No parameters are allowed or tested for.

Usage

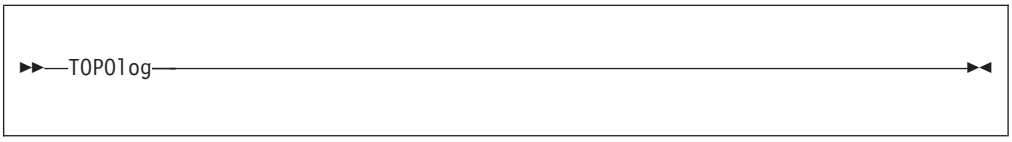
1. The beginning of the log will also be shown after pressing PF4 or PF16.

TOPOLOG

Purpose

The TOPOLOG subcommand causes the System Topology Machine Organization Screen (FCX287) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

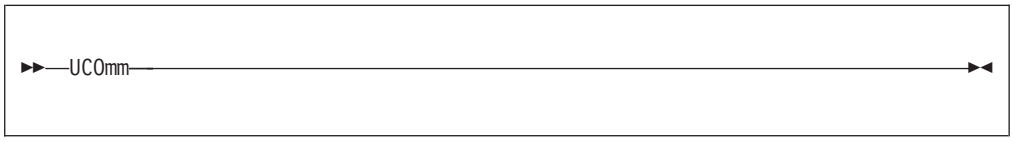
See “FCX287, System Topology Machine Organization Screen -- TOPOLOG” on page 799.

UCOMM

Purpose

The UCOMM subcommand causes the User Communication Screen (FCX132) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

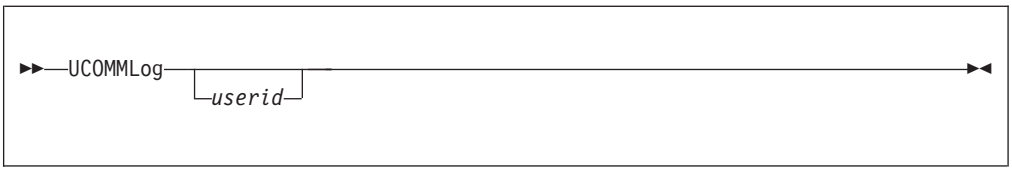
See “FCX132, User Communication Screen – UCOMM” on page 476.

UCOMMLOG

Purpose

The UCOMMLOG subcommand causes either the User Communication Log Screen (FCX167) or the General User Communication Log Screen (FCX182) to be displayed, based on whether a specific *userid* is specified.

Format



Parameters

userid Is the user identification of the virtual machine for which the User Communication Log Screen (FCX167) is to be displayed.

The General User Communication Log Screen (FCX182), with sums and averages for all users on the system, will be shown when the subcommand is entered without an additional argument.

Results

See "FCX182, General User Communication Log Screen – UCOMMLOG" on page 579 if you specified UCOMMLOG.

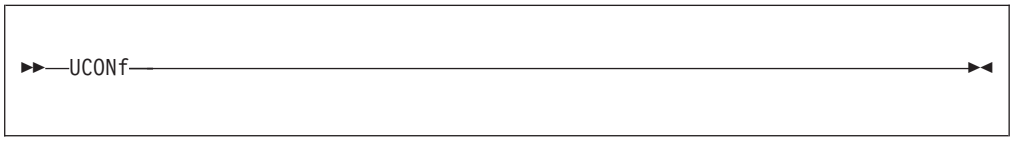
See "FCX167, User Communication Log Screen – UCOMMLOG *userid*" on page 548 if you specified UCOMMLOG *userid*.

UCONF

Purpose

The UCONF subcommand causes the User Configuration Screen (FCX226) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

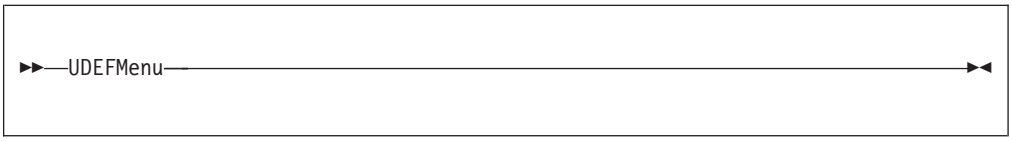
See “FCX226, User Configuration Screen – UCONF” on page 684.

UDEFMENU

Purpose

The UDEFMENU subcommand causes the User Defined Displays Selection Menu (FCX213) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

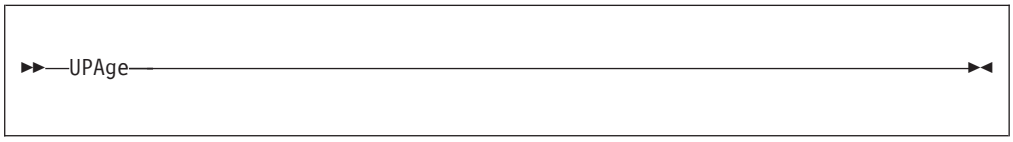
See “FCX213, User Defined Displays Selection Menu – UDEFMENU” on page 656.

UPAGE

Purpose

The UPAGE subcommand causes the User Page Data Screen (FCX113) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

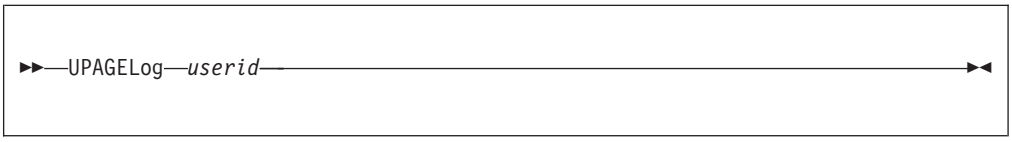
See “FCX113, User Page Data Screen – UPAGE” on page 424.

UPAGELOG

Purpose

The UPAGELOG subcommand causes the User Page Data Log Screen (FCX163) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the virtual machine for which the User Page Data Log Screen (FCX163) is to be displayed.

Results

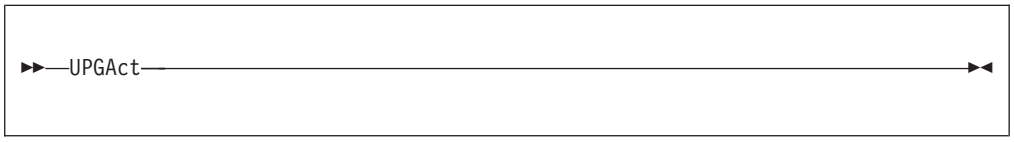
See "FCX163, User Page Data Log Screen – UPAGELOG" on page 544.

UPGACT

Purpose

The UPGACT subcommand causes the User Page Activity screen (FCX290) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

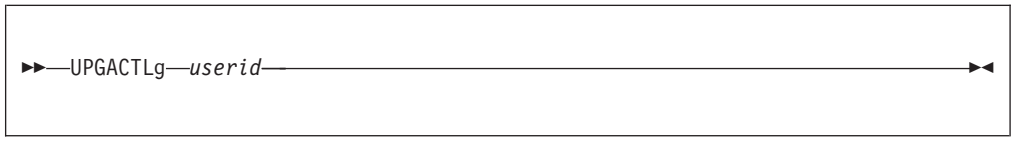
See “FCX290, User Page Activity Screen – UPGACT” on page 802.

UPGACTLG

Purpose

The UPGACTLG subcommand causes the User Page Activity Log screen (FCX291) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the virtual machine for which the User Page Activity Log screen (FCX291) is to be displayed.

Results

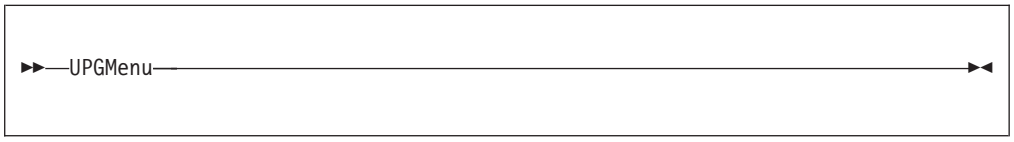
See "FCX291, User Page Activity Log Screen – UPGACTLG" on page 804.

UPGMENU

Purpose

The UPGMENU subcommand causes the User Paging Menu (FCX289) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

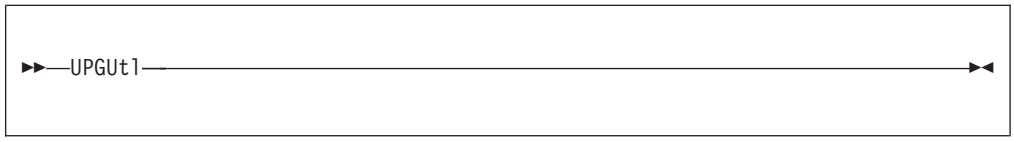
See “FCX289, User Paging Menu Screen – UPGMENU” on page 801.

UPGUTL

Purpose

The UPGUTL subcommand causes the User Page Utilization Data screen (FCX292) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

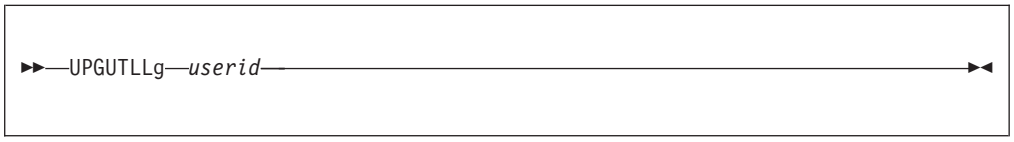
See “FCX292, User Page Utilization Data Screen – UPGUTL” on page 805.

UPGUTLLG

Purpose

The UPGUTLLG subcommand causes the User Page Utilization Data Log screen (FCX293) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the virtual machine for which the User Page Utilization Data Log screen (FCX293) is to be displayed.

Results

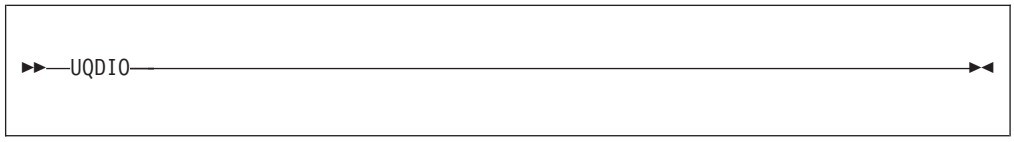
See "FCX293, User Page Utilization Data Log Screen – UPGUTLLG" on page 807.

UQDIO

Purpose

The UQDIO command causes the User QDIO Activity Screen (FCX257) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

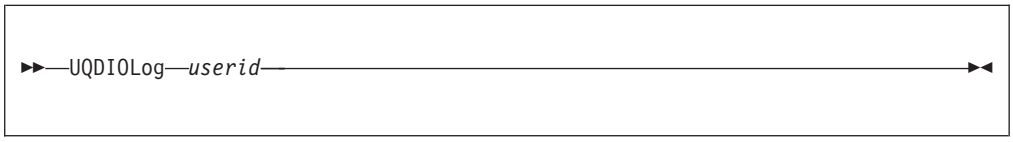
See “FCX257, User QDIO Activity Screen – UQDIO” on page 741.

UQDIOLOG

Purpose

The UQDIOLOG command causes the User QDIO Activity Log (FCX258) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the virtual machine for which the User QDIO Activity Log (FCX258) is to be displayed.

Results

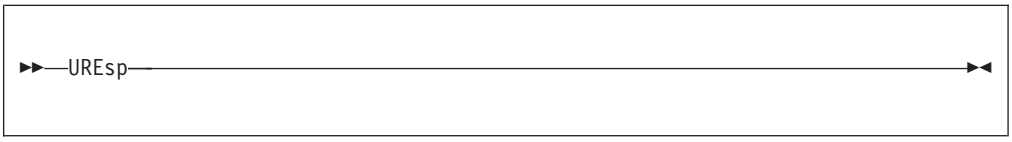
See "FCX258, User QDIO Activity Log – UQDIOLOG" on page 743.

URESP

Purpose

The URESP subcommand causes the User Response Time Screen (FCX127) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

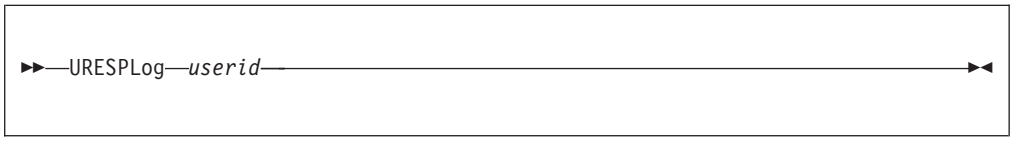
See “FCX127, User Response Time Screen – URESP” on page 467.

URESPLOG

Purpose

The URESPLOG subcommand causes the User Response Time Log Screen (FCX165) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the virtual machine for which the User Response Time Log Screen (FCX165) is to be displayed.

Results

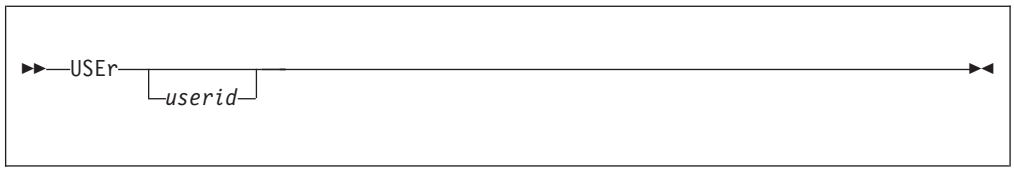
See "FCX165, User Response Time Log Screen – URESPLOG" on page 546.

USER

Purpose

The USER subcommand causes either the User Resource Details Screen (FCX115) or the User Resource Usage Screen (FCX112) to be displayed, based on whether a *userid* is specified.

Format



Parameters

userid Is the identification of a virtual machine for which detailed performance data are to be displayed. A User Resource Details Screen (FCX115) will be shown with performance information for the selected user only.

The User Resource Usage Screen (FCX112) will be shown if you enter the USER subcommand with no *userid*.

Results

See "FCX112, User Resource Usage Screen – USER" on page 420 if you specified USER.

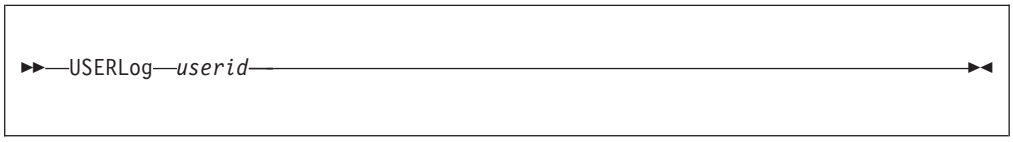
See "FCX115, User Resource Details Screen – USER *userid*" on page 433 if you specified USER *userid*.

USERLOG

Purpose

The USERLOG subcommand causes the User Resource Usage Log Screen (FCX162) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the virtual machine for which the User Resource Usage Log Screen (FCX162) is to be displayed.

Results

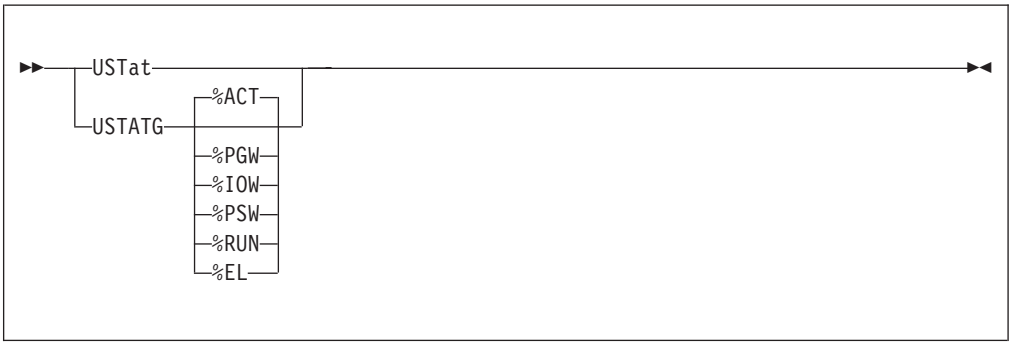
See "FCX162, User Resource Usage Log Screen – USERLOG" on page 543.

USTAT / USTATG

Purpose

The USTAT subcommand causes the User Wait States Screen (FCX114) to be displayed (with user activity and wait state percentages shown numerically). The USTATG subcommand displays the same information graphically in the form of bar charts. Note that the latter requires access to GDDM code and a terminal with graphics capability.

Format



Parameters

Additional sort arguments are valid for the USTATG subcommand only. Use the SORT subcommand for changing the sorting sequence of the normal USTAT display.

%ACT
Causes user output data to be sorted in descending order of user activity (percentage of measurements where the user was found in queue). %ACT sorting will automatically be assumed if no other sort sequence has been specified.

%PGW
Causes user output data to be sorted in descending order of page wait (percentage of in-queue measurements where the user was found waiting for pages)

%IOW
Causes user output data to be sorted in descending order of I/O wait (percentage of in-queue measurements where the user was found waiting for an I/O to complete)

%PSW
Causes user output data to be sorted in descending order of PSW wait (percentage of in-queue measurements where the user was found in PSW wait but not idle)

%RUN
Causes user output data to be sorted in descending order of runnable state. This is the percentage of in-queue measurements where the user was found to be either using CPU or waiting for CPU, or in any state other than the ones specifically displayed (e.g. instruction simulation wait, console function, or IUCV soft wait states)

%EL Causes user output data to be sorted in descending order of resource wait state (percentage of in-queue measurements where the user was found in the eligible list)

Results

See “FCX114, User Wait States Screen – USTAT / USTATG” on page 427.

USTATLOG

Purpose

The USTATLOG subcommand causes the User Wait States Log Screen (FCX164) to be displayed for the selected user.

Format

Parameters

userid Is the user identification of the virtual machine for which the User Wait States Log Screen (FCX164) is to be displayed.

Results

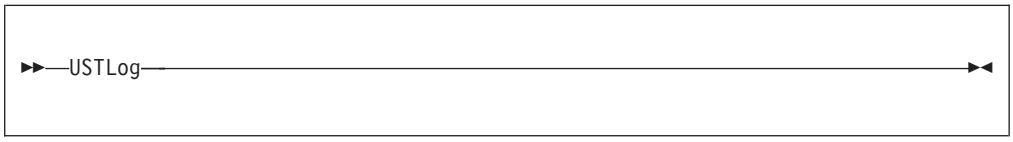
See "FCX164, User Wait States Log Screen – USTATLOG" on page 545.

USTLOG

Purpose

The USTLOG subcommand causes the User Wait State Log Screen (FCX135) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

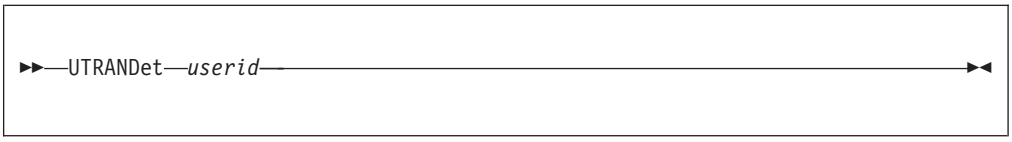
See “FCX135, User Wait State Log Screen – USTLOG” on page 483.

UTRANDET

Purpose

The UTRANDET subcommand causes the User Transaction Details Screen (FCX174) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the virtual machine for which the User Transaction Details Screen (FCX174) is to be displayed.

Results

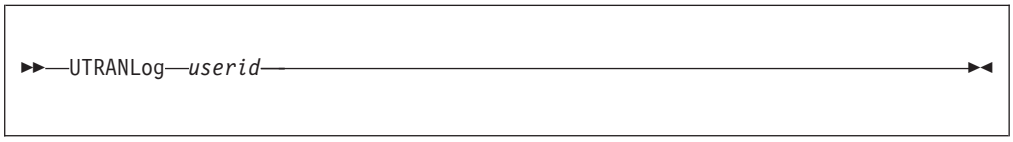
See "FCX174, User Transaction Details Screen – UTRANDET" on page 555.

UTRANLOG

Purpose

The UTRANLOG subcommand causes the User Resources per Transaction Log Screen (FCX166) to be displayed for the selected user.

Format



Parameters

userid Is the user identification of the virtual machine for which the User Resources per Transaction Log Screen (FCX166) is to be displayed.

Results

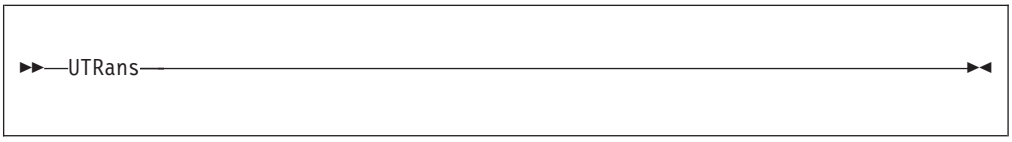
See "FCX166, User Resources per Transaction Log Screen – UTRANLOG" on page 547.

UTRANS

Purpose

The UTRANS subcommand causes the User Resources per Transaction Screen (FCX129) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

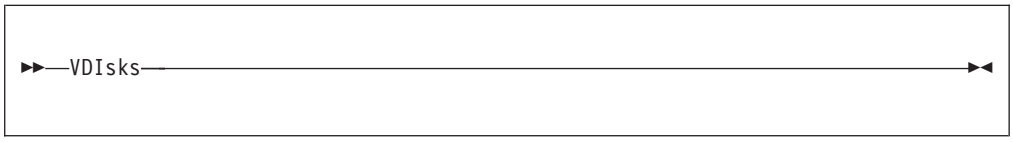
See “FCX129, User Resources per Transaction Screen – UTRANS” on page 470.

VDISKS

Purpose

The VDISKS subcommand causes the Virtual Disks in Storage Screen (FCX147) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

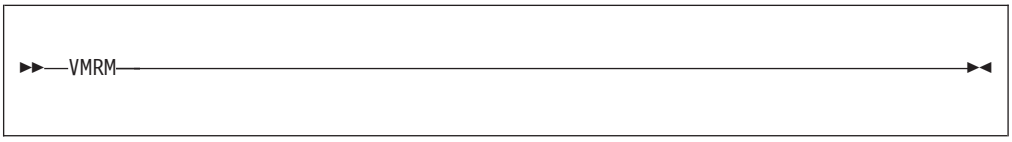
See “FCX147, Virtual Disks in Storage Screen – VDISKS” on page 509.

VMRM

Purpose

The VMRM subcommand causes the VM Resource Manager Screen (FCX241) to be displayed.

Format



Parameters

No parameters are allowed or tested for.

Results

See “FCX241, VM Resource Manager Screen – VMRM” on page 714.

VNIC

Purpose

The VNIC subcommand causes the Virtual Network Device Activity Screen (FCX269) to be displayed. This screen contains performance data for virtual network devices.

To see additional performance data for virtual network devices, see "EVNIC" on page 176.

For a summary of virtual network device definitions, see "GVNIC" on page 193.

Format

Parameters

No parameters are allowed or tested for.

Results

See "FCX269, Virtual Network Device Activity Screen – VNIC" on page 766.

VSWITCH

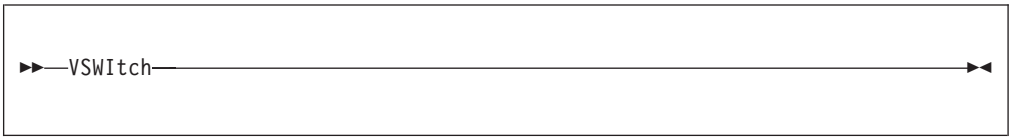
Purpose

The VSWITCH subcommand causes the Virtual Switch Activity Screen (FCX240) to be displayed.

To view additional performance data for VSWITCH, see "EVSWITCH" on page 177.

For a summary of VSWITCH definitions, see "GVSWITCH" on page 194.

Format



Parameters

No parameters are allowed or tested for.

Results

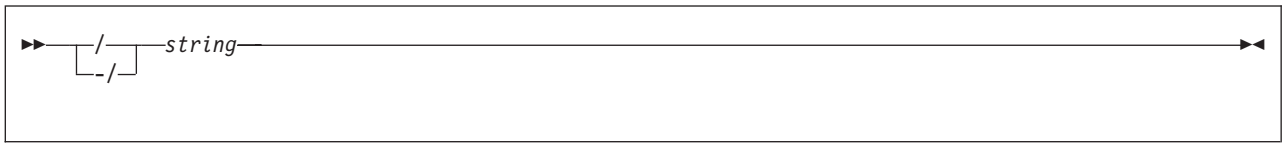
See "FCX240, Virtual Switch Activity Screen – VSWITCH" on page 712.

/ (LOCATE)

Purpose

The LOCATE subcommand searches the monitor output buffer for the character string specified.

Format



Parameters

where

/ Indicates a forward search. The search for the string specified starts with the current line + 1 and continues until either the string is found or the end of the display buffer is reached. 'Current line' is the uppermost non-header line shown on the display terminal.

-/ Indicates a backward search. The search starts with the current line - 1 and continues until either the string is found or the top of the display buffer is reached.

string is the character string to be located. Both the string and the monitor data to be scanned will be translated to upper case for the search. If it could be found, the record containing this string will be shown as first data record on the screen.

'ENTER'

Purpose

Pressing the 'ENTER'-key without any input will cause a new measuring interval to be started, i.e. performance data will be recalculated using current system counter values.

Chapter 2. Performance Toolkit Screens

Refer to “Performance Monitor Mode Subcommands” on page 133 for a description of the specific performance monitor subcommands you will need for selecting and manipulating performance displays, and to the “Using Performance Toolkit in Performance Monitor Mode” chapter in *z/VM: Performance Toolkit Reference* for some hints on how to work with the performance monitor.

Screen Layouts Overview

The general performance screen layout is as follows:

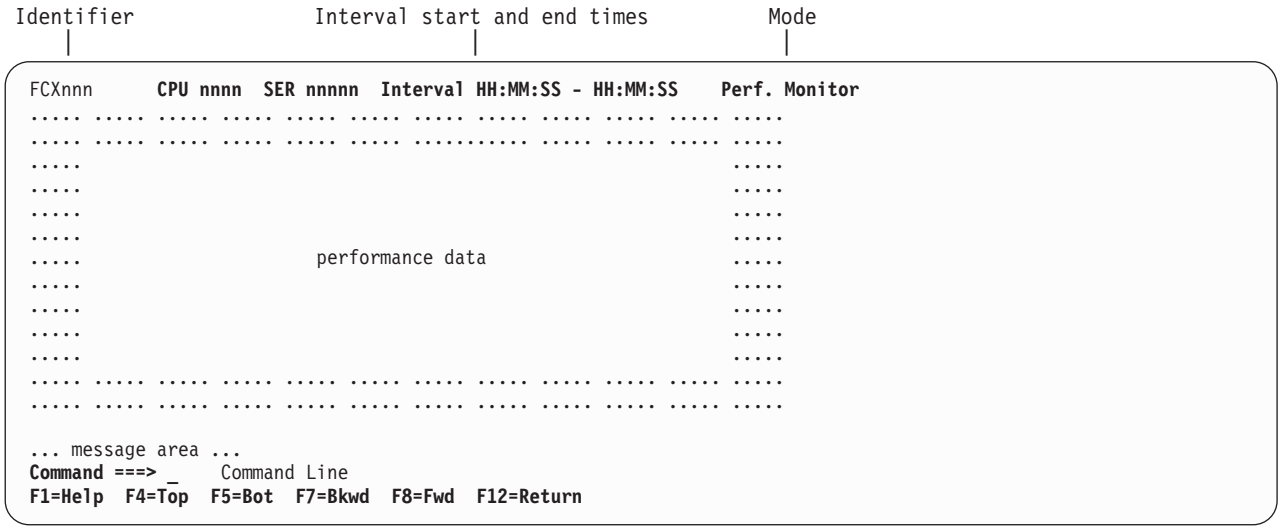


Figure 1. General Layout of Performance Monitor Screens

The header line indicates the following:

- The identifier of the current performance data display
- The CPU type being monitored
- The CPU serial number

  The corresponding RSCS node-ID, or any other string, can alternatively be inserted if desired (controlled by 'SYSTEMID' argument of the FC MONCOLL subcommand, see “FCONTROL MONCOLL” on page 52 for details and space needed). Note that the CPU type and serial number will be replaced by the creation date of the monitor data being viewed while in 'Monitor Data Scan' mode.
- The period of time for which the performance values on the screen have been calculated

The **mode** field contains the string 'Perf. Monitor' to indicate the current display mode. When concurrent printing of performance data has been activated, the string

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`Print on` will be shown in this field. When print output is to be written to a disk file, the string shown will be `Print on Disk`.

Interval

The time interval for which the performance data on the selected screen have been calculated is shown in the header line. The possible intervals are either:

- Current data (last interval)
- Interim data (averages since last INTERIM RESET)
- Average data (averages since last PRINT RESET)

Current Data: This is the initial display mode (and sometimes the only mode possible) for most performance displays. It gives information on system behavior during the last measuring interval, that is, the start and end times shown will usually indicate the time when the last two samples were taken. This will be the CP monitor sample interval for most displays; it can be a one-minute interval which is not linked to the monitor sample interval for some detailed data screens.

You can switch from a display of 'average' or 'interim' data to 'current' data by entering the subcommand CURRENT (see also “CURRENT” on page 165).

Interim Data: The INTERIM subcommand (see “INTERIM” on page 199) allows you to display interim averages of most performance data fields on screens that support interim data, i.e. averages will be calculated for the current interim period. The start time inserted while interim averages are displayed is the start time for the interim period, i.e. the time of the last interim RESET. A note at the end of each performance screen description will tell you whether INTERIM averages are supported.

Average Data: The AVERAGE subcommand (see “AVERAGE” on page 137) allows you to display the averages of most performance data fields for the entire time that monitoring was active or since the last RESET subcommand (automatically generated at midnight if no other RESET time has been entered). The start time inserted while averages are displayed is the start time for the entire period since the last RESET. Averages cannot be calculated for some of the detailed performance displays.

The time stamps shown in the header line have a different meaning for the 'history' log-type data screens which show performance by time:

- The interval for the performance redisplay screen will always indicate the time stamp of the oldest measurement that can still be displayed as starting time, with the seconds part set to '00'.
- For all the other log screens with a `>>Mean>>` line for averages at the top, the interval shown is the period for which these averages were calculated.

In both of the above cases the period shown does not depend on the CURRENT or AVERAGE setting.

By-Time Log Data: All 'by time' logs by default show detail lines which contain data just for the last monitor sample interval, that is, a new detail line is built for each new sample interval. While this high resolution mode of operation is probably what a user needs for analyzing a performance problem in real time, it also requires a lot of work buffer space for a given period or, for a given work buffer space, does not accomodate detail lines for long periods. The BYTIME argument of the 'FC SETTINGS ..' subcommand allows defining a different mode

of operation for most logs where the average or total values for a longer period are shown in each detail line. The length of that period is defined with the BYTIME argument.

Example: Entering the subcommand `FC SETTINGS BYTIME 15` will lead to detail log lines being built which refer to periods of 15 minutes, even though much shorter monitor sample intervals may be used. See "FCONTROL SETTINGS" on page 84 for a description of the subcommand. Exceptions: the BYTIME setting does not affect the REDISP display and the generation of detailed HISTLOG and benchmark logs.

PF-key definitions

The PF-key definitions shown for all examples, and also any references in the explanatory text, correspond to the initial setting. They can be re-defined by the user (command 'FC PFKEY SET nn FUNCTION xxxx', see "FCONTROL PFKEY" on page 66). You should refer to the actual numbers displayed in the bottom line for a specific function.

Data Consistency

Information from many different system control blocks (hundreds, or even thousands on large systems) has to be extracted during each data collect cycle. The fields cannot all be copied at a single moment, and slight inconsistencies between values from different sources must be expected. This inconsistency will be more noticeable for very short measuring intervals and when system load is high.

Although Performance Toolkit tries to use the CP monitor sample interval for collecting the control block based data of the remaining permanently updated general screens, the interval cannot be exactly the same and inconsistencies must be expected. This is true especially when the performance toolkit machine does not have a direct connection to the *MONITOR IUCV service but has to read the data from another machine's disk.

Note also that some detailed performance displays which are based on data collection from CP control blocks use a fixed one-minute interval for data collection. Their collection interval is not linked to the collection interval of all the general performance displays and, because of the different interval, the values shown will not usually match the equivalent values on a general screen.

Data Field Values

In Performance Monitor mode, field values will be numeric when applicable and possible. There are times when a field value is not available (for example, initial startup or zero divide) and the Performance Toolkit will display '...' to indicate that the field value is not available. Likewise, if a field value is not able to be calculated (for example, because the values are too high or exceed a conversion routine's capacity), the Performance Toolkit will display '????'. The '????' will be present for the time frame the conditions exist, and should be investigated if this persists over a significant number of intervals.

When the value being inserted into the field is too large to fit within the field width, a suffix k, m, g, t, p, or e will be appended for a decimal scaling factor (based on a power of 10), or K, M, G, T, P, or E for a binary scaling factor (based on a power of 2). These suffixes stand for kilo, mega, giga, tera, peta, and exa scaling coefficients, respectively.

Data Completeness

Monitor 'event' data records will be used, when available, to determine the 'session' start and end for all the monitor data based user displays, and for the NSS, DSPACESH and VDISKs displays, to capture all the data available. Some data will be lost when the event records are missing. Note also that the required monitor domains should remain enabled for the whole period while data collection is active. Disabling/enabling monitor domains during data collection is not recommended, since it can lead to incomplete and/or incorrect data being displayed.

FCX100, CPU Load and Transactions Screen – CPU

Performance Toolkit Subcommand: "CPU" on page 163.

The CPU Load and Transactions Screen (FCX100):

```
FCX100      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

CPU Load                                                          Status or
PROC TYPE %CPU  %CP %EMU %WT  %SYS  %SP %SIC %LOGLD  %PR %ENT  ded. User
P00  CP      3    3    0  97     2    0  99       3    0  100  Master
P01  CP      1    1    0  99     1    0 100       1    0  100  Alternate
P02  CP      0    0    0   0     0    0  ...    ...  100  100  Parked
P03  CP      0    0    0   0     0    0  ...    ...  100  100  Parked
P04  CP      0    0    0   0     0    0  ...    ...  100  100  Parked
P05  CP      0    0    0   0     0    0  ...    ...  100   71  Parked
P06  CP      0    0    0   0     0    0  ...    ...  100    0  Parked
P07  CP      0    0    0   0     0    0  ...    ...  100    0  Parked
P08  ZAAP    0    0    0 100     0    0  ...      0    0   73  Alternate
P09  ZIIP    0    0    0 100     0    0  ...      0    0   92  Alternate
P10  ICF     0    0    0 100     0    0  ...      0    0   50  Alternate
P11  IFL     0    0    0 100     0    0  ...      0    0  100  Alternate
P12  IFL     0    0    0 100     0    0  ...      0    0  100  Alternate
P13  CP      0    0    0   0     0    0  ...    ...  100    0  Parked
P14  CP      0    0    0   0     0    0  ...    ...  100    0  Parked
P15  CP      0    0    0   0     0    0  ...    ...  100    0  Parked
P16  CP      0    0    0   0     0    0  ...    ...  100    0  Parked
P17  CP      0    0    0   0     0    0  ...    ...  100    0  Parked
P18  CP      0    0    0   0     0    0  ...    ...  100    0  Parked
P19  CP      0    0    0   0     0    0  ...    ...  100    0  Parked
P20  CP      0    0    0   0     0    0  ...    ...  100    0  Parked

Total SSCH/RSCH     91/s     Page rate        .0/s     Priv. instruct.   189/s
Virtual I/O rate     1/s     XSTORE paging    .0/s     Diagnose instr.   187/s
Total rel. SHARE    3000     Tot. abs SHARE     0%

Queue Statistics:     Q0     Q1     Q2     Q3     User Status:
VMDBKs in queue        1      0      0      0     # of logged on users      28
VMDBKs loading         0      0      0      0     # of dialed users          0
Eligible VMDBKs               0      0      0     # of active users         13
El. VMDBKs loading            0      0      0     # of in-queue users        1
Tot. WS (pages)     3884      0      0      0     % in-Q users in PGWAIT     0
Reserved                                         % in-Q users in IOWAIT     0
85% elapsed time   2.088   .348  2.784  16.70     % elig. (resource wait)    0

Transactions      Q-Disp    trivial   non-trv     User Extremes:
Average users         .9         .0        .0     Max. CPU %   RSTL2        .2
Trans. per sec.      1.5         .2        .3     Reserved
Av. time (sec)      .646       .000      .065     Max. IO/sec  RSTL2        .2
UP trans. time                 .000      .176     Max. PGS/s   ........  .....
MP trans. time                 .000      .037     Max. RESPG   CFT2NDA   28585
System ITR (trans. per sec. tot. CPU)    42.8     Max. MDCIO   ........  .....
Emul. ITR (trans. per sec. emul. CPU)    1947     Max. XSTORE  ........  .....
See also DSVBKACT for the Dispatch Vector activity

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 2. Layout of CPU Load and Transactions Screen (FCX100)

The screen layout has been designed for displaying data of VM systems with or without expanded storage. The corresponding fields will remain empty where XSTORE is not available.

Description of CPU Load Fields:

Processor load fields

PROC The processor number in the format 'P*nn*'. The first processor shown is the IPL processor.

TYPE The processor type. The values are:

CP Central Processor

ICF Internal Coupling Facility Processor

IFL Integrated Facility for Linux Processor

ZIIP IBM System z™ Integrated Information Processor (zIIP)

ZAAP IBM System z Application Assist Processor (zAAP)

%CPU Total CPU load as a percent.

%CP Percent of supervisor (CP-) time. This includes both supervisor time spent for specific users and supervisor time for system services which is also shown under the heading `'%SYS'`.

%EMU
Percent of emulation time, that is, the processor time used while virtual machines were running under control of SIE microcode ('virtual' CPU time).

%WT Percent of time spent in wait state. No distinction is made between 'page wait', 'I/O wait', and 'idle wait' states. Refer to the user status fields on this display or to “USTAT / USTATG” on page 339 for indications of excessive page or I/O wait.

%SYS Percent of CPU time spent exclusively for system services, that is, not attributable to specific users.

%SP Percent of time spent spinning on a lock.

Note: All of the above CPU utilization percentages are calculated based on elapsed time, so that the load figures provide a meaningful base for capacity planning. For systems running in an LPAR or 2nd level the value is not, however, a good base for detecting a CPU bottleneck: because CP may not always be able to use a logical processor when it is needed (due to contention from other systems on the processor complex), there may be many users waiting for CPU even though the CPU utilization shown is well below 100%.

See the USTAT and USTLOG displays for information on CPU wait percentages, and the %LOGLD value below or the LPAR display for processor utilization figures which are based on the sum of processor 'active' and voluntary wait time, similar to the output of the 'INDICATE LOAD' subcommand.

%SIC Percent of SIE (Start Interpretive Execution) exits by interception (that is, SIE mode stopped because CP had to simulate an instruction). If no SIE instructions are reported on a processor, then dots are inserted in this field.

%LOGLD
Total 'logical' CPU load, that is, total CPU load calculated based on the sum of processor active plus processor wait time and *not* total elapsed time. The value is calculated only for VM systems running in an LPAR; dots will be inserted otherwise.

This value does not correctly reflect system load, but it is a better indicator on CPU bottlenecks than the %CPU value when the VM system runs in an LPAR.

%PR Total percent of the time when this CPU was in the parked state.

%ENT The average value of a portion of a physical CPU to which this vertical CPU is entitled, as a percentage. The value 100 indicates the CPU was vertically polarized with high entitlement during the measured period; the value 0 indicates the CPU was horizontally polarized.

Processor status field

Status or ded. User
Contains the user ID of the virtual machine the processor is dedicated to, or general status information if the processor is not available for some reason. If the processor is not dedicated to a user, the status field can be:

offline
If the processor is in Offline status

quiescing
If the processor is to be quiesced

quiesced
If the processor is quiesced

stopped
If the processor has been stopped

Master
For the master processor (usually the IPL processor).

Alternate
For alternate processors

Parked
If the processor is in a Parked state.

Or, if there is no special status to be shown:

"- - -" On z/VM versions earlier than V5.4.

General system load fields

Total SSCH/RSCH
Total SSCH (Start Sub-CHannel) and RSCH (Resume Sub-CHannel) rate for the system. The value inserted is the sum of the SSCH and RSCH rates run on all processors used by the system.

Virtual I/O rate
The virtual I/O rate is the sum of the I/O request rates by virtual machines, excluding I/O to virtual UR devices.

Total rel. SHARE
The sum of the relative SHARE values of all users in the dispatch list.

Page rate
Total system page rate.

XSTORE paging
Total XSTORE page rate.

Tot. abs SHARE
The sum of the absolute SHARE values of all users in the dispatch list.

Priv. instruct.
The average number of privileged instructions *simulated* per second by CP during the last measuring interval.

Diagnose instr.
The average number of diagnose instructions run per second during the last measuring interval .

Queue Statistics Fields:

Information for all VM queues (classes 0, 1, 2, and 3) are shown where available for the following fields:

VMDBKs in queue
The number of VMDBKs in the dispatch list (that is, active or waiting for service) in a specific class. A VMDBK (VM Definition Block) usually represents a virtual machine, but virtual MP users have several VMDBKs describing each of their virtual processors.

VMDBKs loading
The number of 'loading' VMDBKs (a subset of the total number of VMDBKs in the dispatch list, with very high paging requirements).

Eligible VMDBKs
The number of VMDBKs in the eligible list (waiting for some resource, for example, main storage, to become available).

El. VMDBKs loading
The number of 'loading' VMDBKs in the eligible list.

Tot. WS (pages)
The sum of the working sets of all users active in the corresponding class, expressed as the number of pages used.

85% elapsed time
Elapsed time slice which determines the maximum time a VMDBK may remain in the dispatch list before it is dropped. This value is continuously adapted for class 1 transactions so 85% of them can complete within a single class 1 elapsed time slice, that is, the value reflects both the system responsiveness to user demand *and* workload characteristics. You should bear this in mind when comparing the values from different systems.

The values for class 0/2/3 transactions are just multiples of the class 1 value, with fixed multiplication factors of 6, 8, and 48 respectively.

Transactions Fields:

Performance values are shown for three separate transaction groups:

Q-Disp
Values for Quick-Dispatch users

trivial Values for trivial transactions

non-trv
Values for non-trivial transactions

Transactions are considered to have been '*trivial*' if they completed with just a single drop from Q1 and no drops from any of the other queues. All other transactions are counted as *non-trivial*.

Performance values:

Average users
The average number of users active in the corresponding transaction group, calculated by dividing the total elapsed time spent in the group during the last interval by the length of the interval.

Trans. per sec.
The transaction rate per second.

Av. time (sec)
The average transaction time, including both UP and MP transactions.

UP trans. time
The average transaction time for UP users.

MP trans. time
The average transaction time for MP users.

System ITR
System Internal Throughput Ratio, that is, the number of transactions on the system per second of total CPU time used.

Emul. ITR
Emulation Internal Throughput Ratio, that is, the number of transactions on the system per second of emulation CPU time used.

User Status Fields:

Most of the following values are samples extracted at the end of the last measuring interval (exception: 'active users'). They are *not* averages for this measuring interval.

# of logged on users
Number of users logged on.

# of dialed users
Number of users dialed to the system.

# of active users
Number of users which were found to have been active during the last measuring interval. This is actually the number of active VMDBKs which describe virtual processors (virtual machines with several processors will be counted as multiple 'users'), and a VMDBK is considered to have been active if it has used one of the following during the last measuring interval:

- At least 10 msec of total CPU
- Some virtual CPU
- Has had some I/O activity

# of in queue users
Number of users found in the dispatch list (or waiting to be added to the dispatch list) at the end of the measuring interval. The virtual machine where this performance monitor was active (collecting data at the end of the measuring interval) is not included in this figure, because it would bias the statistics. This value is taken from user wait state analysis, it may not correspond exactly to the values shown for in-queue VMDBKs in the *Queue Statistics* fields on this display which come from another source (and cannot be collected at exactly the same time).

% in-Q users in PGWAIT
Percentage of in-queue users found in page wait state during the interval.

% in-Q users in IOWAIT
Percentage of in-queue users found in I/O wait state during the interval. This is calculated as the sum of the wait state percentages for the following as reported in the user wait state screens USTAT and USTLOG:

- I/O wait (during CCW translation)
- I/O active

This interpretation is an attempt to provide the performance analyst with a meaningful value for 'I/O wait', but be aware that it is not quite correct. While instruction simulation wait will be mostly I/O wait at least where CMS users are concerned, some other instruction simulation wait will also be contained in this number.

% elig. (resource wait)
Percentage of 'in-queue' users found in an 'eligible list', that is, waiting for a constrained resource, during the measuring interval.

User Extremes Fields:

These fields display the userid and specific load imposed onto the system by the heaviest user for the following areas:

Max. CPU %
User which consumed most CPU during the last measuring interval and the percentage of total CPU used (based on one processor).

Max. IO/sec
Virtual machine with the highest I/O rate (non-spooled) during the last measuring interval and its I/O rate.

Max. PGS/s
Virtual machine with the highest paging rate and its page rate.

Max. RESPG
Virtual machine with the highest number of currently resident pages and the number of resident pages.

Max. MDCIO
Virtual machine with the highest number of MDCACHE inserts and the MDCACHE insert rate.

Note that this value is only a rough indicator. Due to the collect mechanism the numbers shown can be considerably lower than the users' actual MDC insert activity, especially for long monitor intervals.

Note, also, that you may see dashes ("- - -") in this field on z/VM systems earlier than V5.4.

Max. XSTORE
Virtual machine with the highest number of XSTORE pages and the current number of XSTORE pages used by this machine (without dedicated XSTORE).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall period averages will be shown for all performance fields, except for the `User Extremes` fields.

FCX101/FCX181 Remote Performance Log Display – REDISP, REDHIST

Performance Toolkit Subcommand: "REDISP" on page 260 or "REDHIST" on page 259.

This screen will be shown after entering the 'REDISP' sub-command (or pressing the corresponding PF-key). It allows redisplaying key performance values from previous measurements. The data shown can come from either of the following two sources:

- *Performance redisplay buffer* (in storage) which contains data from the last measurements made in your machine during the *current* session. The default number of measurements that can be shown is 720. It can be changed using the command 'FC MONCOLL REDISP *nnn*' to any other value between 60 and 14400.

  The screen identifier for this display is FCX101.
- *Performance history files* (on disk, old format). These will exist only in machines where history data collection on disk has been activated (command 'FC MONCOLL PERFLOG ...'). If available, they can be displayed for analyzing a previous day's performance data. The status message area (center part of the top line) will then look like this

  `Viewing File` *fn ft fm*

  i.e. it will contain the full file identification (file name, file type and file mode) of the history file being viewed.

  The screen identifier for display based on history logs on disk is FCX181.

```
FCX101         CPU nnn  SER nnn  Interval HH:MM:SS  Perf. Monitor

TIME   CPU  %CP  %EM  %WT  %SY -  -  IO/S VIO/S PG/S XPG/S DIAG PRIV LOGN ACT
14:09  163   53  110  237   11 .  .   308   270  194   522 1199 2117 1519 226
14:10  153   51  102  247   11 .  .   322   269  242   571 1157 1957 1520 260
14:11  222   57  165  178   12 .  .   349   323  207   600 1166 2072 1517 257
14:12  146   51   95  254   11 .  .   307   296  141   418 1110 1981 1515 214
14:13  176   49  127  224   11 .  .   284   328  180   422 1084 1832 1510 228
14:14  167   54  113  233   11 .  .   354   323  177   429 1208 2069 1514 232
14:15  225   67  158  175   15 .  .   441   345  218   517 1542 2672 1513 234
14:16  212   66  146  188   14 .  .   403   332  223   622 1572 2847 1516 236
14:17  187   57  130  213   12 .  .   376   364  195   527 1193 2269 1514 229
14:18  164   52  112  236   11 .  .   340   302  203   561 1155 1953 1516 228
14:19  275   59  216  125   14 .  .   406   397  209   521 1261 2293 1518 230
14:20  177   51  126  223   11 .  .   319   274  203   477 1128 1939 1513 218
14:21  180   54  126  220   11 .  .   360   313  170   492 1292 2294 1516 210
14:23  144   42  102  256   10 .  .   269   240  133   442  938 1600 1520 213
14:24  212   53  159  188   12 .  .   363   315  123   456 1188 2171 1522 223
14:25  160   51  109  240   11 .  .   397   322  199   470 1165 2023 1528 266
14:26  149   50   99  251   11 .  .   320   222  190   437 1036 1873 1526 247
14:27  235   57  178  165   13 .  .   374   483  204   535 1359 2354 1524 238

Command ===>
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 3. Layout of Remote Performance Log Display (FCX101)

The screen width of a display terminal is not sufficient for the many performance variables which are available for viewing. You can view performance data not shown in the current screen window by shifting this window to the left or right, using either the 'LEFT' and 'RIGHT' sub-commands (or the corresponding PF-keys), or by direct selection of one of the following sub-sets:

- *'CPU'* data, with actual processor load and overall I/O and paging information.

  Selected by `CPUDATA`-command.

- *'Transaction'* data, with user activity and queue statistics.
  Selected by `TRANSACT`-command.
- *'Storage Utilization'* information, including XSTORE and minidisk cache data.
  Selected by `STORUTIL`-command.
- *'Max. User'* values which show which user caused the highest load in a specific area.
  Selected by `MAXUSER`-command.

The commands for selecting a specific group of performance variables can be supplied as arguments with the `REDISPLAY` command, or they can be entered separately once performance redisplay mode has been entered.

Once entered, the LEFT/RIGHT shift position is retained even after quitting and re-entering performance redisplay mode.

Each line contains a series of performance values from the general CPU screen, the storage utilization screen, or from the SYSTEM screen, preceded by a time stamp indicating when they were calculated. The most recent measurements will be shown first when switching into re-display mode (last measurement in bottom line). Previously calculated values can be viewed by shifting the data backwards ('BACKWARD' sub-command or corresponding PF-key). All values will be shifted upwards by one line and new values inserted into the bottom line whenever a new measurement is made.

See the "Remote Performance Log Display" section in the *z/VM: Performance Toolkit Guide* for more information on this screen.

Redisplay of General CPU Performance Data

This part of the performance redisplay data can be selected

- by initially entering the command `REDisp CPUData`, or
- by entering the command `CPUData` while already viewing other performance redisplay data.

This part will be shown initially, before any left/right shift commands have been entered.

```
FCX101      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

TIME   CPU  %CP  %EM   %WT %SY -  -  IO/S VIO/S PG/S XPG/S DIAG PRIV LOGN ACT
08:14  391  102  289    9   15 .  .   243   565  270   664 2197 3055 1025 275
08:15  378   92  286   22   14 .  .   250   541  173   599 2474 3211 1040 268
08:16  359   85  274   41   14 .  .   239   532  195   627 2054 2902 1062 283
08:17  379  100  279   21   15 .  .   305   600  198   742 2482 3435 1084 303
08:18  370   98  272   30   15 .  .   274   538  235   774 2550 3393 1095 304
08:19  384   91  293   16   15 .  .   267   520  226   680 2183 3036 1112 288
08:20  382  100  282   18   15 .  .   272   531  183   718 2807 3612 1127 300
08:21  383   97  286   17   16 .  .   293   627  283   869 2574 3454 1145 302
08:22  391   92  299    9   15 .  .   274   608  210   896 2175 3032 1160 313
08:23  395   96  299    5   15 .  .   289   605  174   899 2310 3257 1177 317
08:24  355   86  269   45   13 .  .   241   546  122   738 2091 2901 1185 304
08:25  391   95  296    9   15 .  .   286  1078  210   719 3806 4750 1203 312
08:26  400   99  301    0   15 .  .   278   630  176   854 2714 3733 1225 318
08:27  369   88  281   31   14 .  .   249   575  167   771 3116 4007 1238 309
08:28  337   86  251   63   13 .  .   255   527  134   787 1996 2879 1251 321
08:29  361   91  270   39   14 .  .   263   610  202   703 2124 3080 1273 293
08:30  305   92  213   95   15 .  .   305   593  216   797 2278 3169 1288 322
08:31  331  100  231   69   15 .  .   312   671  194   861 2542 3484 1304 335
Enter 'GRAPHIcs' command for history graphics selection menu
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 4. Layout of performance redisplay screen: CPU data

Field Description for CPU Data:

TIME Time stamp. The values shown on this line are either averages calculated for the time interval between the current and the previous time stamp (usually equivalent to the CP monitor sample interval) or samples taken at the end of the measuring interval (current time stamp).

`A time stamp as shown (format hh:mm)`

will be inserted when looking at data from your current redisplay buffer or from a detailed '*mmddyy* PERFLOG*n*' history file. When looking at a condensed history file 'ACUM PERFHIST', the time stamp has the format `mmddyy hh`, i.e. you'll see two fields containing the date and the hour during which the values have been collected.

CPU Total CPU load in percent. On systems with more than one processor this field contains the *total* of the loads on *all* processors (applies also to the following six other CPU load indicators).

All of the processor load figures have been calculated based on elapsed time, so as to provide meaningful data for capacity planning. Note, however, that these figures may be misleading for systems running in an LPAR, or second level under another VM, unless the processors have been dedicated to this VM system, an overall load value well below the theoretical maximum may be no guarantee that you do not have a CPU bottleneck on the system, because other systems may contend for the same processors. Look at CPU wait percentages in the USTAT and USTLOG screens as indicators of a CPU bottleneck if you suspect problems in this area.

%CP Percent of supervisor (CP-) time

%EM Percent of emulation (problem) time

%WT Percent of time spent in wait

%SY Percent of supervisor time spent for system services which could not be charged to any specific user

IO/S Number of SSCH or RSCH operations executed per second on all processors

VIO/S
Number of virtual I/O operations per second, without UR I/O

PG/S Page rate (pages read/written per second)

XPG/S
XSTORE (expanded storage) page rate (inserted only on systems with expanded storage)

DIAG
The number of diagnose instructions executed per second by CP

PRIV The number of privileged instructions per second simulated by CP

Redisplay of User Transaction Data

This part of the performance redisplay data can be selected

- by initially entering the command `REDISP TRANSACT`, or
- by entering the command `TRANSACT` while already viewing other performance redisplay data.

```
FCX101      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

TIME >LOGN  ACT TR-T NT-T C1ES TR-Q NT-Q TR/S NT/S  ITR %PQ %IQ %LD %EL  Q1  Q
08:14 1025  275 0.04 1.14  .52   .8 18.7 19.6 16.3  9.4   0  25   0   0  12  2
08:15 1040  268 0.05 1.61  .51   .9 22.5 18.2 13.9  8.8   4  34   0   0  11
08:16 1062  283 0.04 0.99  .52  1.0 15.3 21.0 15.4 10.6   0  24   0   0  20  2
08:17 1084  303 0.04 1.40  .49  1.1 27.7 24.3 19.6 11.8   0  48   0   0  13  1
08:18 1095  304 0.05 1.08  .48  1.1 17.9 21.4 16.6 10.5   3  35   5   0  17  1
08:19 1112  288 0.04 0.89  .46  1.0 15.1 21.2 17.1 10.2   0  39   0   0  12  2
08:20 1127  300 0.04 0.95  .48   .9 16.1 20.3 16.9 10.0   0  43   2   0  15  2
08:21 1145  302 0.04 1.23  .50  1.0 24.5 23.2 19.8 11.5   0  16   0   0  13  3
08:22 1160  313 0.04 2.21  .51  1.1 42.7 23.6 19.3 11.3   4  30   0   0  20  2
08:23 1177  317 0.05 0.98  .51  1.2 19.6 25.2 19.8 11.7   0  48   0   0  11  2
08:24 1185  304 0.04 1.06  .47  1.1 18.8 22.8 17.5 11.6   2  39   0   0  15  1
08:25 1203  312 0.04 1.13  .45  1.0 21.7 24.3 19.1 11.3   0  30   0   0  20  1
08:26 1225  318 0.04 1.12  .47  1.2 22.5 27.0 19.9 12.0   0  33   0   0  17  1
08:27 1238  309 0.04 0.83  .44  1.3 16.3 27.6 19.5 13.1   0  30   0   0  13  1
08:28 1251  321 0.04 0.72  .43  1.0 13.8 24.3 18.9 13.2   3  34   0   0  17
08:29 1273  293 0.05 1.31  .46  1.2 22.6 22.2 17.0 11.1   5  51   2   0  25  1
08:30 1288  322 0.05 0.89  .47  1.3 15.7 24.2 17.7 14.2   0  54   0   0  15  2
08:31 1304  335 0.05 1.14  .49  1.3 22.9 25.7 19.9 14.1   0  45   0   0  15  1
Enter 'GRAPHIcs' command for history graphics selection menu
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 5. Layout of performance redisplay screen: Transaction data

Only part of the available transaction data can be shown on the initial screen. Use the 'RIGHT' command, or press the corresponding PF-key for viewing the remainder of the variables.

Field Description for Transaction Data:

TIME Time stamp, see 'CPU' data for details

LOGN
Number of users logged on at the end of the measuring interval

ACT Number of users which have been active (i.e. used some CPU time or executed I/Os) during the last measuring interval

TR-T Average elapsed time used for trivial transactions (UP and MP)

NT-T Average elapsed time used for non-trivial transactions (UP and MP)

C1ES Class 1 elapsed time slice: the time slice within which 85% of all class 1 transactions completed. This includes time spent in Q1 and E1 (class 1 dispatch and eligible lists), and it is a good indicator of system responsiveness to interactive user requests.

TR-Q Average number of concurrently active users with trivial transactions (UP and MP) during the last interval

NT-Q Average number of concurrently active users with non-trivial transactions (UP and MP)

TR/S Average trivial transaction rate during the last measuring interval (UP and MP)

NT/S Average non-trivial transaction rate (UP and MP)

ITR The 'system internal throughput ratio', i.e. the number of transactions executed on the system per second of total CPU time

%PQ Percentage of in-queue users (users which were either in the dispatch list or the eligible list) found in page wait state during the interval

%IQ Percentage of in-queue users found in I/O wait state during the interval. This is calculated as the sum of the wait state percentages for

- I/O wait (CCW translation)
- I/O active

as reported in the user wait state screens USTAT and USTLOG.

%LD Percentage of 'loading' in-queue users during the interval, i.e. of users with a very high page read activity

%EL Percentage of 'in-queue' users in an eligible list (in resource wait) during the interval

Q1 Number of class 1 users in the dispatch list at the end of the interval

Qx Number of non-class 1 users (in either of the classes 0, 2 or 3) in the dispatch list at the end of the interval

Q1L Number of in-queue class 1 users in 'loading' state

QxL Number of in-queue non-class 1 users (in either of the classes 0, 2 or 3) in 'loading' state

E1 Number of class 1 users in the eligible list at the end of the interval

Ex Number of non-class 1 users (in either of the classes 0, 2 or 3) in the eligible list

E1L Number of eligible class 1 users in 'loading' state

ExL Number of eligible non-class 1 users (in either of the classes 0, 2 or 3) in 'loading' state

Redisplay of Storage Utilization Data

This part of the performance redisplay data can be selected

- by initially entering the command `REDISP STORUTIL`, or
- by entering the command `STORUTIL` while already viewing other performance redisplay data.

```
FCX101      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

TIME > PPAG %ST ALO/S  FPGS %FR SHAR #TW ESCN %PGSL %SPSL XSTAV %XS XAL/S XAGE
08:14 52514  13  1918  ....  94 1551   0    0    13    61 1024M  99   459  516
08:15 52380   7  1689  ....  94 1539   0    0    14    61 1024M  99   378  516
08:16 52139  15  1864  ....  94 1930   0    0    15    61 1024M  99   406  508
08:17 51926  10  2124  ....  94 1540   0    0    16    61 1024M  99   455  504
08:18 51844  11  1950  ....  94 1551   1    0    16    61 1024M  99   482  496
08:19 51649  13  1767  ....  94 1489   0    0    17    61 1024M  99   437  490
08:20 51519  14  1802  ....  94 1410   0    0    18    61 1024M  99   449  493
08:21 51325  14  2133  ....  94 1861   0    0    20    61 1024M  99   548  490
08:22 51164  15  2031  ....  95 1485   0    0    20    61 1024M  99   544  500
08:23 50990  11  2250  ....  94 1943   0    0    21    61 1024M  99   534  517
08:24 50915  11  1809  ....  95 1820   0    0    21    61 1024M  99   427  540
08:25 50774  12  1856  ....  94 1920   0    0    22    61 1024M  99   454  495
08:26 50542   9  2032  ....  95 1646   0    0    23    61 1024M  99   532  455
08:27 50379  10  1923  ....  94 1686   0    0    23    61 1024M  99   475  439
08:28 50253   8  1753  ....  94 1721   0    0    24    61 1024M  99   475  430
08:29 50031  13  1942  ....  95 1616   0    0    24    61 1024M  99   464  406
08:30 49893  16  1980  ....  95 1659   1    0    25    61 1024M  99   510  391
08:31 49722  10  2220  ....  94 1734   0    0    25    61 1024M  99   547  379
Enter 'GRAPHIcs' command for history graphics selection menu
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 6. Layout of performance redisplay screen: Storage Utilization data

Only part of the available storage utilization data can be shown on the initial screen. Use the 'RIGHT' command, or press the corresponding PF-key for viewing the remainder of the variables.

Field Description for Storage Utilization Data:

TIME Time stamp, see 'CPU' data for details

PPAG
Number of pageable pages in the DPA at the end of the measuring interval

%ST Percentage of pageable pages used by the current in-queue users' working sets

ALO/S
The number of page frame requests per second, i.e. the page frame allocation rate

FPGS Amount of real storage reserved by CP for subpool, save, system and VMDBK free storage. On z/VM 5.2 and later, dots will be inserted here.

%FR The percentage of subpool free storage which is currently in use

SHAR
Number of shared pages

#TW Rate per second at which tasks were found to be waiting for a page

ESCN
The percentage of 'demand scans' (calls to the available list replenishment routine) which did not complete after the first scan.

Note that the first scan takes page frames from dormant users, and only unreferenced pages from active users, and is therefore harmless. If the number of page frames freed in this way is not yet sufficient, a second and, if necessary, even a third scan ('emergency scan') will be done, and referenced pages from active users, shared segments and CP itself will then be taken. This can severely impact performance and should be avoided.

The number shown represents the number of scans which did complete after the second scan or the emergency scan, or which were unsuccessful, as a percentage of all demand scans.

The number should be zero; high numbers indicate insufficient real storage.

%PGSL
Page slot utilization, in percent of available slots

%SPSL
SPOOL slot utilization, in percent of available slots

XSTAV
XSTORE size available for CP

%XS Percent of XSTORE blocks in use

XAL/S
The number of XSTORE pages allocated per second

XAGE
Average age of XSTORE blocks, in seconds

MAGE
Average age of XSTORE blocks at migration, in seconds

BKRD
Blocking factor when reading pages from DASD

BKMG
Blocking factor when migrating pages out of XSTORE

BKST
Blocking factor for page steals, i.e. when writing pages from main storage to DASD

MDUS
Number of users which caused at least one insert operation into the minidisk cache during the last fair share interval

MDNE
Number of XSTORE blocks and of central storage page frames used by the minidisk cache. See STORAGE or MDCSTOR displays for monitoring both values separately.

MDR/S
The number read operations per second to the minidisk cache

%MDR
Minidisk cache read block percentage, i.e. the percentage of read block operations out of the total of read and write block operations.

%MDH
Minidisk cache read percentage, i.e. the percentage of minidisk read operations which did not require an I/O operation to real DASD

Redisplay of User Extremes

This part of the performance redisplay data can be selected

- by initially entering the command `REDISP MAXUSER`, or
- by entering the command `MAXUSER` while already viewing other performance redisplay data.

```
FCX101      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

TIME >Max. CPU  Max. Vector     Max. I/O      Max. Paging    Max. Resident  Ma
08:14 CHBAT01   54.1 ........   ... CHVTAM    48.3 RKAU      16.7 CHNETV    17
08:15 STW       49.3 ........   ... SBU       57.6 FHI        9.6 CHNETV    17
08:16 STW       66.7 ........   ... CHVTAM    50.6 DKN        7.3 CHNETV    17
08:17 STW       50.3 ........   ... CHVTAM    51.7 PTR        8.6 CHNETV    17
08:18 STW       64.9 ........   ... CHVTAM    53.2 BCH       11.0 CHNETV    15
08:19 CHBAT03   58.0 ........   ... CHVTAM    55.0 TEL2       6.4 CHNETV     8
08:20 STW       46.9 ........   ... CHVTAM    47.0 SWU        6.1 CHCAL      5
08:21 STW       50.2 ........   ... CHVTAM    50.5 JBB        7.5 CHVSCS     4
08:22 CHBAT02   52.7 ........   ... CHVTAM    51.1 MW         7.2 CHVSCS     4
08:23 CHBAT02   49.8 ........   ... CHVTAM    48.4 CAST       5.7 VBO        4
08:24 CHBAT02   67.2 ........   ... CHVTAM    48.5 CSTB       5.6 CHCAL      5
08:25 MAINT     21.3 ........   ... ROP        520 SYSTEM    24.7 CHCAL      6
08:26 MAINT     14.1 ........   ... CHVTAM    56.7 TUL        6.3 CHCAL      5
08:27 CHBAT01   29.7 ........   ... CHVTAM    52.0 MEV        6.9 CHCAL      6
08:28 CHBAT03   27.6 ........   ... CHVTAM    52.5 KIM        6.5 CHCAL      5
08:29 CHBAT01   32.0 ........   ... CHVTAM    54.3 DRUE       9.5 CHCAL      5
08:30 GYS       24.4 ........   ... CHVTAM    48.7 FJEI       9.6 CHCAL      5
08:31 MKOP      24.0 ........   ... CHVTAM    51.3 ANB        8.2 CHCAL      5
Enter 'GRAPHIcs' command for history graphics selection menu
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 7. Layout of performance redisplay screen: Max. User data

Only part of the available user extremes data can be shown on the initial screen. Use the 'RIGHT' command, or press the corresponding PF-key for viewing the remainder of the variables.

Field Description for Max. User Data:

TIME Time stamp, see 'CPU' data for details

Max. CPU
User-ID which consumed most CPU during the last measuring interval, and the percentage of total CPU used

Max. Vector
User-ID which caused the highest load on the vector facility during the last interval, and the percentage used. On z/VM 5.2 and later, dots will be inserted here (or on earlier systems, when Vector Facility support is not available).

Max. I/O
User-ID which executed the highest number of non-spooled I/O operations during the last measuring interval, and its I/O rate

Max. Paging
User-ID which imposed the highest paging load onto the system during the last measuring interval, and its page rate

Max. Resident
User-ID with the highest number of pages resident at the end of the last measuring interval, and the number of resident pages

Max. MDC Ins.
User-ID with the highest rate of MDCACHE inserts, and the MDCACHE insert rate during the measuring interval.

Note that this value can be only a rough indicator. Due to the collect mechanism the numbers shown can be considerably lower than the user's actual MDC insert activity, especially for long monitor intervals.

Max. XSTORE
User-ID with the highest number of blocks in expanded storage, and the number of blocks occupied.

FCX102, System Counters Screen – SYSTEM

Performance Toolkit Subcommand: "SYSTEM" on page 307.

The System Counters Screen (FCX102):

```
FCX102      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Operation                Count Rate/s    Operation                Count Rate/s
Real SSCH instructions    9673    161    Real CSCH instructions       1     .0
Real HSCH instructions       0     .0    El. time slice drops       336    5.6
SVC instr. simulated         0     .0    SVC interrupts reflectd      0     .0
SVC 76 reflected             0     .0    Diagnose I/O requests      489    8.2
FP external call simul.      0     .0    FP partial executions     7449    124
Fast-path SIGP simulat.      0     .0    FP simul of Diag.X'44'       0     .0
Diag.X'9C', Not Ready       18     .3    Diag.X'9C', Wait State     642   10.7
Diag.X'9C', Soft Wait        7     .1    Diag.X'9C', Alr.Dispat.   9553    159
FP successful x-lates       19     .3    CCW chains not FP-elig.      0     .0
Fast-path aborts             0     .0    Total FP xlate attempts     19     .3
Nr. of SIE executions    55674    927    Nr. of SIE intercepts    30232    503
Entries to enabled wait  16548    275    CP issued Diag.X'44'         0     .0
HPF write                99999   99.9    HPF done                 99999   99.9

Storage Management
Subpool FREE req bk <2G  34118    569    Total FREE req bk <2G    34118    569
Subpool FREE req bk >2G 178404   2973    Total FREE req bk >2G   178407   2973
Reserved                                 Storage fast clears        294    4.9
Avail lst frame req <2G   1052   17.5    Avail lst frame req >2G    740   12.3
Available lst empty <2G      0     .0    Available lst empty >2G      0     .0
Demand scan 1st pass       ---    ---    Demand scan 2nd pass       ---    ---
Demand scan emergency      ---    ---    Demand scan not satisf.    ---    ---
Dispatch lst pgs stolen    ---    ---    Shared stor. pgs taken     ---    ---
Pgs from dormant users     ---    ---    Eligible lst pgs stolen    ---    ---
Fast PGINs from XSTORE       0     .0    Pages taken for FREE         0     .0
PGOUTs main to XSTORE        0     .0    Slow PGINs from XSTORE       0     .0
XSTORE allocations           0     .0    Reserved
Glbl cycl list searched      0     .0    XSTORE releases              0     .0
Migr thresh buf increas      0     .0    Migr. target time reset      0     .0
Page migr. from dormant      0     .0    Migr thresh buf lowered      0     .0
Page migr. from active       0     .0    Dormant with page migr.      0     .0
Shared pages migrated        0     .0    Active with page migrat      0     .0
Blocks migrated from CP      0     .0    Shared sys with pg migr      0     .0
Blocks migrated to DASD      0     .0    PGMBKs sel. during migr      0     .0
No I/O for pg migration      0     .0    XSTORE migr invocations      0     .0
Pg not referenced (STL)      0     .0    Pg not referenced (MIG)      0     .0
Single system pg reads       0     .0    Page blocks read             0     .0
Pages read from DASD         0     .0    Single guest page reads      0     .0
Spool pages read             0     .0    Pages written to DASD        0     .0
Total pgs to/from DASD       0     .0    Spool pages written          0     .0

Minidisk Cache Management
MDC page reads               9     .2    MDC page writes              0     .0
MDC wait queue inserts       0     .0    MDC fair share exceeded      0     .0
Compl. successful reads    412    6.9    MDC blocks invalidated       0     .0
Total MDC read requests    412    6.9    Total invalidate req.        0     .0

Memory Constraint Relief
Redrive attmps anywhere      0     .0    Task redrives anywhere       0     .0
Redrive attempts <2G         0     .0    Task redrives <2G            0     .0
Redrive attempts >2G         0     .0    Task redrives >2G            0     .0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 8. Layout of System Counters Screen (FCX102)

The SYSTEM screen provides additional detailed information on the system's operation, especially in the areas of storage management and minidisk caching. It

is intended to allow a more detailed analysis of information shown on other displays (for example, CPU or STORAGE display) if you suspect a problem in one of these areas.

Note:

1. When running on z/VM systems earlier than V5.4, you will see dashes ("- - -") in any field on this screen.
2. When running on a z/VM V5.4 system, Perfkit can use trend files created on V5.4 using monitor data from any release – in which case, older information may cause dashes ("- - -") to appear in some fields. Note, however, that Perfkit *cannot* use trend files which were actually created on older releases for this screen.

Description of SYSTEM Display Fields:

Operation

This block describes the events which are monitored.

Count The count in the selected interval, that is, during the last measurement interval or since the last RESET, for 'current' or 'average' data selection respectively.

Rate/s The number of occurrences per second in the selected interval.

Events Shown:

Real SSCH operations
The number of real SSCH operations (Start Subchannel) run by the system.

Real CSCH instructions
The number of real CSCH instructions (Clear Subchannel) run by the system.

Real HSCH instructions
The number of real HSCH instructions (Halt Subchannel) run by the system.

El. time slice drops
The number of elapsed time slice drops in the interval. A virtual machine's (or more correctly: a VMDBK's) stay in the dispatch list ends when it has used up its allocated time (the 'elapsed time slice'), or when the virtual machine's work has ended and it becomes idle.

SVC instr. simulated
The number of SVC instructions simulated by the system for guest operating systems.

SVC interrupts reflectd
The number of SVC interrupts reflected to guest systems.

SVC 76 reflected
The number of SVC 76 reflected to guest systems.

Diagnose I/O requests
The number of virtual I/O requests via Diagnose codes X'18', X'20', X'58', X'A4', and X'A8'. Other virtual I/O activity (for example, via SIO, SSCH) is not included in this count. See “FCX100, CPU Load and Transactions

Screen – CPU" on page 357, and "FCX101/FCX181 Remote Performance Log Display – REDISP, REDHIST" on page 363 for the total virtual I/O activity.

FP external call simul.
The number of fast path reflections of guest external call interrupts.

FP partial executions
The number of fast path partial execution intercepts.

Fast-path SIGP simulat.
The number of fast path simulations of SIGP external call instructions.

FP simul. of Diag.X'44'
The number of fast path simulations of Diagnose X'44'.

Diag.X'9C', Not Ready
Count of times a guest issued Diagnose X'9C' and the target was in a VMDSTATE < VMDREADY.

Diag.X'9C', Wait State
Count of times a guest issued Diagnose X'9C' and the target was found in wait state.

Diag.X'9C', Soft Wait
Count of times a guest issued Diagnose X'9C' and the issuer had to soft-wait on the target.

Diag.X'9C', Alr.Dispat.
Count of times a guest issued Diagnose X'9C' and the target was already dispatched.

FP successful x-lates
The number of successful fast-path CCW translations.

CCW chains not FP-elig.
The number of times a CCW chain was found to be not eligible for fast-path translation.

Fast-path aborts
The number of times a fast-path translate attempt was aborted.

Total FP xlate attempts
The total number of fast-path CCW translate attempts.

Nr. of SIE executions
The number of times the SIE operation (Start Interpretive Execution) was run.

Nr. of SIE intercepts
The number of times an SIE operation (Start Interpretive Execution) ended due to an intercept (privileged operation intercepted for handling by CP).

Entries to enabled wait
The number of guest machine entries to an enabled wait state.

CP issued Diag.X'44'
Count of Diagnose X'44's issued by CP.

HPF Write
Number of times a write channel program for a DASD device was presented for HPF DCW translation.

HPF Done
Number of times HPF DCW translation processing completed successfully for a DASD device.

Storage Management Fields

This block provides many fields with information on central and expanded storage management.

Subpool FREE req bk <2G
The number of requests for free storage which were satisfied from subpools below 2G.

Total FREE req bk <2G
The total number of requests for free storage backed below 2G (sysperm, guestperm, and regular subpooled).

Subpool FREE req bk >2G
The number of requests for free storage which were satisfied from subpools above 2G.

Total FREE req bk >2G
The total number of requests for free storage backed above 2G (sysperm, guestperm, and regular subpooled).

Storage fast clears
The number of fast path clears of real storage (requests for a new page which could be satisfied by a zeroed page without disk I/O).

Avail lst frame req <2G
The number of times that a new frame was requested from the <2G available list.

Avail lst frame req >2G
The number of times that a new frame was requested from the >2G available list.

Available lst empty <2G
The number of times the <2G available list became empty. This number should be very low in relation to the number of frame requests – the available list replenishment task ("demand scan") will usually ensure that a sufficient number of page frames are made available, well before the frames are actually needed.

Available lst empty >2G
The number of times the >2G available list became empty. This number should be very low in relation to the number of frame requests – the available list replenishment task ("demand scan") will usually ensure that a sufficient number of page frames are made available, well before the frames are actually needed.

Demand scan 1st pass
The number of times the available list replenishment task completed after the 1st pass.

This routine *must* make a certain number of real storage page frames free. During the first pass it will take only pages from dormant (that is, inactive) users and unreferenced pages from active users, which should have only a minimum impact on system performance.

When running on z/VM V6.3 or later, you will see dashes ("---") in this field.

Demand scan 2nd pass
The number of times the available list replenishment task completed after the 2nd pass.

During the second pass of demand scan referenced pages from active users (in eligible or dispatch list) will also be taken. Since these pages may be needed again soon, the frequency of occurrence should be low. High numbers indicate insufficient real storage for the current workload.

When running on z/VM V6.3 or later, you will see dashes ("---") in this field.

Demand scan emergency
The number of times the available list replenishment task completed after the emergency pass.

During the emergency pass of demand scan, referenced shared storage, system pages, and even reserved pages from active users (in eligible or dispatch lists) are taken. These pages have to be taken to keep the system running, but they were probably frequently referenced and will have to be paged in again soon (thrashing). High emergency pass numbers indicate a bad real storage bottleneck.

When running on z/VM V6.3 or later, you will see dashes ("---") in this field.

Demand scan not satisf.
The number of times the available list replenishment task ran without satisfying the demand for frames.

This indicates an even more severe storage problem than the 'emergency pass' counts.

When running on z/VM V6.3 or later, you will see dashes ("---") in this field.

Dispatch lst pgs stolen
The number of pages taken from users in the dispatch list (unreferenced and referenced pages).

When running on z/VM V6.3 or later, you will see dashes ("---") in this field.

Shared stor. pgs taken
The number of shared segment pages taken by the available list replenishment function. `SYSTEM` and shared segment pages are taken only during the emergency pass of the demand scan, that is, the counts should be low for systems with sufficient real storage.

When running on z/VM V6.3 or later, you will see dashes ("---") in this field.

Pgs from dormant users
The number of pages taken from dormant users.

When running on z/VM V6.3 or later, you will see dashes ("---") in this field.

Eligible lst pgs stolen
The number of pages taken from users in the eligible list (unreferenced and referenced pages).

When running on z/VM V6.3 or later, you will see dashes ("---") in this field.

Pages taken for FREE
The number of pages taken from users by frame table scan.

Fast PGINs from XSTORE
The number of fast path PAGE IN operations (page moves from expanded storage to main storage).

Slow PGINs from XSTORE
The number of PAGE IN operations that did not take the fast path.

PGOUTs main to XSTORE
The number of pages moved out from main storage to expanded storage.

XSTORE allocations
The number of allocations of expanded storage frames.

XSTORE releases
The number of times that an XSTORE frame was released.

Glbl cycl list searched
The number of times the migration task has searched through the global cyclic list of logged-on users.

The MIGRATE task searches through the cyclic list in order to find XSTORE blocks to migrate out and thus free up XSTORE. It chooses blocks to migrate out based on the migrate target time (initially set equal to the XSTORE average age). If half the cyclic list is searched without finding enough migratable blocks, the target time is lowered and an additional search is made through the cyclic list (see also next value).

Migr. target time reset
The number of times the migration target time was reset. See also description of previous value.

Migr thresh buf increas
The number of times the migration threshold buffer was increased.

The migration threshold buffer is the buffer used for block paging migration blocks. Its size is initially set equal to the number of paging devices times a multiplication factor of 10. If the low threshold is raised, the multiplication factor is incremented by 1 and thus the size of the threshold buffer increased.

This is an indication of migration not being able to keep up with XSTORE demand. A high number may indicate concern.

Migr thresh buf lowered
The number of times that the migration threshold buffer was lowered.

This is an indication of migration working well.

Page migr. from dormant
The number of pages migrated from dormant users.

Dormant with page migr.
The number of dormant users which had pages migrated from them.

Page migr. from active
The number of pages migrated from active users.

Active with page migr.
The number of active users which had pages migrated from them.

Shared pages migrated
The number of pages migrated from shared systems.

Shared sys with pg migr
The number of shared systems which had pages migrated from them.

Blocks migrated from CP
The number of blocks migrated from CP (system owned pages).

PGMBKs sel. during migr
The number of PGMBKs selected while migrating. This is an indication of the efficiency of the migration task: the more pages can be migrated from a single PGMBK, the more efficient page migration works, that is, you should see this number in relation to the number of pages migrated.

Blocks migrated to DASD
The number of pages migrated to DASD (the total of the pages migrated from dormant and active users, shared systems, and CP)

XSTORE migr invocations
The number of times the migration task was invoked.

No I/O for pg migration
The number of times no I/O was necessary for migrating a page. If a page already resides on disk, and if it was not referenced since being read for the last time, it can simply be released.

Pg not referenced (MIG)
The number of pages found by the migrate task which have been read in but were not referenced before the migrate task selected them for migration. Block paging may read in many additional pages when a page fault occurs. The ones not used are counted here, that is, a low number is good.

Pg not referenced (STL)
The number of pages found by the steal function which have been read in but were not referenced before the steal function moved them out of main memory to either XSTORE or DASD.

Page blocks read
The number of pages read from DASD (block paging).

Single system pg reads
The number of single-page reads for CP.

Single guest page reads
The number of single-page reads for virtual machines.

Pages read from DASD
The number of pages read from DASD.

Pages written to DASD
The number of pages written to DASD.

Spool pages read
The number of pages read from SPOOL.

Spool pages written
The number of pages written to SPOOL.

Total pgs to/from DASD
The total number of pages moved to/from DASD, for both paging and spooling translate attempts.

Minidisk Cache Management Fields

This block provides detailed information on the management of the minidisk cache.

MDC page reads
The number of CMS blocks moved from XSTORE to main storage.

Note that this is *not* the number of CMS read operations: read misses are also read operations, but they will not result in a MDC page being moved to main storage. Calculate the number of read operations by adding the number of read hits, partial read hits, and read misses (you can find this value on the general STORAGE display).

MDC page writes
The number of minidisk data blocks moved from main storage to XSTORE. This includes blocks which are written to XSTORE as the result of a WRITE operation *and* blocks which are written to XSTORE after a READ operation for a block which could not be found in expanded storage (read misses).

MDC wait queue inserts
The number of insertions into the waiting queue. The waiting queue keeps track of users that request data which are already on the way to the cache and so do not require another I/O operation, even though the blocks are not yet available in the minidisk cache.

MDC fair share exceeded
The number of times minidisk data blocks were not put into the cache because the fair share limit was exceeded.

Compl. successful reads
The number of MDC reads which were completely successful (all blocks found).

MDC blocks invalidated
The number of MDC blocks which were invalidated.

Total MDC read requests
The number of read requests to MDC.

Total invalidate req.
The total number of invalidate requests.

Memory Constraint Relief delta counters

This block provides detailed information on the Memory Constraint Relief fields.

Redrive attmps anywhere
Count of times HCPPTGRD attempted to redrive tasks waiting for an available frame that can be located anywhere.

Task redrives anywhere
Count of individual task redrives performed by HCPPTGRD for an available frame that can be located anywhere.

Redrive attempts <2G
Count of times HCPPTGRD attempted to redrive tasks waiting for an available frame that can be located only <2G.

Task redrives <2G
Count of individual task redrives performed by HCPPTGRD for an available frame that can be located only <2G.

Redrive attempts >2G
Count of times HCPPTGRD attempted to redrive tasks waiting for an available frame that can be located only >2G.

Task redrives >2G
Count of individual task redrives performed by HCPPTGRD for an available frame that can be located only >2G.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall period totals since last RESET will be shown for all `Count` fields; overall averages will be displayed for the `Rate/s` fields.

FCX103, Storage Utilization Screen – STORAGE

Performance Toolkit Subcommand: "STORAGE" on page 294.

The Storage Utilization Screen (FCX103):

```
FCX103      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Main storage utilization:                 XSTORE utilization:
Total real storage          4'096MB       Total available              8'192MB
Total available             4'096MB       Att. to virt. machines           0kB
Offline storage frames          0         Size of CP partition         8'192MB
SYSGEN storage size         4'096MB       CP XSTORE utilization            0%
Shared storage             22'708kB       Low threshold for migr.      1'200kB
FREE stor. subpools         1'368kB       XSTORE allocation rate           0/s
Subpool stor. utilization      74%        Average age of XSTORE blks      ...s
Total DPA size              4'011MB       Average age at migration        ...s
Locked pages                 3770
Reserved user storage           5MB
Set reserved SYSMAX         3'996MB
Trace table                512'000 B      MDCACHE utilization:
Pageable                    3'996MB       Min. size in XSTORE              0kB
Storage utilization            57%        Max. size in XSTORE          8'192MB
Tasks waiting for a frame       0         Ideal size in XSTORE         5'195MB
Tasks waiting for a page        0/s       Act. size in XSTORE              0kB
Standby real stor. size         0kB       Bias for XSTORE               1.00
Reservd real stor. size         0kB       Min. size in main stor.          0kB
                                          Max. size in main stor.      4'096MB
Paging / spooling activity:               Ideal size in main stor.     2'997MB
Page moves <2GB for trans.      0/s       Act. size in main stor.      7'072kB
Fast path page-in rate          0/s       Bias for main stor.           1.00
Long path page-in rate          0/s       MDCACHE limit / user       689'820kB
Long path page-out rate         0/s       Users with MDCACHE inserts       1
Page read rate                  0/s       MDISK cache read rate            0/s
Page write rate                 0/s       MDISK cache write rate       ...../s
Change page rewrites            5/s       MDISK cache read hit rate        0/s
Ref only page write bypass      3/s       MDISK cache read hit ratio      76%
Changed page writes MLOAD       3/s
Ref only page writes MLOAD      9/s       VDISKs:
Page read blocking factor      ...        System limit (blocks)       40857k
Page write blocking factor     ...        User limit (blocks)              0
Migrate-out blocking factor    ...        Main store page frames           0
Paging SSCH rate                0/s       Expanded stor. pages             0
SPOOL read rate                 0/s       Pages on DASD                    0
SPOOL write rate                0/s

                                          Agelist:
Reorder Settings:                         Target size                     55MB
Reorder for System              Off       Current size                    50MB
                                          Revalidation rate              100/s
Memory Constraint Relief:                 Reval post-write rate           0/s
Pageable memory <2G             On        Steal rate                     25/s
Pageable memory >2G             Off       Pages Evaluated                 25%
Demand scans <2G                On        Writes rate                    55MB
Demand scans >2G                Off
Allocate pageable freeze        ---
Multiplier before Min/Max      ---
Turnover Rate Mult <2G         ---
Turnover Rate Mult >2G         ---
Requests waiting anywhere       .0
Requests waiting <2G            .0
Requests waiting >2G            .0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 9. Layout of Storage Utilization Screen (FCX103)

The screen layout has been designed to allow displaying storage utilization data of VM systems with expanded storage. The corresponding fields will remain empty if no expanded storage is available.

Description of Storage Utilization Fields:

Main Storage Utilization:

This block provides information on the size and utilization of central processor storage.

Total real storage
Total main storage size, including any offline frames.

Total available
Total main storage size. Note that this is the *real* storage size, including HSA (Hardware Storage Area) frames and that less storage may actually be used by your system if less storage has been defined during system generation.

Offline storage frames
The number of total main storage frames that are offline.

SYSGEN storage size
Storage size defined for the VM system.

Shared storage
The amount of main storage currently used by shared segments.

FREE stor. subpools
Storage taken up by subpools (total DWs available, expressed in kB).

Subpool stor. utilization
The percentage of subpool free storage which is currently in use.

Total DPA size
The total size of the 'dynamic paging area', including non-pageable (locked, CP owned, free storage, etc.) page frames, but without 'offline' pages.

Locked pages
The number of DPA storage pages, consisting of pages which have been locked (including CP FREE storage space).

Reserved user storage
Total amount of storage reserved, in bytes, via the SET RESERVED command.

Set reserved SYSMAX
The maximum amount of storage that can be reserved, in bytes, via the SET RESERVED command. When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

Trace table
Storage occupied by CP trace tables.

Pageable (DPA-locked)
The size of the pageable part of the DPA (that is, total DPA size minus locked pages, minus trace table).

Storage utilization
The percentage of pageable storage which is used up by the working sets of currently active users.

Tasks waiting for a frame
The number of CP tasks which are waiting for a page frame.

Tasks waiting for a page
The number of CP tasks which were found to be waiting for a page, per second.

Standby real stor. size
Real machine standby storage size.

Reserved real stor. size
Real machine reserved storage size.

XSTORE utilization:

This block provides information on the size and utilization of expanded storage (often abbreviated to XSTORE).

Total available
Total size of expanded storage.

Att. to virt. machine
Size *dedicated* to specific virtual machines.

Size of CP partition
Expanded storage size available for CP use.

CP XSTORE utilization
Percentage of CP partition currently in use.

Low threshold for migr.
The minimum XSTORE size which is to be kept free for allocation of new blocks. Used XSTORE blocks will be migrated to DASD if less free XSTORE space is available.

XSTORE allocation rate
The rate at which XSTORE pages were allocated.

Average age of XSTORE blks
The average age of XSTORE pages in the CP partition (seconds).

Average age at migration
The average age of XSTORE pages at migration. If the average age at migration is low and near to the average age of all XSTORE blocks in storage, the size of the CP partition is probably too small.

MDCACHE utilization:

This block provides information on the size and utilization of the minidisk cache.

Min. size in XSTORE
The minimal size of the full track cache area in expanded storage.

Max. size in XSTORE
The authorized ceiling for the MDCACHE.

Ideal size in XSTORE
The ideal size of the full track cache area in expanded storage.

Act. size in XSTORE
Current XSTORE size used for MDCACHE.

Bias for XSTORE
The bias for XSTORE usage of the full track cache.

Min. size in main stor.
The minimum size of the full track cache in main storage.

Max. size in main stor.
The maximum size of the full track cache in main storage.

Ideal size in main stor.
The ideal size of the full track cache in main storage.

Act. size in main stor.
Main storage actually occupied by full track cache.

Bias for main stor.
The bias for XSTORE usage of the full track cache.

MDCACHE limit / user
The maximum amount of MDCACHE storage into which any one user may insert minidisk data in an interval. This is a fair share limit which will prevent a user from monopolizing the MDISK cache unless the machine is exempted by means of the NOMDCFS directory option.

Users with MDCACHE inserts
The number of users which had blocks inserted into the minidisk cache during the fair share interval.

MDISK cache read rate
The number of read I/O operations per second to the MDCACHE.

MDISK cache write rate
The number of write operations per second to the MDCACHE.

MDISK cache read hit rate
The number of read operations per second to cached minidisks where the block to be read was already in the cache.

MDISK cache read hit ratio
The percentage of read operations to cache minidisks where the block to be read was already in the cache. Both the MDISK cache read hit rate and the read hit ratio are an indication of the efficiency of caching.

VDISKs:

This block provides information on virtual disk system settings and overall storage utilization by virtual disks.

System limit (blocks)
The system limit set for maximum storage utilization by virtual disks.

User limit (blocks)
The maximum number of VDISK blocks that can be defined per user.

Main store page frames
The number of main storage page frames used by virtual disks.

Expanded stor. pages
The number of expanded storage blocks used by virtual disks.

Pages on DASD
The number of virtual disk pages that have been migrated to DASD.

Paging / spooling activity:

This block provides information on paging and spooling activity.

Page moves <2GB for trans.
The rate at which pages were moved below the 2GB line for translation. The field is available only for VM systems running in 64-bit mode.

Fast path page-in rate
The rate at which pages were paged in using fast path logic.

Long path page-in rate
The rate at which pages were paged in using long path logic.

Long path page-out rate
The rate at which pages were paged out using long path logic.

Page read rate
Average number of pages read per second (includes any reads from a paging slot).

Page write rate
Average number of pages written per second (includes any writes to a paging slot).

Change page rewrites
Rate of changed pages written to old auxiliary slot during frame reclaim from the global Age List. When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

Ref only page write bypass
Rate of referenced-only pages that were not written to auxiliary during frame reclaim from the global Age List. When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

Changed page writes MLOAD
Rate of changed pages written to a new auxiliary slot during frame reclaim from the global Age List due to load balancing. When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

Ref only page writes MLOAD
Rate of referenced-only pages written to a new auxiliary slot during frame reclaim from the global Age List due to load balancing. When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

Page read blocking factor
Average blocking factor for page read operations, that is, average number of pages read with a single read operation.

Page write blocking factor
Average blocking factor for page write operations.

Both the page read and page write blocking factors are indicators of the efficiency of block paging (the higher the number, the greater the efficiency). Due to the page-in logic employed, the page read blocking factor will usually turn out to be about half the page write blocking factor.

Migrate out blocking factor
Average blocking factor for migrating pages out from XSTORE to DASD.

Paging SSCH rate
Number of I/O operations per second for moving pages between main storage and paging devices. This number will, due to the block paging logic, usually be considerably lower than the number of pages transferred.

SPOOL read rate
The rate at which pages were read from SPOOL devices.

SPOOL write rate
The rate at which pages were written out to SPOOL devices.

Reorder settings:

This block provides information on Reorder for System setting.

Reorder for System
The System default reorder settings (On/Off). The System setting applies to the Shared Frame Owned list and the User Frame Owned list of every virtual machine in the system with the exception of those virtual machines for which a SET REORDER command was issued to override the System default.

When running on z/VM systems earlier than V6.2, you will see dashes ("---") in this field.

Memory Constraint Relief parameters:

This block provides information on the Memory Constraint Relief fields:

Pageable memory <2G
Pageable Pages <2G. When On, pageable pages may be placed <2G. When Off, pageable pages may not be placed <2G. Depending on storage conditions this bit may go on and off.

Pageable memory >2G
Pageable Pages >2G. When On, pageable pages may be placed >2G. When Off, pageable pages may not be placed >2G. Depending on storage conditions this bit may go on and off.

Demand scans <2G
Demand Scans may be done <2G. When On, demand scans may be done for pageable pages <2G. When Off, demand scans will not be done for pageable pages <2G. Does not affect frame table scans.

Demand scans >2G
Demand Scans may be done >2G. When On, demand scans may be done for pageable pages >2G. When Off, demand scans will not be done for pageable pages >2G. Does not affect frame table scans. Currently: once this bit goes on, it is not turned off.

Allocate pageable freeze
When On, the decision on how to allocate pageable pages, as well as the Turnover Rate Multiplier values, will no longer change.

When running on z/VM V6.3 and later releases, you will see dashes ("---") in this field

Multiplier before Min/Max
Calculated <2G Turnover Rate Multiplier before any Min/Max applied.

When running on z/VM V6.3 and later releases, you will see dashes ("---") in this field

Turnover Rate Mult <2G
<2G Turnover Rate Multiplier. Used to adjust the available list high thresholds to influence steal rates. Used during available frame comparisons to cause appropriate consumption of available frames above and below 2G.

When running on z/VM V6.3 and later releases, you will see dashes ("---") in this field

Turnover Rate Mult >2G
>2G Turnover Rate Multiplier. Used to adjust the available list high thresholds to influence steal rates. Used during available frame comparisons to cause appropriate consumption of available frames above and below 2G.

When running on z/VM V6.3 and later releases, you will see dashes ("---") in this field

Requests waiting anywhere
Count of deferred frame requests that are waiting for an available frame that can be located anywhere. This count plus 'Requests waiting <2G' plus 'Requests waiting >2G' is the total wait count.

Requests waiting <2G
Count of deferred frame requests that are waiting for an available frame that can be located only <2G. This count plus 'Requests waiting anywhere' plus 'Requests waiting >2G' is the total wait count.

Requests waiting >2G
Count of deferred frame requests that are waiting for an available frame that can be located only >2G. This count plus 'Requests waiting anywhere' plus 'Requests waiting <2G' is the total wait count.

Agelist:

This block provides information about the state of the age list used by the frame replenishment algorithm. When running on z/VM systems earlier than V6.3, you will see dashes ("---") in these fields.

Agelist target size
Target amount of storage in the age list, in bytes.

Agelist current size
Current amount of storage in the age list, in bytes.

Agelist revalidation rate
Rate of age list page revalidations.

Reval post-write rate
Rate of age list page revalidations after the pages were written to auxiliary.

Steal rate
Rate of page steals (i.e. frame reclaims).

Pages Evaluated
Percentage of the age list that has been evaluated and written to auxiliary if necessary.

Writes rate
Rate of amount of storage written to auxiliary, in bytes per second.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall period averages will be shown for all performance fields except Reorder for System setting (the last state will be shown).

FCX104, Privileged Operations Screen – PRIVOP

Performance Toolkit Subcommand: "PRIVOP" on page 248.

The Privileged Operations Screen (FCX104):

```
FCX104      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Operation                Count Rate/s    Operation                Count Rate/s
Diagnose X'00'               0     .0    Diagnose X'04'             347    5.8
Diagnose X'08'               2     .0    Diagnose X'0C'              18     .3
Diagnose X'10'               0     .0    Diagnose X'14'               0     .0
Diagnose X'18'               0     .0    Diagnose X'20'               0     .0
Diagnose X'24'              11     .2    Diagnose X'28'               0     .0
Diagnose X'34'               0     .0    Diagnose X'3C'               0     .0
Diagnose X'40'               0     .0    Diagnose X'44'               0     .0
Diagnose X'48'               0     .0    Diagnose X'4C'               0     .0
Diagnose X'54'               0     .0    Diagnose X'58'               2     .0
Diagnose X'5C'               0     .0    Diagnose X'60'               0     .0
Diagnose X'64'               0     .0    Diagnose X'68'              22     .4
Diagnose X'70'               0     .0    Diagnose X'74'               0     .0
Diagnose X'7C'              94    1.6    Diagnose X'80'               0     .0
Diagnose X'84'               0     .0    Diagnose X'88'               0     .0
Diagnose X'8C'               0     .0    Diagnose X'90'               0     .0
Diagnose X'94'               0     .0    Diagnose X'98'             211    3.5
Diagnose X'9C'               0     .0    Diagnose X'A0'               0     .0
.
.
.

EPSW  Extract PSW            0     .0    ESEA  Extr/Set Sec Auth     0     .0
IPTE  Inv. Pg Tab Entry      0     .0    ISK   Insert Stor. Key      0     .0
ISKE  Ins. Stor Key Ext      0     .0    IUCV  total instr. cnt   1156   19.3
Reserved                                 RSCH  Resume Subchannel     0     .0
SSCH  Start Subchannel     104    1.7    SIO   Start I/O             0     .0
SIOF  Start I/O Fast         0     .0    TCH   Test Channel          0     .0
LCTL  Load Control (32)      0     .0    LCTLG Load Control (64)     0     .0
LPSW  Load PSW               0     .0    LPSWE Load PSW Extended     0     .0
PGIN  Page-In                0     .0    PGOUT Page-Out              0     .0
PTLB  Purge TLB              0     .0    RRB   Reset Ref. Bit       0     .0
RRBE  Reset Ref. Bit Ex      0     .0    SCK   Set Clock             0     .0
SCKPF Set Clock Progr.       0     .0    SERVC Service Call          0     .0
SIGP  Signal Processor      24     .4    SPX   Set Prefix            0     .0
SSK   Set Storage Key        0     .0    SSKE  Set Stor. Key Ext    0     .0
SSM   Set System Mask        0     .0    STAP  Store CPU Address    0     .0
STCTG Store Contrl (64)      0     .0    STCTL Store Contrl (32)     0     .0
STFL  Store Facil. List      0     .0    STIDP Store CPU ID          0     .0
STNSM Store Then AND SM      0     .0    STOSM Store Then OR SM      0     .0
STPX  Store Prefix           0     .0    TB    Test Block            0     .0
TPROT Test Protection        0     .0    SIE   Start Int. Exec.     15     .3
BSA   Branch/Set Auth        0     .0    ESSA  Extr/Set Stg Atrs     0     .0
IDTE  Inv. DAT Tab. Ent      0     .0    PTFF  Perf Tim Fac Func     0     .0
STFLE Store Fac Lst Ext      0     .0    STSI  Store System Info     0     .0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 10. Layout of Privileged Operations Screen (FCX104)

The privileged operations screen shows counts and frequency of utilization of many DIAGNOSE and other privileged instructions, issued by virtual machines, that had to be simulated by CP (that is, were not emulated by SIE microcode). Such instructions are one source of CP overhead; their counts and frequencies may help you when analyzing virtual machine workloads.

Note:

1. When running on z/VM systems earlier than V5.4, you may see dashes ("- - -") in any field on this screen.

2. When running on a z/VM V5.4 system, Perfkit can use trend files created on V5.4 using monitor data from any release – in which case, older information may cause dashes ("- - -") to appear in some fields. Note, however, that Perfkit *cannot* use trend files which were actually created on older releases for this screen.

Description of Privileged Operation Fields:

Operation
This column describes the privileged operation.

Count The number of simulations in the selected interval, that is, during the last measurement interval or since the last RESET, for 'current' or 'average' data selection respectively.

Rate/s The number of simulations per second.

All the values shown are based on the sums of the respective counters accross all online processors of the system.

Diagnose Codes

Refer to your operating system's reference manuals for a full description of the functions performed by the different diagnose codes.

Diagnose X'00'
Store extended identification code.

Diagnose X'04'
Examine real storage. This is the diagnose code used by Performance ToolkitPerformance Toolkit for retrieving performance relevant data from CP control blocks, and Performance ToolkitPerformance Toolkit (or other real-time monitors) will usually cause most of the load.

Diagnose X'08'
Virtual console function. Used to run CP commands from programs running in a virtual machine.

Diagnose X'0C'
Pseudo timer.

Diagnose X'10'
Release pages.

Diagnose X'14'
Input spool file manipulation.

Diagnose X'18'
Standard DASD I/O.

Diagnose X'20'
General 370 synchronous I/O.

Diagnose X'24'
Query device type and features.

Diagnose X'28'
Dynamic channel program modification.

Diagnose X'34'
Read system dump spool file.

Diagnose X'3C'
Activate CP directory.

Diagnose X'40'
Clean up after virtual IPL by device.

Diagnose X'44'
Voluntary time slice end.

Diagnose X'48'
Second level SVC 76.

Diagnose X'4C'
Generate accounting records.

Diagnose X'54'
Control the function of the PA2 key.

Diagnose X'58'
3270 virtual console full-screen interface.

Diagnose X'5C'
Error message editing by EMSG setting.

Diagnose X'60'
Determine virtual machine storage size.

Diagnose X'64'
Finding, loading, and purging a named saved segment.

Diagnose X'68'
Virtual machine communication facility (VMCF).

Diagnose X'70'
TOD clock accounting interface.

Diagnose X'74'
Saving and loading a 3800 image library file.

Diagnose X'7C'
Logical device support facility.

Diagnose X'80'
MSSF hardware call.

Diagnose X'84'
Directory update in place.

Diagnose X'88'
Validate user authorization/link minidisk.

Diagnose X'8C'
Access 3270 display device information.

Diagnose X'90'
Read symbol table.

Diagnose X'94'
Set up virtual machine dump block (VMDUMP).

Diagnose X'98'
Real I/O (for example, VTAM).

Diagnose X'9C'
Voluntary time slice yield.

Diagnose X'A0'
Obtain ACIGROUP name.

Diagnose X'A4'
Synchronous DASD I/O for standard CMS blocks.

Diagnose X'A8'
Synchronous general I/O to fully supported devices.

Diagnose X'B0'
Get protected application re-IPL data.

Diagnose X'B4'
Reading, writing, and erasing virtual printer extended attribute buffer.

Diagnose X'B8'
Spool file external attribute buffer manipulation.

Diagnose X'BC'
Open and query spool file characteristics.

Diagnose X'C4'
Handle class override data for UCR file. This field should always be zero on z/VM systems running V6.3 or later.

Diagnose X'C8'
Set language.

Diagnose X'CC'
Save message repository.

Diagnose X'D0'
Tape volume serial support.

Diagnose X'D4'
Alternate user ID support.

Diagnose X'D8'
Read spool file descriptor blocks.

Diagnose X'DC'
Declare/delete virtual buffer for application data.

Diagnose X'E0'
System trace file interface.

Diagnose X'E4'
Return minidisk real device information (get information about another user's minidisk).

Diagnose X'EC'
Query GUEST trace status.

Diagnose X'F0'
CSE communication (information transmission between communication virtual machines).This field should always be zero on z/VM systems running V6.3 or later.

Diagnose X'F8'
Spool file origin information.

Diagnose X'FC'
Channel path reconfiguration interface.

Diagnose X'210'
Retrieve device information.

Diagnose X'214'
CMS page management.

Diagnose X'218'
Access to real processor CPU ID.

Diagnose X'238'
Time based unique identifiers.

Diagnose X'23C'
Address space services.

Diagnose X'240'
Access list services.

Diagnose X'244'
Minidisk mapping services.

Diagnose X'248'
Copy to primary address space.

Diagnose X'250'
Synchronous/asynchronous block I/O.

Diagnose X'254'
Access real subsystem (issue a limited set of channel programs to select tape control unit subsystems).

Diagnose X'258'
Page reference services.

Diagnose X'25C'
Directory query (VMUDQ macro).

Diagnose X'260'
Access certain virtual machine information.

Diagnose X'264'
CMS/CP communication via communication area.

Diagnose X'268'
370 accommodation services.

Diagnose X'26C'
Access certain system information.

Diagnose X'270'
Pseudo timer extended.

Diagnose X'274'
Set timezone interrupt flag.

Diagnose X'278
Extract XLINK control blocks.

Diagnose X'27C'
Product enablement verification.

Diagnose X'280'
Set POSIX IDs — security values.

Diagnose X'288'
Control virtual machine time bomb.

Diagnose X'290'
Perform privileged spool functions.

Diagnose X'29C'
Set–POSIX-IDs services.

Diagnose X'2A0'
Query POSIX IDs.

Diagnose X'2A4'
POSIX Process ID (PID) services.

Diagnose X'2E0'
SYSEVENT Query virtual server (QVS).

Diagnose X'2FC'
Obtain certain guest performance data.

Simulated Instructions and Events

See *z/Architecture Principles of Operation* for a description of the functions performed by the different privileged instructions.

EPSW Count of 'Extract PSW' instructions simulated

ESEA Count of 'Extract and Set Extended Authority' instructions simulated

IPTE Count of 'Invalidate Page Table Entry' instructions simulated

ISK Count of 'Insert Storage Key' instructions simulated (370 mode virtual machines only)

ISKE Count of 'Insert Storage Key Extended' instructions simulated

IUCV total instr. cnt
Total number of IUCV calls

RSCH
Count of 'Resume Subchannel' instructions simulated

SSCH Count of 'Start Subchannel' instructions simulated

SIO Count of 'Start I/O' instructions simulated (370 mode virtual machines only)

SIOF Count of 'START I/O Fast' instructions simulated (370 mode virtual machines only)

TCH Count of 'Test Channel' instructions simulated (370 mode virtual machines only)

LCTL Count of 'Load Control' instructions simulated

LCTLG
Count of 'Load Control' instructions simulated for 64–bit mode

LPSW
Count of 'Load PSW' instructions simulated

LPSWE
Count of 'Load PSW Extended' instructions simulated

PGIN Count of 'Page In' instructions simulated

PGOUT
Count of 'Page Out' instructions simulated

PTLB Count of 'Purge TLB' instructions simulated (purge translation look-aside buffer)

RRB Count of 'Reset Reference Bit' instructions simulated (370 mode virtual machines only)

RRBE Count of 'Reset Reference Bit Extended' instructions simulated

SCK Count of 'Set Clock' instructions simulated

SCKPF
Count of 'Set Clock Programmable Field' instructions simulated

SERVC
Count of 'Service Call' instructions simulated

SIGP Count of 'Signal Processor' instructions simulated

SPX Count of 'Set Prefix' instructions simulated

SSK Count of 'Set Storage Key' instructions simulated (370 mode virtual machines only)

SSKE Count of 'Set Storage Key Extended' instructions simulated

SSM Count of 'Set System Mask' instructions simulated

STAP Count of 'Store CPU Address' instructions simulated

STCTG
Count of 'Store Control' instructions simulated for 64–bit mode

STCTL
Count of 'Store Control' instructions simulated

STFL Count of 'Store Facility List' instructions simulated

STIDP
Count of Store CPU ID instructions simulated

STNSM
Count of 'Store Then AND System Mask' instructions simulated

STOSM
Count of 'Store Then OR System Mask' instructions simulated

STPX Count of 'Store Prefix' instructions simulated

TB Count of 'Test Block' instructions simulated

TPROT
Count of 'Test Protection' instructions simulated

SIE Count of 'Start Interpretive Execution' instructions simulated

BSA Count of 'Branch and Set Authority' instructions simulated

ESSA Count of 'Extract and Set Storage Attributes' instructions simulated

IDTE Count of 'Invalidate DAT Table Entry' instructions simulated

PTFF Count of 'Perform Timing Facility Function' instructions simulated

STFLE
Count of 'Store Facility List Extended' instructions simulated

STSI Count of 'Store System Information' instructions simulated

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields.

FCX105, Graphical Displays of Performance History Data

Performance Toolkit Subcommand: "GRAPHDET / PLOTDET" on page 181, "GRAPHSUM / PLOTSUM" on page 184, "GRAPHVAR / PLOTVAR" on page 189.

See "Graphics Selection Menu" on page 892 for more information on this specific display, and Appendix A, "Graphical Displays of Performance History Data," on page 889 for more general information.

FCX106, CP IUCV Services Screen – CPSERV

Performance Toolkit Subcommand: "CPSERV" on page 159.

The CP IUCV Services Screen (FCX106) shows the activity for all CP IUCV services and also for VMCF communication.

```
FCX106      CPU 2817  SER 1EE75  Interval 18:13:38 - 19:38:38    Perf. Monitor

IUCV         Transfers TO     Transfers BY     Unsuccessful       Total X-fers
Service      Count Rate/s     Count Rate/s     Count Rate/s       Count Rate/s
*MSGALL          0     .0         1     .0         0     .0          1     .0
*MSG             0     .0      6085    1.2         0     .0       6085    1.2
*BLOCKIO      125M  24587      125M  24587         5     .0       251M  49174
*RPI         11259    2.2     11259    2.2         0     .0      22518    4.4
*MONITOR       176     .0       176     .0         0     .0        352     .1
*SIGNAL      44320    8.7     44320    8.7         0     .0      88640   17.4
*CCS             0     .0         0     .0         0     .0          0     .0
*SPL             0     .0         0     .0         0     .0          0     .0
*SYMPTOM         0     .0         0     .0         0     .0          0     .0
*ACCOUNT         0     .0       249     .0         0     .0        249     .0
*LOGREC          0     .0        33     .0         0     .0         33     .0
*CRM             0     .0         0     .0         0     .0          0     .0
*IDENT           0     .0         0     .0         0     .0          0     .0
*CONFIG          0     .0         0     .0         0     .0          0     .0
*VSWITCH         3     .0         3     .0         0     .0          6     .0
*ASYNCMD         0     .0         0     .0         0     .0          0     .0
*SCLP            0     .0         0     .0         0     .0          0     .0
*VMEVENT         0     .0         0     .0         0     .0          0     .0
Total         125M  24598      125M  24599         5     .0       251M  49197

Tot VM IUCV   126M  24791      126M  24792      1071     .2       253M  49583
Tot VMCF      8167    1.6      8167    1.6         0     .0      16334    3.2
Total X-fer   126M  24792      126M  24794      1071     .2       253M  49586
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 11. Layout of CP IUCV Services Screen (FCX106)

The information shown is based on CP monitor SYSTEM domain SAMPLE data. Fields which indicate some activity will appear highlighted on the screen.

Field Description:

IUCV Service

The name of the IUCV system service

- ***MSGALL** - Message All System Service
- ***MSG** - Message System Service
- ***BLOCKIO** - DASD Block I/O System Service
- ***RPI** - Access Verification System Service
- ***MONITOR** - Monitor System Service
- ***SIGNAL** - Signal System Service
- ***CCS** - Console Communication Service
- ***SPL** - Spool System Service
- ***SYMPTOM** - Symptom System Service
- ***ACCOUNT** - Account System Service
- ***LOGREC** - Error Logging System Service
- ***CRM** - Collection Resource Management System Service
- ***IDENT** - Identify System Service
- ***CONFIG** - Enterprise Systems Connection Manager System Service

- ***VSWITCH** - Virtual Switch System Service
- ***ASYNCMD** - Asynchronous CP Command Response System Service
- ***SCLP** - SCLP System Service
- ***VMEVENT** - VM Event System Service
- **Total** - Totals for all CP IUCV services
- **TOT VM IUCV** - Totals for Virtual Machine IUCV Service
- **TOT VMCF** - Totals for VMCF
- **Total X-fer** - Overall totals for both VM IUCV and VMCF activities

Transfers TO
IUCV transfer activity from virtual machines ***to*** the CP service

Transfers BY
IUCV transfer activity ***by*** the CP service to a virtual machine

Unsuccessful
Unsuccessful attempts for IUCV data transfers

Total X-fers
Total number of IUCV transfers for the respective service

The actual activity is shown in the form of two values under each of the above headings:

Count the number of transfers in the relevant interval

Rate/s the transfer rate, in transfers per second, during the interval

Note that each successful data transfer is associated with two counters. One for the target (transfer to) and one for the source (transfer by).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields.

FCX107, Channel Load Screen – CHANNEL

Performance Toolkit Subcommand: "CHANNEL" on page 151.

In the Channel Load Screen (FCX107), fields which indicate that the channel has been busy will be highlighted on the screen.

```
FCX107      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

CHPID Chan-Group    <%Busy>     <----- Channel %Busy Distribution 04:24:40-04:
(Hex) Descr Qual    Cur Ave     0-10 11-20 21-30 31-40 41-50 51-60 61-70 71-80
 31   ESCON   00     31  20      17    33    27    23     0     0     0     0
 32   ESCON   00     31  20      17    30    30    23     0     0     0     0
 76   FICON   00     27  27       0     0   100     0     0     0     0     0
 34   ESCON   00     18  15       0    90    10     0     0     0     0     0
 11   ESCON   00     17  15       3    93     3     0     0     0     0     0
 33   ESCON   00     17  14       3    93     3     0     0     0     0     0
 10   ESCON   00     16  14      17    83     0     0     0     0     0     0
 0E   ESCON   00     14   8      63    30     7     0     0     0     0     0
 0F   ESCON   00     14   8      63    30     7     0     0     0     0     0
 66   FICON   00     12  12       0   100     0     0     0     0     0     0
 80   FICON   00     12  12       0   100     0     0     0     0     0     0
 77   FICON   00     11  11       0   100     0     0     0     0     0     0
 14   FICON   00      4   4     100     0     0     0     0     0     0     0
 15   FICON   00      4   4     100     0     0     0     0     0     0     0
 4A   FICON   00      4   4     100     0     0     0     0     0     0     0
 13   FICON   00      3   3     100     0     0     0     0     0     0     0
 04   FICON   00      1   1     100     0     0     0     0     0     0     0
See also LCHANNEL and FCHANNEL displays
Command ===>
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 12. Layout of Channel Load Screen (FCX107)

Overall channel load analysis is based on data from the Extended Channel-Path Measurement Facility, where available; otherwise high-frequency sampling data from the CP monitor SYSTEM domain is used.

Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

The screen shows a list of the active channels. Only channels for which some 'busy' conditions have been recorded will be included in the display, and the message:

```
No channel busy conditions logged so far
```

will be shown if no busy conditions were recorded at all.

Channels will be ordered in `%Busy` sequence, either for the *current*, i.e. the last interval's %Busy values if 'current' data are being displayed, or for *average* %Busy values when 'average' performance data have been selected. Channels with equal %Busy figures will be sorted in ascending CHPID sequence.

Field Description for Channel Load:

CHPID (Hex)
: The hexadecimal 'channel path identifier'.

Chan-Group Descr
: Description of the channel model group, as found in the Store-Channel-Path description.

Chan-Group Qual
The hexadecimal channel model group qualifier. Note that a valid qualifier is available only on systems with the extended channel measurement facility.

%Busy
The percentage of 'busy' conditions found, where

Cur Shows the 'current' figures, calculated for the last interval

Ave Shows the 'average' load, calculated for the whole period since the last RESET, or since Performance Toolkit was last invoked.

For FICON channels the 'busy' value is calculated as the percentage of actual work unit utilization compared to the maximum possible value. Channel 'busy' percentages cannot be calculated for Hipersocket channels; the string `n/a` is inserted instead.

Under the heading:

```
Channel %Busy Distribution hh:mm:ss-hh:mm:ss
```

you will find the channel load distribution for each of the active channels. It shows the relative frequency with which the channel busy percentage of separate measurement intervals was found in either of the 10% ranges 0-10, 11-20, ..., 91-100.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Interim averages are displayed for the INTERIM setting, and overall averages are shown for both the AVERAGE and CURRENT settings since average data is shown together with the current load. Sorting of the channels is based on the average %Busy percentage instead of the last interval's %Busy values.

FCX108, General I/O Device Screen – DEVICE or DEVICE DASD

Performance Toolkit Subcommand: "DEVICE" on page 169.

The General I/O Device Screen (FCX108) will be shown if you enter the DEVICE subcommand with either no parameters at all, or with the DASD parameter, in which case only disks (and no other devices) will be included in the display. Devices which have been active during the last measuring interval are highlighted on the screen.

```
FCX108      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

.   .                .   ___    .   .   .   .   .   .   .   .   .   .   .   .   .   .
<-- Device Descr. -->  Mdisk Pa- <-Rate/s-> <------- Time (msec) -------> Req. <Percent>  SEEK Recov <-Throttle-> Nr of
Addr Type   Label/ID   Links ths  I/O Avoid Pend Disc Conn Serv Resp CUWt Qued Busy READ  Cyls  SSCH Set/s  Dly/s  Devs
>> All DASD <<          ....  ..   .3    .0 .169 .042 .792 1.00 .233 .000  .00    0   61   269     0   ...     .0  3295
5CB1 3390-9 FC5CB1 CP      0   2  104    .0 .126 .017 .510 .653 .653 .000  .00    7    0     0     0   ...    ...
5CB0 3390-9 FC5CB0 CP      0   2  103    .0 .126 .017 .523 .666 .666 .000  .00    7    0     0     0   ...    ...
5CB3 3390-9 FC5CB3 CP      0   2  101    .0 .125 .017 .520 .662 .662 .000  .00    7    0     0     0   ...    ...
5CB2 3390-9 FC5CB2 CP      0   2 99.2    .0 .126 .017 .623 .766 .766 .000  .00    8    0     0     0   ...    ...
B8A7 3390-3 FCPAG1 CP      0   2 94.4    .0 .199 .079 1.07 1.35 1.35 .000  .00   13    0     0     0   ...    ...
B869 3390-3 FC2A69 CP      0   2 93.7    .0 .202 .020 .933 1.16 1.16 .000  .00   11    0     0     0   ...    ...
B86B 3390-3 FC2A6B CP      0   2 93.6    .0 .201 .021 .986 1.21 1.21 .000  .00   12    0     0     0   ...    ...
B86C 3390-3 FC2A6C CP      0   2 92.7    .0 .204 .020 .989 1.21 1.21 .000  .00   12    0     0     0   ...    ...
B868 3390-3 FC2A68 CP      0   2 91.8    .0 .204 .080 1.19 1.48 1.48 .000  .00   14    0     0     0   ...    ...
B86A 3390-3 FC2A6A CP      0   2 90.3    .0 .203 .105 1.20 1.51 1.51 .000  .00   14    0     0     0   ...    ...
B8A6 3390-3 FCSPL2 CP      0   2  3.2    .0 .184 1.93 3.66 5.78 5.78 .000  .00    2    0     0     0   ...    ...
B863 3390-3 FC2A63 CP      0   2  2.9    .0 .183 .020 1.53 1.73 1.73 .000  .00    1    0     0     0   ...    ...
5CA2 3390-3 PCK62A         5   2  2.0    .0 .112 .417 .212 .741 .741 .000  .00    0   71   338     0   ...    ...
2B21 CTCA   >PVM          ...   1  1.5   ... .114 .167 .051 .333 .333 .000  .00    0   ..   ...     0   ...    ...
0500 CTCA                ...   1   .6   ... .059 .221 .007 .287 .287 .000  .00    0   ..   ...     0   ...    ...
B8A0 3390-3 FCRES  CP    189   2   .6    .0 .194 .021 .273 .488 .488 .000  .00    0    0     0     0   ...    ...
B866 3390-3 FC2A66 CP      0   2   .5    .0 .178 .023 .244 .446 .446 .000  .00    0    0     0     0   ...    ...
B876 3390-3 FCUSR7        67   2   .3    .0 .189 .000 .616 .805 .805 .000  .00    0  100   134     0   ...    ...
8A20 CTCA                ...   1   .2   ... .102 .060 .000 .162 .162 .000  .00    0   ..   ...     0   ...    ...
B883 3390-3 FCSFSA         9   2   .2  30.5 .154 .000 .154 .307 .307 .000  .00    0    0   208     0   ...    ...
B864 3390-3 FC2A64 CP      0   2   .1    .0 .183 .018 .165 .366 .366 .000  .00    0    0     0     0   ...    ...
1980 CTCA                ...   1   .1   ... .128 .085 .021 .235 .235 .000  .00    0   ..   ...     0   ...    ...
B87E 3390-3 FCUSRF         1   2   .1    .0 .179 .000 .230 .410 .410 .000  .00    0    0     4     0   ...    ...
163E CTCA                ...   1   .1   ... .096 .000 .032 .128 .128 .000  .00    0   ..   ...     0   ...    ...
163F CTCA                ...   1   .1   ... .160 .000 .032 .192 .192 .000  .00    0   ..   ...     0   ...    ...
16B0 CTCA                ...   1   .1   ... .192 .192 .000 .384 .384 .000  .00    0   ..   ...     0   ...    ...
16BF CTCA                ...   1   .1   ... .160 .000 .032 .192 .192 .000  .00    0   ..   ...     0   ...    ...
16D0 CTCA                ...   1   .1   ... .064 .000 .032 .096 .096 .000  .00    0   ..   ...     0   ...    ...
1900 CTCA                ...   1   .1   ... .224 .064 .064 .352 .352 .000  .00    0   ..   ...     0   ...    ...
199F CTCA                ...   1   .1   ... .224 .000 .000 .224 .224 .000  .00    0   ..   ...     0   ...    ...
19C0 CTCA                ...   1   .1   ... .160 .096 .032 .288 .288 .000  .00    0   ..   ...     0   ...    ...
16B4 CTCA                ...   1   .0   ... .043 .000 .000 .043 .043 .000  .00    0   ..   ...     0   ...    ...
...

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 13. Layout of General I/O Device Screen (FCX108)

The information shown is based on CP monitor MONITOR domain and I/O domain SAMPLE data.

The sample shows a screen with I/O devices sorted in descending I/O rate sequence (indicated by the underscore characters '___' above the 'I/O' header). Other possible sort sequences are indicated by dots above the corresponding columns, they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Some additional lines with device group averages will be shown at the top when the device groups have been defined. (See "FCONTROL DEVGROUP" on page 26.) The device group name will be displayed in place of the device number and

device type. The Nr of Devs field in a device group line contains the number of active devices belonging to the device group shown on the current screen.

For more detailed information on one specific I/O device (especially disks) either:

- Place the cursor on the Addr field of the device you are interested in and press ENTER, or
- Enter the subcommand 'DEVICE *devno*' on the command line

The 'I/O device details' screen will then be shown with detailed data for the selected device (see "DEVICE" on page 169 for more information on that performance display).

Field Descriptions:

The following field descriptions apply to both the DEVICE and DEVLOG *devno* displays, with the exception of the Addr, Type and Label/ID fields which will be replaced by the field Interval End Time on the DEVLOG display.

Device Descr.:

Addr Real device number.

The first line contains the prefix >> All DASD << instead of a device number. It provides the average load figures for all disks for which performance data were collected.

Type Device type and model. For alias parallel access volumes of an IBM DASD Subsystem, the device type is replaced by the string:

```
-> xxxx
```

where xxxx is the device number of the base parallel access volume.

Label/ID
This field contains either

- The *ID* of the virtual machine the device is currently attached to in the format '>userid', or
- The *disk label* of a DASD which is not dedicated to a single user. The disk label will be followed by the characters 'CP' if the device is CP owned.

Mdisk Links
The number of MDISK LINKs to a shared DASD (attached to system)

Paths The number of available channel paths to the device. If the number of channel paths is low, and their utilization high, this may cause excessive reconnect misses which would result in abnormally high 'disconnect' times.

Rate/s:

I/O Number of SSCH and RSCH operations executed per second from this system during the selected interval.

The suffix 'T' will be appended to the I/O rate numbers of all devices whose I/O rate is currently being 'throttled'.

Avoid
Number of real I/O operations per second which could be avoided because the blocks were found in the minidisk cache.

Time (msec):

Pend Function pending time (msec). This is the average time an I/O request remained pending in the I/O subsystem due to path busy conditions.

This value, and also the `Disc, Conn, Serv, Busy` and `Resp` values, are calculated based on information obtained from the 'host measurement facility'. This information is important especially for disks; dots will be inserted for devices where the information is not available or not calculated.

Note that this information will usually not be available for I/O assisted devices of XA-mode guests. It will also not be available for integrated adapter and control unit FBA disks (e.g. 9332/5/6) where incorrect values of '0' can be shown because the relevant fields are not updated by the hardware.

Disc Device disconnected time (msec). This is the average time that the device remained disconnected from the channel while executing I/O requests. For DASD it includes the time spent for executing the SEEK and SET SECTOR orders and also any re-connect misses. High values may indicate overloaded paths, or many long SEEKs to data at opposite ends of the device.

The value also includes the 'device-active-only' time where that information is available.

Conn Device connected time (msec). This is the average time that the device was connected to the channel while executing I/O requests, i.e. receiving commands or actually transferring data. For DASD it includes the SEARCH time.

Serv Service time for the device (sum of function pending, connected and disconnected times)

Resp Device response time. This is the device service time plus the time during which an I/O request was waiting to be started. It is calculated based on the average I/O request queue length `Req. Qued` and the I/O rate.

CUWt
The control unit queuing time, i.e. the additional wait caused when the target device was already busy with an I/O started from another system.

Req. Qued
Average I/O queue length in the selected interval.

The value is taken from CP monitor high-frequency sample data; it is an indicator for I/O contention on the device.

Note that both the I/O queue length (`Req. Qued`) and the device response time, which is based on it, are not meaningful for devices which are dedicated (attached) to guest systems: the guest system will not try to start another I/O operation before an active one has ended, but will rather do its own queuing. Guest system queuing cannot be shown by host performance monitors, but will have to be analyzed using a performance monitor on the guest system.

A similar restriction exists for CP-owned disks with page or spool areas: Multiple pending I/O requests for the page or spool area are queued in a different place and do *not* become visible here. See the `Queue Lngth` field on the CP owned device screen for queue lengths of paging and spooling activity.

Percent:

Busy Percentage of time during which the device was busy

READ
Percentage of I/O requests which were for READ operations only

SEEK Cyls
The average number of cylinders skipped per SEEK order

Recov SSCH
The number of SSCHs (*not* the rate) executed for error recovery purposes.

Throttle:

Set/s The throttle I/O rate set for the device.

Since an average or total of this value for all DASD does not make much sense, the field is left empty in the `>> All DASD <<` line.

Dly/s The rate at which arriving I/Os were delayed due to throttling.

Nr. of Devs
The number of DASDs used in the DASD average value calculations in the `>> All DASD <<` line or the number of devices used for device group average calculations in the device group lines.

Missing Interrupt detection:

When missing interrupt detection has been activated, the performance monitor checks the status of all non-CP owned disks at the end of each monitor sample interval. An interrupt is considered to be missing if a disk was found to be busy during two consecutive measurements, and if no I/O interrupt was received in between.

If a missing interrupt is detected on a real device, the message

```
FCXPEI354M Device 'cuu' waiting for interrupt
```

will be shown in the error message line at the bottom of the screen while in performance monitor mode. If monitor data are collected permanently (via 'FC MONCOLL ON' subcommand), the above message will also be generated and inserted into the basic mode output screen.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields. Real averages will be shown for all fields which display device load figures. The *Label/ID* and *Links* fields will always contain current information.

FCX109, CP Owned Device Screen – DEVICE CPOWNED

Performance Toolkit Subcommand: "DEVICE" on page 169.

The CP Owned Device Screen (FCX109) will be shown if you specify the CPOWNED parameter on the DEVICE subcommand:

```
FCX109      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Page / SPOOL Allocation Summary
PAGE slots available      1564200          SPOOL slots available       729600
PAGE slot utilization          34%         SPOOL slot utilization          36%
T-Disk space avail. (MB)     2642          DUMP slots available        119850
T-Disk space utilization       39%         DUMP slot utilization           16%

____ .            .                          .     .     .     .     .      .
< Device Descr. ->                         <------------- Rate/s ------------->
            Volume Area   Area      Used   <--Page---> <--Spool-->          SSCH
Addr Devtyp Serial Type   Extent       %   P-Rds P-Wrt S-Rds S-Wrt Total  +RSCH
060C 3380-K VMPG1N PAGE   1200-1499   72    2.1   1.7   ...   ...   3.8    1.5
060D 3380-K VMPG1O PAGE   1200-1499   71    2.2    .0   ...   ...   3.9    1.5
0612 3380-K VMSP1A SPOOL     1- 884   61    2.8    .0  10.2   7.3  20.3   18.2
0619 3380-K VMBA01 T-DISK  501-1300   32    ...   ...   ...   ...   ...    ...
061F 3380-K ESARS1 T-DISK  650- 699   86    ...   ...   ...   ...   ...    ...
0728 3380-K VMBA02 DUMP      1- 799   16     .0    .0    .0    .0    .0     .1
                   T-DISK  901-1300   28    ...   ...   ...   ...   ...    ...
0729 3380-K VMSER1 DIRECT    1-  19   21    ...   ...   ...   ...   ...    ...
072C 3380-K VMPG1P PAGE   1200-1499   60    1.9   1.8   ...   ...   3.4    1.2
072D 3380-K VMPG1Q PAGE   1200-1499   58    2.3   1.9   ...   ...   4.1    1.2
Select a device for I/O device details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 14. Layout of CP Owned Device Screen (FCX109)

The screen shown in the above figure is a sample for the type of display you may expect when analyzing CP owned disks. Since the performance of paging and spooling I/O is a key factor of general system performance, this display is a good starting point when problems in that area are suspected.

Two blocks of data will be shown:

- A summary of the total PAGE and SPOOL space and its utilization
- A detailed list with all system area definitions and their utilization and activity.

This information is based on CP monitor STORAGE domain sample data, and on MONITOR domain configuration records. It can be displayed only when data collection for these domains is active.

The sample shows a screen with the system areas sorted in ascending device number sequence, the initial setting. Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the appropriate column heading (see "SORT" on page 287), or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER. Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

For more detailed information on one specific CP owned disk, either:

- Place the cursor on the `Addr` field of the device you are interested in and press ENTER, or
- Enter the subcommand 'DEVICE *devno*' on the command line.

Field Description for CP Owned Device Performance Data:

The following field descriptions apply to both the 'DEVICE CPOWN' and CPOWNLOG *devno* displays, with the exception of the `Addr` field which will be replaced by the field `Interval End Time` on the CPOWNLOG display.

Page / SPOOL Allocation Summary

PAGE slots available
The total number of slots allocated as `PAGE` areas on the currently online disks

PAGE slot utilization
The utilization, in percent, of the available `PAGE` area

SPOOL slots available
The total number of slots allocated as `SPOOL` areas on the currently online disks

SPOOL slot utilization
The utilization, in percent, of the available `SPOOL` area

T-Disk space avail. (MB)
The total number of megabytes allocated in `TDSK` areas on the currently online system disks

T-Disk space utilization
The utilization, in percent, of the available `TDSK` area

DUMP slots available
The total number of slots allocated as `SPOOL` areas on disks which have been dedicated to DUMPs

DUMP slot utilization
The utilization, in percent, of the available `SPOOL` area on DUMP disks

Detailed System Area Display

Addr Real device number of the disk

Devtyp
Device type and model of the disk

Volume Serial
Disk label

Area Type
Describes what the system area is used for. The area type indicated can be

DIRECT
For directory cylinders

DUMP
For a spooling area on DUMP disks

PAGE
For a paging area

SPOOL
For a general spooling area

T-DISK
For temporary minidisk space

Area Extent
Start and end cylinders for the system area, or start and end slot number for FBA disks. Where the cylinder or block number range would require more space than is available for this field, the number of slots in the area is inserted instead.

Used %
Percentage of slots currently in use in this area. In the case of TDSK and DIRECTORY space the 'used' percentage is based on the number of used cylinders, not blocks.

Valid information for the remainder of the performance fields can be shown only for PAGE, SPOOL and DUMP areas.

Rate/s:

P-Rds
Average page read rate during the last interval. This field, and also the next one 'Page Write' will be inserted only for the first page area on a specific disk, but will show the *total* activity on *all* PAGE areas on the same disk pack.

P-Wrt Average page write rate during the last interval.

S-Rds
Average spool read rate during the last interval. This field, and also the next one 'Spool Write' will be inserted only for the first spool area on a specific disk, but will show the *total* activity on *all* SPOOL areas on the same disk pack.

S-Wrt Average spool write rate during the last interval.

Total Total page and spool read and write activity during the selected interval.

SSCH+RSCH
The total SSCH and RSCH rate to the disk, i.e. the rate of CP-generated real I/O operations to the disk. This number does not include I/O activity by users to other areas on the same device.

I/O Interferes
The number of I/O requests which had interference in the last interval (for current data), or the average number of I/O requests which had interference per monitor sample interval if average data are shown. Some examples of I/O Interference are:

- CP I/O done to the volume on behalf of privileged CP commands, for example QUERY PATHS, QUERY CACHE, HYPERSWAP, and SNAPDUMP.
- CP I/O done on behalf of MONITOR data collection, for example Cache statistics in the Device Activity record.
- CP I/O done on behalf of CP error recovery, for example State change processing.
- User I/O to non-paging/non-spool extents on the volume.

Queue Lngth
The number of page and spool reads and writes which are currently active or queued. This is just a single sample if 'current' data are being shown; it is the average of all samples since the last reset if 'average' data are shown.

Note that this value reflects queue lengths for CP paging and spooling activity only; it does *not* tell you anything about the queueing of other I/O

to the same device (i.e. by users). See the Req. Qued field of the general I/O device screen for information on I/O queueing done for user I/O requests.

Serv Time/Page
The smoothed service time for processing a paging I/O, in msec.

MLOAD Resp Time
The smoothed response time for CP I/O operations to this device (paging and spooling), in msec. The value is normalized to reflect the response time for servicing a single PIOBK (paging I/O CCW package), and it takes into account also the PIOBK queue length for the device. This is a smoothed average for the last few I/O requests, *not* an average for the whole monitor sample interval. Note also that:

- It refers only to CP I/O operations to the disk and does not take into account I/O to user minidisks.
- It may be considerably smaller than the device response time shown on the DEVICE screen for the same device, because it is the time required for servicing a *single* PIOBK. The response times shown on the DEVICE screen will always be longer where multiple PIOBKs are handled by a single I/O operation.

Dots will be inserted for disks where no MLOAD value is available.

Block Page Size
The average number of pages in the blocks available on the device.

%Used for Allloc
Percent of times the volume was chosen for allocation when looked at while choosing a volume.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields. Current values will be inserted for the *Used %* values of T-DISK and DIRECT areas which are only extracted, for performance reasons, when the screen is actually selected for viewing or printing.

FCX110, I/O Device Details Screen – DEVICE *devno*

Performance Toolkit Subcommand: "DEVICE" on page 169.

The I/O Device Details Screen (FCX110) will be shown if you specify a *devno* on the DEVICE subcommand, or by pressing ENTER after placing the cursor on the device number field on the General I/O Device Screen (FCX108), CP Owned Device Screen (FCX109), or CU-Cached Disks Screen (FCX111).

This screen gives detailed information on the load of a single I/O device. Although intended primarily for analyzing the I/O load to different minidisks on system-attached disks (online SEEKS analysis), it can also give some additional information for other devices.

```
FCX110      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Detailed Analysis for Device 0145 ( CP OWNED )
Device type :  3380-A      Function pend.:    4.8ms      Device busy   :   23%
VOLSER      :  VMPG1C      Disconnected  :   38.5ms      I/O contention:    7%
Nr. of LINKs:      41      Connected     :    7.3ms      Reserved      :    0%
Last SEEK   :     524      Service time  :   50.6ms      SENSE SSCH    :    0
SSCH rate/s :     4.6      Response time :   54.1ms      Recovery SSCH :    0
Avoided/s   :      .0      CU queue time :     .0ms      Throttle del/s:  ...
Status: SHARABLE

System Page/Spool I/O Details
Page reads/s  :   6.2      Total pages/s   :   10.9      PG serv. time:  4.8ms
Page writes/s :   4.7                                    PG resp. time:  4.8ms
Spool reads/s :    .0      System I/Os /s  :    3.4      PG queue len.:  .00
Spool writes/s:    .0      User interfer./s:     .0      Avail. bsize :   14

Path(s) to device 0145:    01    41
Channel path status   :    ON    ON

Device            Overall CU-Cache Performance           Split
DIR ADDR VOLSER   IO/S %READ %RDHIT %WRHIT ICL/S BYP/S   IO/S %READ %RDHIT
8A  0145 VMPG1C    5.5    54      0      0    .0    .0   'NORMAL' I/O only

        MDISK Extent       Userid   Addr IO/s VSEEK Status    LINK MDIO/s
+-------------------------------------------------------------------------+
|       0071 -  0092       SNAMAINT 03CF   .0     0 WR           1     .0 |
|       0189 -  0204       SNAMAINT 06C3   .0     0 WR           1     .0 |
|       0205 -  0228       SNAMAINT 06C4   .0     0 WR           2     .0 |
|       0289 -  0298       SNAMAINT 07C2   .0     0 WR           1     .0 |
|       0299 -  0299       CHGCS    0191   .0     0 RR           6     .0 |
+-------------------------------------------------------------------------+
|       0300 -  0599       SYSTEM PAGE     RD/s  WR/s  MLOAD  Used   IO/s |
|                          LOAD   ====>     6.2   4.7    6.1   47%   .... |
+-------------------------------------------------------------------------+
|       0600 -  0619       SNAMAINT 07C1   .0     0 WR           1     .0 |
|       0620 -  0664       CHVSCS   0193   .0     6 RR           4     .0 |
|       0821 -  0884       MAINT    0A95   .0       owner                 |
|                          XAACNT   0195  1.2     0 WR           1    1.2 |
+-------------------------------------------------------------------------+

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 15. Layout of I/O Device Details Screen (FCX110)

The screen in the above figure is a sample for the type of display you may expect when analyzing a disk containing active minidisks. It shows performance data for a 3380 disk which is connected to 3880-23 controllers, but for which caching has been disabled. Basically, the information shown is grouped into up to five blocks:

- A first block containing general device performance data. This block will always be shown, but its layout depends on the device type being analyzed.

- A second block with details on system I/O (e.g. to paging and spooling areas on the device). Shown only when some system I/O activity has ever taken place.
- A third block containing information on the data path(s) available to the device. Always shown, always same layout regardless of device type.
- A fourth block containing information on the use made of the control unit cache. This information is actually extracted from the 'Control Unit Cache Data Screen', and it can be shown only when the necessary prerequisites are met: I/O domain of CP MONITOR active, and data extraction from CP MONITOR enabled for the Performance Toolkit. See "CACHDBSE" on page 147 for a more detailed description of these requirements.
- A fifth block containing data for minidisk load analysis. This block will be shown only when system-attached or -owned disks are analyzed which either contain minidisks that have been linked by a logged-on user, or which contain system areas (e.g. paging, spooling or dump areas). The line **No active MDISKs on this volume - no SEEKs analysis possible** will be displayed instead for all other disks.

  Note that SEEKs analysis *is* possible, of course, but only based on CP monitor data: you will have to select one of the specific DASD seeks displays to obtain information on the distribution of I/O activity for such a disk (see "SEEKDET" on page 276 for more information).

The minidisk load analysis part of the data may extend beyond the number of lines that can be shown simultaneously on the screen, in which case the 'FORWARD' and 'BACKWARD' subcommands (or the corresponding PF-keys) can be used to view the remaining data.

The example shown is for a disk which is shared with another VM system; the minidisk cache cannot be used for I/O to minidisks on this pack.

Where use of the minidisk cache is possible, the minidisk load analysis part of the screen has a slightly different layout to allow displaying information on minidisk cache efficiency:

```
        MDISK Extent      Userid   Addr IO/s VSEEK Status    LINK  VIO/s %MDC
+-------------------------------------------------------------------------------
|       0051 -  0060      BGF      0191   .0     0 WR           1     .0  ...
|       0121 -  0170      CAR      0319  6.2     0 RR
|                         KSC      0319  3.7     0 RR
|                         BERS     0319  1.4     0 RR
|                         ALO      0319   .8     0 RR
|                         FBL      0319   .5     0 RR         814   24.6   99
|       .... -  ....      ....
```

Note that in this case, the information extends beyond the 80 columns of an ordinary screen. Use the LEFT/RIGHT subcommands, or the corresponding PF-keys, to shift the display window to view the remaining data.

Field Description for General Device Performance Data:

Device type
: Real device type and model of the device found on the address being analyzed

SSCH rate/s
: Average number of SSCH and RSCH operations per second during the last measuring interval. Please note that the total number of SSCHs executed per second on a disk will usually not match exactly the total of the I/O rates displayed for all minidisks on the pack. This inconsistency is to be expected because:

- The values come from different sources and cannot be extracted at exactly the same time
- Some of the minidisks which contributed to the total may have been detached, or their users logged off, in the mean time, and
- I/O activity on CP areas (paging, spooling, etc.) cannot be shown.

Status
General device status information. The status indicated can be

RESERVE HELD
A RESERVE to the real DASD is held from this system

RESERVE PEND
A RESERVE to the real DASD is pending from this system

RELEASE PEND
A RELEASE to the real DASD is pending

MDCACHE USED
Minidisk caching is used for at least one minidisk on this device

SHARABLE
The disk has been defined as 'SHARED' in the HCPRIO or configuration file, or by command

HOT I/O DEV.
Hot I/O device

INTERV. REQD.
Operator intervention is required on the real device

RECORDING
Intensive recording mode is active for the device

DEV. OFFLINE
The *device* is OFFLINE

PATH OFFLINE
All *path(s)* to the device are OFFLINE

ONLINE
Device ONLINE - no special status to be indicated. This status will be inserted only when no other status applies.

for DASD only:

VOLSER
Disk label

Nr. of LINKs
The total number of LINKs to minidisks found on the disk pack. As for the total I/O rate above, this number may differ slightly from the LINK total found when adding up all the LINKs to each minidisk.

Last SEEK
The address of the last real SEEK executed for the disk. For FBA or SCSI disks, this is the block or address on which that last emulated I/O operation was performed.

Avoided/s
The rate at which I/O requests could be satisfied via the minidisk cache, without execution of real I/O operations.

for GRAF devices only:

Features
Indicates extended data stream features available on the device. Features can be

C Device has extended color support

H Device has extended highlighting support

PS Device has programmed symbols support

Screen stat.
Special GRAF status information. The status indicated can be

DISA Disabled

DISASQ
Disabling sequence

DROP DROP processing

LOGON
User logged on

ENA Enabled

for high speed devices only:

Function pend.
The average time, in milliseconds, during which an I/O operation remained pending in the I/O subsystem during the last measuring interval due to path busy conditions.

This value, and also the next five values, is calculated based on data from the 'host measurement facility'. Dots will be inserted for devices where this information is not available.

Disconnected
The average time, in milliseconds, during which the device remained disconnected while handling an I/O operation. Abnormally high 'disconnected' times (as in the example shown) could be caused by an overloaded channel path which did lead to many re-connect misses, or, for DASD, by long SEEKs due to I/O to data at opposite ends of the device.

Connected
The average time, in milliseconds, during which the device was connected to the channel path while handling an I/O operation (receiving commands or transferring data). This time also includes SEARCH time for DASD.

Service time
The average service time of the device, i.e. the average time required by the device for executing an I/O operation (in milliseconds). The service time is an indication of device performance only, it does not include queueing delays.

Response time
The average I/O response time for the device. The I/O response time is the service time plus any queueing delays, it is calculated from the service time and the average I/O request queue length.

CU queue time
The time when the device was logically disconnected from the channel subsystem while it was busy with an I/O operation initiated from another system.

The field will contain valid data only if the control unit queuing measurement facility is installed.

Device busy
Percent of elapsed time during which the device was busy with an I/O operation. This value is calculated based on the I/O rate of the device and it's service time, using the data provided by the 'host measurement facility'.

I/O contention
The smoothed relative I/O queue length, in percent. The value is based on the number of IORBKs found queued during the last few measurements. (see "DEVICE" on page 169).

This value should be very low, it indicates an I/O performance problem because of an overloaded device (too many users having high-activity minidisks allocated on the same real device) if it is often high.

Please note that the contention is calculated based on one sample per measurement interval. The resulting contention figures should be taken as rough indicators only.

Reserved
Percentage of measurements during which the device was found to have been 'reserved' by real reserve/release logic. This value is a smoothed average, based on the last few samples, and it is inserted only for DASD.

SENSE SSCH
The number of 'SENSE' SSCH operations during the last measuring interval. This should normally be zero: SENSE operations are usually performed when a previous I/O operation has terminated with an error condition (unit check).

Recovery SSCH
The number of recovery SSCH operations during the last measuring interval.

Throttle del/s
The rate at which I/Os to the device were delayed due to throttling (applicable only when throttling set on).

Field Description for System Page/Spool I/O Details:

These fields describe the CP I/O activity to system areas (e.g. paging and spooling areas), and to minidisks which have been mapped for paging I/O to VM data spaces. The fields shown and their meaning are

Page reads/s
The number of pages read per second

Page writes/s
The number of pages written per second

Spool reads/s
The number of spool pages read per second

Spool writes/s
The number of spool pages written per second

Total pages/s
The total number of pages moved per second

System I/Os /s
The number of actual SSCH or RSCH operations per second for system areas

User interf./s
The rate at which user-generated I/Os caused interference with system-generated I/O activity (system I/O program could not be resumed)

PG serv. time
The smoothed service time per PIOBK (page I/O CCW package), in milliseconds. Continuously updated by CP after each I/O.

PG resp. time
The smoothed response time per PIOBK. Based on the smoothed service time, but taking into account also the PIOBK queue length. CP uses this value when selecting suitable disks for the next paging or spooling write operation.

PG queue len.
The smoothed PIOBK queue length. This value is determined by sampling the actual current queue length, and then smoothing it according to the formula

```
(15*old value + current value) / 16
```

Avail. bsize
The average number of consecutive free slots found during the last measuring interval. Dots will be inserted when no new slot sizes have been determined in an interval.

Field Description for Path Information:

The path information section shows the channel paths by which the I/O device is connected to the system, based on the specifications in the IOCP.

The format is:

```
Path(s) to device nnnn:    p1    p2   p3   p4
Channel path status   :   xxx   xxx  xxx  xxx
```

where:

nnnn Is the real device number

p1 p2 ..
Are the path numbers of all generated paths to the device

xxx Is the channel path status. It can be either `'ON'` for 'ONLINE', or `'OFF'` for 'OFFLINE'.

Field Description for Cache Usage:

The output shown is an extract of the data displayed on the control unit cache data screen. Refer to “CACHDBSE” on page 147 for the corresponding field descriptions.

Please be aware that cache performance data are asynchronously collected by the CP MONITOR I/O domain. Since the data collect interval of the CP MONITOR is

different from the one used for collecting detailed device data, the I/O rates shown will usually be different too. See also the 'Usage Notes' for the control unit cache data screen for further guidelines.

Field Description for Minidisk Load Analysis:

Minidisks found on the device which belong to, or are linked by currently logged on users will be displayed in ascending sequence of start cylinder or block. Minidisks for which any I/O activity was found during the last measuring interval will be highlighted.

Since both the total I/O count to each minidisk and also the individual contribution to this total by individual users are shown, this display can be used as a very powerful tool for detecting the reason for high I/O contention on a specific device.

MDISK Extent
Start and end cylinders for minidisks on CKD disks. For minidisks on FBA devices the numbers of the first and last block of the minidisk are inserted instead.

Userid
User identifications of users linked to the minidisk. The first entry shown for any minidisk is always the minidisk owner, regardless of I/O activity. Where other users are linked to the same minidisk, up to four of them will be shown if they have contributed to the minidisk's I/O activity in the preceding measuring interval, in descending order of I/O activity.

Addr Virtual minidisk address

IO/s Number of I/O requests per second to this particular minidisk (to this virtual address of this user)

VSEEK
Last virtual SEEK address. The seek address has only little meaning for CMS minidisks where the user usually does not know where specific files have been allocated, and where the address may not even be updated for normal CMS file I/O. It provides an indication on the dataset being processed if the minidisk is used by a VSE or MVS system.

Status
Minidisk status information. The status information consists of two parts. The first part indicates how the minidisk has been linked by the user: the characters 'WR' are shown for minidisks linked in write mode and the characters 'RR' for minidisks in read-only mode (always shown). The string `'owner'` will be inserted instead for the first entry of minidisks which are in use, but whose owner does not have them linked.

The second part of the status information is inserted only if the minidisk was found to be in a special status at the end of the measuring interval. The status indicated can be:

BUSY
Indicates that the minidisk was busy with an I/O operation when the last sample was taken

SUSP Indicates that an I/O operation has been suspended

RPEND
Indicates that a 'resume SSCH' operation was pending

QUED
Indicates that an I/O operation was queued for the minidisk

RS/RL
Indicates that the minidisk has been defined in the directory with virtual reserve/release support

TDISK
Indicates that the minidisk has been defined as a temporary minidisk

Only the first status found (from top to bottom of the above list) will be inserted, even if more than one status applies.

LINK Number of LINKs to the minidisk

VIO/s
Total number of *virtual* I/O requests per second to the minidisk. This field is shown only for disks which can use the minidisk cache.

%MDC
Minidisk cache efficiency, shown as the percentage of virtual I/O requests which did not require a real I/O operation. This field is shown only for disks which can use the minidisk cache; dots will be inserted when the value cannot be calculated because the virtual I/O rate is 0.

Although not absolutely accurate (there is no fixed 1:1 relation between virtual and real I/O operations to a disk, especially to non-CMS minidisks, even if no minidisk cache is available), this value should be a good indicator of minidisk cache efficiency for a specific CMS minidisk.

MDIO/s
Total number of real I/O requests per second to the minidisk

Cache-eligible minidisks:

If a minidisk has been defined in the directory as eligible for caching in the expanded storage minidisk cache (the default, valid unless a 'CACHOPT' statement specifying 'NOMDC' follows the minidisk entry), the character 'C' will be used as left and right delimiter instead of the standard '|'.

If the minidisk cache is used for a minidisk (less real I/Os measured than there were virtual I/Os, i.e. %MDC value > 0), these delimiters and the extent information for the minidisk will be highlighted.

Additional fields for system areas on the disk:

System area fields are separated from each other and from general user minidisk entries by a dashed line.

The layout for system areas is as follows:

```
+-----------------------------------------------------------------+
|  0412 - 0471    SYSTEM  type    RD/s  WR/s  MLOAD  Used   IO/s |
|                 LOAD   ====>     4.1   2.3   16.5   74%    6.4 |
+-----------------------------------------------------------------+
```

SYSTEM *type*
The area type can be

DIRECT
For CP directory space (allocation 'DRCT')

PAGE
For a paging area (allocation 'PAGE')

SPOOL
For a spooling area (allocation 'SPOL')

TDSK
For a temporary minidisk area (allocation 'TDSK')

The following three fields contain meaningful data only if the system area is of the type 'PAGE' or 'SPOOL':

RD/s Page or SPOOL read rate during the last interval (number of PIOBKs read per second)

WR/s Page or SPOOL write rate during the last interval (number of PIOBKs written per second)

MLOAD
Smoothed response time for CP I/O operations to this area, in msec. The value is normalized to reflect the response time for servicing a single PIOBK (paging I/O CCW package), and it takes into account also the PIOBK queue length for the device.

This is not an average of the last interval, but just the current value of the EXPMLOAD field where CP keeps the updated value, using its own smoothing algorithm to approximate the average of the last few I/O operations.

Used Percentage of blocks (PAGE and SPOOL areas) or of cylinders (DIRECT and TDSK) currently in use in this area.

IO/s Information for calculating I/O rates to system areas directly is not available. The I/O rate will be inserted for SPOOL areas as the sum of the read and write request rate, and for PAGE areas as the difference between the sum of all read and write requests and the number of requests which could be appended to an existing channel program without a separate SSCH/RSCH. Where more than one PAGE or SPOOL area exists on the same disk pack, the load information is inserted for the first area only (no information is available to tell how the load is split). Dots are inserted for the I/O rate in further PAGE or SPOOL areas, and for all other types of system areas.

See also the system I/O details section of this screen for information on I/O handling to system areas on the disk.

For temporary minidisk areas you will see both a system area entry, specifying the total size of the TDSK space available, and ordinary minidisk entries for each of the temporary minidisks which are currently defined.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None. Averages cannot be shown for the detailed I/O device display.

FCX111, CU-Cached Disks Screen – CACHDBSE

Performance Toolkit Subcommand: "CACHDBSE" on page 147.

The CU-Cached Disks Screen (FCX111) shows performance data for disks connected to a cached 3880-13 or 3880-23 control unit or an IBM DASD subsystem, and it gives information on the use made and the effectiveness of the cache. Devices which have been active during the last measuring interval will be highlighted on the screen.

```
FCX111      CPU nnnn  SER nnnnn  Interval hh:mm:ss - hh:mm:ss    Perf. Monitor
             ____          .     .      .     .     .     .
Device           Overall CU-Cache Performance       Split
DIR ADDR VOLSER IO/S %READ %RDHIT %WRHIT ICL/S BYP/S IO/S %READ %RDHIT
02  2000 530RES   .6     4     94     81    .0    .0   .2     5     83 (N)
                                                       .4     4    100 (S)
                                                       .0   ...    ... (F)
02  2001 530SPL   .0     0    ...    100    .0    .0 No SEQ./ CACHE FW
02  2002 530PAG   .0   100    100    ...    .0    .0 'NORMAL' I/O only
02  2003 530W01   .0   100     66    ...    .0    .0 'NORMAL' I/O only
02  2004 530W02   .0   ...    ...    ...    .0    .0 'NORMAL' I/O only
02  2005 530PG1   .0   ...    ...    ...    .0    .0 'NORMAL' I/O only
02  2006 530PG2   .0   100      0    ...    .0    .0 'NORMAL' I/O only
02  2007 530PG3   .0    33      0    100    .0    .0 No SEQ./ CACHE FW
02  2008 530PG4   .0   ...    ...    ...    .0    .0 'NORMAL' I/O only
02  2009 530PG5   .0   100      0    ...    .0    .0   .0   100      0 (N)
                                                       .0   100      0 (S)
                                                       .0   ...    ... (F)
02  200A LNXC07   .4     0    ...     91    .0    .0   .2     0    ... (N)
                                                       .2     0    ... (S)
                                                       .0   ...    ... (F)
02  200B LNXW02   .0     0    ...     60    .0    .0   .0     0    ... (N)
                                                       .0     0    ... (S)
                                                       .0   ...    ... (F)
02  200C LNXW03   .0     0    ...     50    .0    .0 No SEQ./ CACHE FW
02  200D LNXW04   .0     0    ...     44    .0    .0 No SEQ./ CACHE FW
Select a device for I/O device details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 16. Layout of CU-Cached Disks Screen (FCX111)

The information shown is based on CP monitor MONITOR and I/O domain data.

The sample shows a screen with performance information for 3380 disks which are connected over two paths to storage directors of two different 3880-23 control units. Only one line per device is shown, containing the sum of the relevant data from both 3880-23 control units. Output lines have been sorted for ascending DASD device number in the example (indicated by the underscore characters '____' above the 'Addr' header). Other possible sort sequences are indicated by dots above the corresponding columns, they can be set using the 'SORT' subcommand with the column heading (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER. The cache has not been activated for all disks, hence the ratio of 0 for some of them.

For more detailed information on the load of one specific disk, either:

- Place the cursor on the ADDR field of the device you are interested in and press ENTER, or
- Enter the subcommand 'DEVICE *devno*' on the command line

A cached 3880-13 or 3880-23 control unit accepts both NORMAL and SEQUENTIAL I/O requests, and an IBM DASD subsystem can additionally handle

FAST WRITE requests. Separate counts are kept by the control units and collected by the CP MONITOR for these modes, so separate performance information can be shown. The first few output line columns (with the heading `Overall CU-Cache Performance`) are summaries which include all request types. The last three columns with the heading `'Split'` are included to indicate the contribution of each of the different request types to the total load. Where only 'NORMAL' I/O requests have been executed, as in the example above, no load split is shown. The string

`'NORMAL' I/O only` (for 3880) `No SEQ./ CACHE FW` (for IBM DASD subsystems)

will be inserted for all devices where no SEQUENTIAL or CACHE FAST WRITE I/O requests were made during the interval shown. The string:

`initial sample`

and dots will be inserted for devices where no valid delta values could be found (initial display, or not valid counts found).

If there was any SEQUENTIAL or CACHE FAST WRITE I/O activity on the device, the performance data for NORMAL, SEQUENTIAL and, for IBM DASD subsystems, CACHE FAST WRITE I/O will be inserted separately as shown in the following example:

```
FCX111    CPU nnnn  SER nnnnn  Interval hh:mm:ss - hh:mm:ss  PERF. MONITOR

Device            Overall CU-Cache Performance           Split
DIR ADDR VOLSER   IO/S %READ %RDHIT %WRHIT ICL/S BYP/S   IO/S %READ %RDHIT
xx  xxxx xxxxxx    n.n   nnn    nnn    nnn   n.n   n.n    n.n   nnn    nnn (N)
                                                         n.n   nnn    nnn (S)
                                                         n.n   nnn    nnn (F)
xx  xxxx xxxxxx    n.n   nnn    nnn    nnn   n.n   n.n    n.n   nnn    nnn (N)
                                                         n.n   nnn    nnn (S)
                                                         n.n   nnn    nnn (F)
```

The strings `(N)` or `(S)` on the right indicate that the data inserted under the `'Split'` heading is for NORMAL or SEQUENTIAL I/O respectively. For an IBM DASD subsystem a third line for CACHE FAST WRITE will be added, with the designator `(F)` on the right.

Field Description for Overall Performance:

The following field descriptions apply to both the CACHDBSE and CACHDLOG *devno* displays, with the exception of the `DIR` and `ADDR` fields which will be replaced by the field `Interval End Time` on the CACHDLOG display.

DIR 3880-13/23 storage director ID. For IBM DASD subsystems the last two hexadecimal digits of the SSID will be inserted.

ADDR
Disk device number

VOLSER
Disk label

IO/S Sum of NORMAL, SEQUENTIAL and FAST WRITE (for IBM DASD subsystems only) I/O requests per second (READ + WRITE)

%READ
Overall percentage of READ requests (NORMAL, SEQUENTIAL and FAST WRITE) to the total I/O activity of the device.

Note that dots will be inserted when this value is not relevant.

%RDHIT
Overall percentage of READ hits, i.e. the percentage of READ requests which did not need DASD access (NORMAL, SEQUENTIAL and FAST WRITE).

Note that dots will be inserted when this value is not relevant.

%WRHIT
Ratio of WRITE hits to WRITE requests. On 3880 control units this refers to 'write normal' hits, and on IBM DASD subsystems to DASD fast write hits.

Note that dots will be inserted when this value is not relevant.

ICL/S Number of INHIBIT CACHE LOAD requests per second

BYP/S
Number of BYPASS CACHE requests per second

Field Description for Normal / Sequential / Fast Write Split:

IO/S Number of I/O requests per second over this storage director.

%READ
Percentage of READ requests.

Note that dots will be inserted when this value is not relevant.

%RDHIT
READ percentage, i.e. the percentage of READ requests which did not need DASD access.

Note that dots will be inserted when this value is not relevant.

Where separate 'normal', 'sequential' and 'cache fast write' load information is available the strings:

(N) For normal I/O

(S) For sequential I/O

(F) For cache fast write I/O

will be appended to the end of split lines.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields.

FCX112, User Resource Usage Screen – USER

Performance Toolkit Subcommand: "USER" on page 337.

The User Resource Usage Screen (FCX112), which shows general information on resource usage by individual users, will be shown if you enter the USER subcommand with no *userid*. Output lines with data of users which have been active during the last interval are shown highlighted on the screen.

```
FCX112      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

______       .     .     .     .     .     .     .     .     .     .               .     .     .     .     .     .     .
       <----- CPU Load -----> <----- Virtual IO/s ----->                    <UsrTime> <--Spool-->    MDC         VConf
           <-Seconds->   T/V                      Diag                     <Minutes> Total  Rate Insert         Rebal Nr of
Userid    %CPU  TCPU  VCPU Ratio Total DASD Avoid   98   UR Pg/s  User Status  Logd Act. Pages SPg/s MDC/s Share  Scat. Users
>>Mean>>   .09  .051  .031  1.63    .0   .0    .1   .0   .0   .0  ---,---,----  1.0   .4    .0    .0    .0   ---    ...    39
User Class Data:
FTP        .00 .000  .000  ....    .0   .0    .0   .0   .0   .0  ---,---,----  1.0  1.0    .0    .0    .0   ---    ...     2

User Data:
CFT2ND    2.88 1.730 1.124  1.54    .0   .0    .0   .0   .0   .0  EME,CL3,DISP    1    1    .0    .0    .0   100   .478
CFT2NDA    .00  .001  .001  1.00    .0   .0    .0   .0   .0   .0  EME,---,DORM    1    1    .0    .0    .0   100   .000
CHG00007   .04  .026  .019  1.37    .5   .3   1.7   .0   .0   .0  ESA,---,DORM    1    1    .0    .0    .0   100   .000
DGA41        0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
DGA42        0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
DGA43        0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
DGA44        0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
DTCVSW1    .00  .000  .000   .00    .0   .0    .0   .0   .0   .0  ESA,---,DORM    1    1    .0    .0    .0   100   .000
DTCVSW2    .00  .000  .000   .00    .0   .0    .0   .0   .0   .0  ESA,---,DORM    1    1    .0    .0    .0   100   .000
DWPLEXA1     0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0  STOP    ...
FTPSERVE   .00  .000  .000   .00    .0   .0    .0   .0   .0   .0  XC, ---,DORM    1    1    .0    .0    .0   100   .000
FTPSRV50   .00  .000  .000   .00    .0   .0    .0   .0   .0   .0  ESA,---,DORM    1    1    .0    .0    .0   100   .000
GCS          0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
MISCSERV     0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
MPROUTE    .07  .043  .031  1.39    .0   .0    .0   .0   .0   .0  EME,CL0,DISP    1    1    .0    .0    .0  3000   .000
OPERATNS     0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
OPERATOR     0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
OPERSYMP     0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
PERFSVMA   .15  .088  .021  4.19    .4   .2    .0   .0   .0   .0  ESA,---,DORM    1    1    .0    .0    .0 3.0%A   .000
PORTMAP      0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
PVM          0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0  3000    ...
REXECD     .00  .000  .000   .00    .0   .0    .0   .0   .0   .0  ESA,---,DORM    1    1    .0    .0    .0   100   .000
RSCS       .00  .001  .000   .00    .1   .0    .0   .0   .0   .0  ESA,---,DORM    1    1    .0    .0    .0   100   .000
RSCSDNS      0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
RSTL3      .15  .089  .021  4.24    .7   .7   3.5   .0   .0   .0  ESA,---,DORM    1    1    .0    .0    .0 3.0%A   .000
RXAGENT1     0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
SCSICPIO     0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
SFSFCFT      0     0     0  ....    0    0     0    0    0    0  XC, ---,DORM    1    0    0     0     0  1500    ...
SMTP       .00  .001  .001  1.00    .0   .0    .0   .0   .0   .0  ESA,---,DORM    1    1    .0    .0    .0   100   .000
TCPIP      .02  .010  .004  2.50    .0   .0    .0   .0   .0   .0  ESA,---,DORM    1    1    .0    .0    .0  3000   .000
TCPIP50    .00  .001  .001  1.00    .1   .0    .0   .0   .0   .0  ESA,---,DORM    1    1    .0    .0    .0  3000   .007
TEST50       0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
UFTD         0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
VMNFS        0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...
VMSERVP      0     0     0  ....    0    0     0    0    0    0  XC, ---,DORM    1    0    0     0     0  1500    ...
VMSERVR      0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0  1500    ...
VMSERVS      0     0     0  ....    0    0     0    0    0    0  XC, ---,DORM    1    0    0     0     0  1500    ...
VMSERVU      0     0     0  ....    0    0     0    0    0    0  XC, ---,DORM    1    0    0     0     0  1500    ...
YVETTE       0     0     0  ....    0    0     0    0    0    0  ESA,---,DORM    1    0    0     0     0   100    ...

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 17. Layout of User Resource Usage Screen (FCX112)

The sample shows a screen from a system without vector facility, with the user entries sorted in descending order of total CPU utilization (indicated by the underscore characters '____' above the '%CPU' header). Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the column heading as sort argument (see "SORT" on page 287), or by placing the cursor on the header for the field which is to be sorted and then pressing the ENTER key.

The first entry is reserved for the overall system averages, regardless of the current sorting sequence. It is identified by the >System<-'userid'.

Some additional lines with user class averages will be shown at the top when user classes have been defined (see "FCONTROL UCLASS" on page 91). The 'userid' shown will then be the user class name.

For more detailed information on one specific user, either:

- Place the cursor on the Userid field of the virtual machine you are interested in and press ENTER, or
- Enter the subcommand 'USER *userid*' on the command line

Field Descriptions:

The following field descriptions apply to both the USER and USERLOG *userid* displays, with the exception of the Userid field which will be replaced by the field Interval End Time on the USERLOG display.

Userid
User identification

CPU Load:

%CPU
Percent of total CPU used.

This value is based on the utilization of a single processor. Values exceeding 100% are possible for virtual MP users.

TCPU
Seconds of total CPU time used during the interval.

VCPU
Seconds of virtual CPU time used during the interval (emulation time).

T/V Ratio
Ratio of total to virtual (emulation) CPU time used.

Virtual IO/s:

Total Total virtual I/O rate per second in the selected interval.

DASD
Virtual I/O rate to disks

Avoid
Rate of I/Os which were avoided because the requested blocks could be found in the minidisk cache or because the I/Os were done to Virtual Disk(s).

Diag 98
Diagnose X'98' rate. Diagnose X'98' allows virtual machines to execute I/Os very efficiently, bypassing normal CCW translation logic.

UR Rate of start requests to virtual UR devices.

Pg/s Page rate (total pages read from or written to DASD).

User Status
Status information on the virtual machine, as collected at the end of the last monitor sample interval.

The status indicators *'xxx,yyy,zzzz'* shown can be:

for *xxx*:

XC Machine working in XC-mode.

ESA Machine working in ESA/370 mode (32-bit).

EME Machine working in 64-bit mode.

XA Machine working in XA-mode.

for *yyy*:

---- Machine is not in queue

CL*n* Machine was in queue as a class *n* user

for *zzzz*:

IDLE Machine found to have been idle for more than the initial period set by the 'FC FORCEUSR' subcommand. The status field will be highlighted in red and reverse video.

LOOP
Machine found to have been looping for more than the initial time period set by the 'FC FORCEUSR' subcommand. The status field will be highlighted in red and reverse video.

DORM
Machine in DORMANT state.

DISP Machine in the dispatch list.

ELIG Machine in eligible list (in resource wait).

More than one of the above *'xxx'*, *'yyy'* and *'zzzz'* states could apply at the same time, but only the first one found will be inserted (search order from top to bottom in the above list).

A status of 'LOGOFF' will be shown for virtual machines which are no longer active, but whose data will still be included when displaying 'average' data because their last session fell within the 'average' period processed.

A status of 'LOGON' will be shown for virtual machines that are in the process of logging on.

UsrTime, Minutes:

Logged
Time, in minutes, that the user was found to be logged on.

Act. Time, in minutes, that the user was found to have been active (the whole length of a sample interval will be counted as 'active' time if the user consumed some virtual CPU time or executed any I/Os during the interval).

Spool:

Total Pages
The total number of pages spooled for the user.

Rate SPg/s
Spool read and write rate per second.

MDC Insert MDC/s
Minidisk cache inserts per second.

Note that this value can be only a rough indicator due to the collect mechanism the numbers shown can be considerably lower than the users' actual MDC insert activity, especially for long monitor intervals.

Share Absolute share (in the format *nn*%A) or relative share of the user. One of the following suffixes may be appended to the share value:

m if a maximum share has been set for the user.

h if the maximum share has been set with hard limit.

Note that this field does not display the value of the maximum share; it displays whether a maximum share (and/or hard limit) has been set.

For z/VM Release 5.4 or later, a virtual machine's share is dynamically distributed across its started virtual processors rather than its defined virtual processors.

For special cases this field contains:

MIX Types of defined virtual processors in running state are different, and the summary share value can not be calculated.

DED All defined virtual processors work as dedicated on logical processors. Because only processors of the primary logical processor type can be dedicated, this string can appear only for users with virtual CPUs of type CP or IFL.

STOP All defined virtual processors are in stopped state.

For related information, see the Share field description under "FCX115, User Resource Details Screen – USER *userid*" on page 433.

Vconf Rebal Scat.
The weighted average grade of how scattered the Vconfig tended to be placed.

Nr of users
The number of users which contributed to the average shown on this line (values are inserted only for lines with averages; the field remains empty for normal user data lines).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages or totals will be shown for all fields, with the exception of the machine status and share fields which will always display the machine status found when the last sample was taken. All of a user's sessions during the selected period contribute to the averages shown. Note also that all of the activity fields (e.g. rates) are based on each user's connect time within the overall period, *not* the total elapsed time for the whole period.

FCX113, User Page Data Screen – UPAGE

Performance Toolkit Subcommand: "UPAGE" on page 326.

The User Page Data Screen (FCX113) contains detailed information on each user's paging activities during the last measuring interval (for current data), or since the last RESET (when average data has been selected). Users who have been active during the last interval are shown highlighted on the screen.

```
FCX113      CPU 3090  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

______        .     .     .     .     .    .    .    .     .      .      .      .     .     .      .      .      .
          Data  <--------- Paging Activity/s ---------->  <----------------- Number of Pages ----------------->
         Spaces  <Page Rate>   Page  <--Page Migration-->              <-Resident-> <--Locked-->                Stor  Nr of
Userid    Owned  Reads Write Steals  >2GB> X>MS MS>X X>DS    WSS Resrvd  R<2GB  R>2GB L<2GB  L>2GB  XSTOR   DASD  Size  Users
>System<  10.6   51.1  34.8     .0     .0   .0   .0   .0  1446k  65609   8776  1372k     0     10      0 840841  6341M     56
User Class Data:
PERF        .0   12.8  12.4     .0     .0   .0   .0   .0   4234      0      0   4234     0      0      0   8824  3072M      1
Service     .0    .0    .0     .0     .0   .0   .0   .0    493    512      1    511     0     19      0    910 32768K      1

User Data:
APCSCIF      0    .0    .0     .0     .0   .0   .0   .0    238      0      0      1     0      0      0    242    64M
BK200001     0    .0    .0     .0     .0   .0   .0   .0 849408      0      0 786462     0      0      0    540  3328M
BK200007     0    .0    .0     .0     .0   .0   .0   .0 849408      0   3052 783410     0      0      0 786982  3328M
BK200008     0    .0    .0     .0     .0   .0   .0   .0 849408      0     19 786443     0      0      0 786982  3328M
BK300012     0   1321   353     .0     .0   .0   .0   .0  1074k      0     24  1525k     0      0      0  4195k    16G
BK400015     0    231   700     .0     .0   .0   .0   .0 26277k      0 194642 22470k     0      0      0 15340k   100G
CFT2NDA      0     .1    .2     .0     .0   .0   .0   .0    268      0      0    268     0      0      0  16255    64M
CHG00001     0    .0    .2     .0     .0   .0   .0   .0    181      0      0    183     0      0      0    421    65M
CHG00006     0    .0   1.1     .0     .0   .0   .0   .0    355      0      0    357     0      0      0    577    65M
CHG00008     0    .0    .0     .0     .0   .0   .0   .0     49      0      0     49     0      0      0    396    65M
CHG00010     0     .1    .2     .0     .0   .0   .0   .0    255      0      0    255     0      0      0    420    65M
CHSCTSTN     0    .0    .0     .0     .0   .0   .0   .0      2      0      0      2     0      0      0     29    16M
DG100037     0    .0   168     .0     .0   .0   .0   .0 270528      0      4 223832     0      0      0 516343  2048M
DG100038     0    374   .0     .0     .0   .0   .0   .0 340183      0     29 123137     0      1      0 516343  2048M
DTCVSW1      0    .0    .0     .0     .0   .0   .0   .0     46      0      0     47     0      1      0   2853    32M
DTCVSW2      0    .0    .0     .0     .0   .0   .0   .0     46      0      0     47     0      1      0   2853    32M
D250A      128    .0    .0     .0     .0   .0   .0   .0    190      0      0      2     0      1      0    202    32M
D2501      464    .0    .3     .0     .0   .0   .0   .0     44      0      0    111     0      0      0    897    32M
FTPSERVE     0    .0    .0     .0     .0   .0   .0   .0     19      0      0     20     0      1      0   1601    32M
GCS          0    .0    .0     .0     .0   .0   .0   .0     52      0      0      1     0      1      0     52    16M
GERTNERJ     0     .1    .1     .0     .0   .0   .0   .0     29      0      0     29     0      0      0    297    32M

Select a user for user details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 18. Layout of User Page Data Screen (FCX113)

The sample shows a screen with the userids sorted in ascending sequence, the default (indicated by the underscore characters '____' above the 'USERID' headers). Other possible sort sequences are indicated by dots above the corresponding columns, they can be set using the 'SORT' subcommand with the column heading as sort argument (see "SORT" on page 287), or by placing the cursor on the header for the field which is to be sorted and then pressing the ENTER key.

The first entry is reserved for the overall system average for all users, regardless of the current sorting sequence. It is identified by the >System<-'userid'.

Some additional lines with user class averages will be shown at the top when user classes have been defined (see "FCONTROL UCLASS" on page 91). The 'userid' shown will then be the user class name.

Use the scrolling PF-keys or subcommands to view data not visible on the initial screen, or use the LOCATE subcommand if you want to search for a specific user.

For more detailed information on one specific user, either:

- Place the cursor on the `Userid` field of the virtual machine you are interested in and press ENTER, or
- Enter the subcommand 'USER *userid*' on the command line

Field Descriptions:

The following field descriptions apply to both the UPAGE and UPAGELOG *userid* displays, with the exception of the `Userid` field which will be replaced by the field `Interval End Time` on the UPAGELOG display.

Userid
User identification

Data Spaces Owned
The number of non-base address spaces owned by the virtual machine.

Paging Activity/s:

Page Rate:

Reads
The rate at which pages were read in via paging operation

Write The rate at which pages were written out via paging operation

Page Steals
The rate at which pages were stolen from the virtual machine's address spaces while they were private.

Page Migration:

>2GB>
The rate at which page frames were moved below the 2GB line for translation.

X>MS
The rate at which page frames were moved from XSTORE to main storage

MS>X
The rate at which page frames were migrated out from main storage to XSTORE

X>DS The rate at which page frames were migrated out from XSTORE to DASD

Number of Pages:

WSS The number of pages in the user's projected working set

Resrvd
The number of reserved pages for the user

Resident R<2GB
The number of pages that are resident below the 2GB line.

Resident R>2GB
The number of pages that are resident above the 2GB line. This field is available only when running in 64-bit mode.

Locked L<2GB
The number of pages locked in the user's private address spaces below the 2GB line.

Locked L>2GB
The number of private pages that are locked above the 2GB line.

XSTOR
The number of pages of this user which are currently resident in XSTORE (without dedicated XSTORE)

DASD
The number of page slots used on system paging areas on DASD

Stor Size
The machine's virtual storage size.

Where the user's storage consists of discontiguous extents, this is the number of bytes addressable by the user, *not* the highest address that can be referenced.

Nr of users
The number of users which contributed to the average shown on this line (values are inserted only for lines with averages; the field remains empty for normal user data lines).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all data fields. All of a user's sessions during the selected period contribute to the averages shown. Note also that all of the activity fields (rates) are based on each user's connect time within the overall period, *not* the total elapsed time for the whole period.

FCX114, User Wait States Screen – USTAT / USTATG

Performance Toolkit Subcommand: "USTAT / USTATG" on page 339.

User wait state data can be shown in two formats:

- The User Wait States Screen (FCX114), a standard display with user activity and wait state percentages shown numerically, or
- GDDM graphics display where user activity and wait state are shown in bar chart format (requires access to GDDM code and a display terminal with graphics capability).

Standard User Wait State Display

The User Wait States Screen (FCX114), obtained by issuing the USTAT subcommand, is based on CP monitor data. It shows user status information collected by the high-frequency sampling facility of the CP monitor.

Status information of users which have been active during the last interval is shown highlighted on the screen.

```
FCX114      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
.           ____      .    .    .    .    .    .    .    .   .   .    .    .
                                                          <-SVM and->
Userid      %ACT  %RUN %CPU %LDG %PGW %IOW %SIM %TIW %CFW %TI %EL %DM %IOA %OTH
>System<       3     5    4    0    0    1    8   27   40    4   0  10    3    0
ABSTSSW      100     0    0    0    0    0    0    0  100    0   0   0    0    0
BARSMGR      100     0    0    0    0    0    0    0  100    0   0   0    0    0
BARSSUBB     100     0    0    0    0    0    0    0    0    0   0 100    0    0
CHVSCS       100     3    3    0    0    0    0   58    0   35   0   0    0    0
CHVTAM       100     1    3    0    0    0    1   22    0   68   0   0    6    0
JST          100     0    0    0    0    0    0    0  100    0   0   0    0    0
PASSUF       100     0    0    0    0    0    0    0  100    0   0   0    0    0
PME          100     0    0    0    0    0    0  100    0    0   0   0    0    0
VMASMON      100     0    0    0    0    0    0    0  100    0   0   0    0    0
CHRSCS        81     0    4    0    0    0   10    0    5    0   0   1   79    0
FJEI          60     0    0    0    0    0    0    3   97    0   0   0    0    0
RACFVM        57     4    0    0    0    0    9   81    0    0   0   0    6    0
SQ3PSBS       48    42    7    0    0    0    9   19    0   23   0   0    0    0
CHCAL         46     0   20    0    0    0   44   35    2    0   0   0    0    0
FAE           45     0    0    0    0    0    0    0  100    0   0   0    0    0
CHMBX04       43     0    0    0    0    0    8    2    2    4   0  84    0    0
RGUB          43     8    6    0    0    0   25   62    0    0   0   0    0    0
CHMBX05       40     0    4    0    0    0    8   10    6    0   0  71    0    0
Select a user for user details or IDLEUSER for a list of idle users

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 19. Layout of User Wait States Screen (FCX114)

The sample shows a screen with the users sorted in descending user activity sequence, the initial setting (indicated by the underscore characters '____' above the %ACT headers). Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the appropriate column heading as sort argument (see "SORT" on page 287 and "USTAT / USTATG" on page 339), or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

The first entry is reserved for the overall system average for all users, regardless of the current sorting sequence. It is identified by the >System<-'userid', and it is a good indicator of system bottlenecks which might be masked by a high CPU usage

of a minority of users: paging or I/O bottlenecks will show up as a high percentage of in-queue time spent in either page wait or I/O wait (or instruction simulation wait for CMS diagnose I/O).

Some additional lines with user class averages will be shown at the top when user classes have been defined (see "FCONTROL UCLASS" on page 91). The 'userid' shown will then be the user class name.

Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

For more detailed information on one specific user either:

- Place the cursor on the `Userid` field of the virtual machine you are interested in and press ENTER, or
- Enter the subcommand 'USER *userid*' on the command line.

Field Description:

The following field descriptions apply to both the USTAT and USTATLOG *userid* displays, with the exception of the `Userid` field which will be replaced by the field `Interval End Time` on the UTRANLOG display.

Users' wait states are tested for in the following sequence:

- I/O wait
- Console function wait
- Instruction simulation wait
- Page wait
- CPU wait
- Running
- SVM wait and in the eligible list
- Loading
- Dormant
- Dormant and in SVM wait
- I/O active
- Test idle wait
- SVM wait and test idle wait
- Page active wait
- Other

Only the first matching wait state found is accounted for.

Userid
User identification

%ACT
Percent of samples during which the user was found to be active, either consuming CPU or waiting for some service.

%RUN
Percent of 'active' samples during which the user was found to be running on a real processor.

%CPU
Percent of 'active' samples during which the user was found to be waiting to run on the real CPU.

%LDG
Percent of 'active' samples during which the user was found in 'loading' state, i.e. with a very high page read rate

%PGW
Percent of 'active' samples during which the user was found in page wait state

%IOW
Percent of 'active' samples during which the user was found in 'I/O wait' state.

%SIM
Percent of 'active' samples during which the user was found in instruction simulation wait, i.e. waiting for CP to complete simulation of a privileged instruction.

%TIW
Percent of 'active' samples during which the user was found in 'test idle' wait, i.e. waiting to be dropped from the dispatch list.

%CFW
Percent of 'active' samples during which the user was found in 'console function' wait, i.e. waiting for CP to execute one of the console function commands which allow a user to alter the state and configuration of the virtual machine (e.g. LINK, ATTACH, and DETACH).

%TI Percent of 'active' samples during which the user was found in both SVM wait and 'test idle' wait. SVM wait state indicates that the user was waiting for the completion of a communication with a service virtual machine.

%EL Percent of 'active' samples during which the user was found in both SVM wait and in the eligible list (resource wait).

%DM
Percent of 'active' samples during which the user was found in both SVM wait and in the dormant list. (This status is counted as 'active' since the machine is actually waiting for something, and not just idle.)

%IOA
Percent of 'active' samples during which the user was found waiting for something other than the above while an I/O operation started by this machine had not yet completed.

%OTH
Percent of 'active' samples during which the user was found in other states.

%LIM
Percent of 'active' samples during which the user was found in the 'limit list', i.e. in the dispatch list waiting for CPU but prevented from running by a maximum share setting.

%PGA
Percent of 'page active' wait, i.e. the virtual machine has loaded a wait PSW while waiting for the completion of a page read operation. This state is to be expected for guest systems running with PAGEX ON.

%Time spent in: The columns under this header show the relative frequency with which a machine was found in the different lists and classes:

Q0 Percent of 'active' samples during which the user was found in Q0 (in the dispatch list as class 0 user)

Q1 Percent of 'active' samples during which the user was found in Q1 (in the dispatch list as class 1 user)

Q2 Percent of 'active' samples during which the user was found in Q2 (in the dispatch list as class 2 user)

Q3 Percent of 'active' samples during which the user was found in Q3 (in the dispatch list as class 3 user)

E0-3 Percent of 'active' samples during which the user was found in the eligible list (any class)

Nr of users
The number of users which contributed to the average shown on this line (values are inserted only for lines with averages; the field remains empty for normal user data lines).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all data fields. All of a user's sessions during the selected period contribute to the averages shown.

Graphical Display of User Status Data

This type of display, obtained by issuing the USTATG subcommand, often gives an overview of user wait states which is easier to interpret than the large amount of figures shown in the user status display obtained with the USTAT subcommand, but it requires access to GDDM code and also a display terminal with graphics capability.

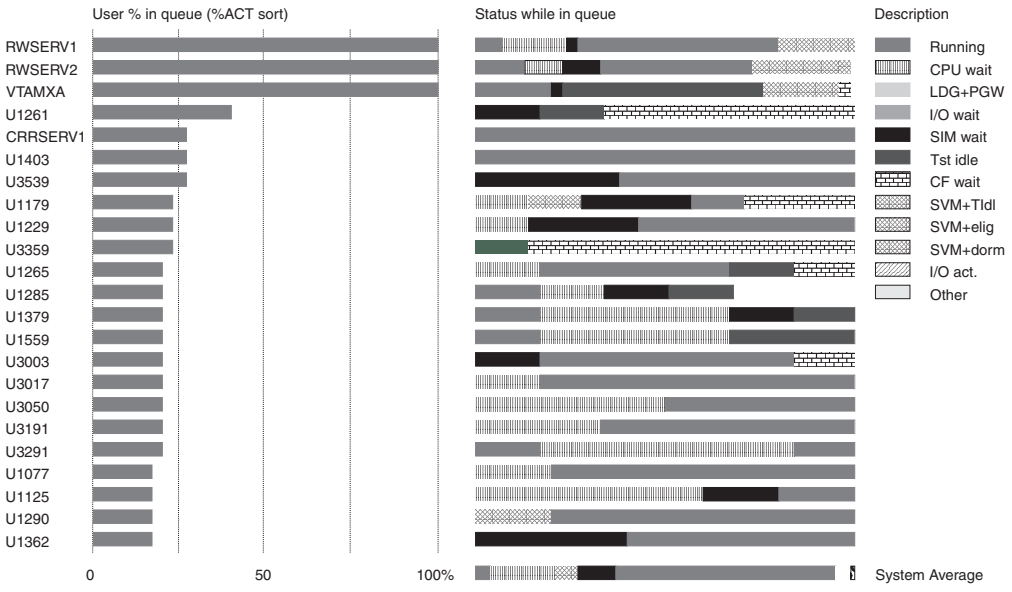

Figure 20. Layout of Graphic User Wait State Display

Wait state information for all users can be shown (use the scrolling PF-keys if necessary), and users can be sorted according to different criteria by supplying the name of the sorting variable with the USTATG subcommand.

Field Description:

Each line of the bar chart represents the wait state information for one virtual machine. The userid of the machine is inserted in front of the corresponding bar.

User % in-queue (*%xxx* sort)
The bar chart shown under this heading gives the percentage of high-frequency samples where the user was found to be active (in queue). This is the equivalent of the '%ACT' value in the standard user status display.

'%xxx' indicates the current sorting sequence.

Status while in queue
The bar chart shown under this heading indicates the relative frequency with which the machine was found in different states while in-queue.

No load bar can be shown if none of the accumulated samples found the user to be in a non-dormant state. The string:

```
No activity
```

will then be inserted instead of a load bar.

Description
Explains which colors and shading patterns were used for the different states shown under the heading `'Status while in queue'`.

Note that wait time in the limit list (for users with max. share settings) and 'page active' wait time (for users with PAGEX ON) will not be displayed separately but will be included in the 'CPU wait' and 'Page wait' percentages respectively.

An additional line at the bottom of the display shows the average of all users' in-queue states; it corresponds to the `>System<` entry on the standard user status diplay. This is the main indicator of paging or I/O bottlenecks on the system.

Saving / Printing Screen:

The graphical part of the screen can be saved on disk for further use. The field:

```
( FCONUST  1 )
```

at the right hand side of the bottom line can be overwritten. It allows you to:

- Define the file name of the disk file: overwrite the string `FCONUST` with the file name to be used for the disk file
- Set the number of copies to be created when printing the screen contents: overwrite the number 1 with a digit corresponding to the number of copies to be printed.

You can then use the allocated PF-keys to let the data be written to disk:

- Press PF6 (or the PF-key to which you assigned the 'SAVE' function) to save the graphics part of the display as file '*xxxxxxxx* ADMGDF A', where *xxxxxxxx* is the file name previously entered in the '(FCONUST 1)' field in the bottom line of the screen. The resulting file can later be retrieved by GDDM for re-displaying, or it can be converted and included in a script file for processing by DCF (Document Composition Facility, 5748-XX9).
- Press PF9 (or the PF-key to which you assigned the 'PRINT' function) to save the graphics part of the display as file '*xxxxxxxx* ADMPRINT A'. where *xxxxxxxx* is

the file name previously entered in the '(FCONUST 1)' field in the bottom line of the screen. It can then be printed using standard GDDM facilities. line.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all data fields. The graphical representation of user wait states will be based on average values when an AVERAGE subcommand has been entered prior to invoking USTATG. Note that you cannot switch between average and current data without first leaving the USTATG display.

FCX115, User Resource Details Screen – USER *userid*

Performance Toolkit Subcommand: "USER" on page 337.

The User Resource Details Screen (FCX115) will be shown if you specify a *userid* on the USER subcommand, or when pressing ENTER after selecting a user with the cursor on either of the general user, user paging, or user status displays:
The information shown is grouped into several blocks:

```
FCX115      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Detailed data for user TCPIP50
Total CPU      :   .0%     Storage def.   :      128MB  Page fault rate:   .0/s
Superv. CPU    :   .0%     Resident <2GB  :        9    Page read rate :   .0/s
Emulat. CPU    :   .0%     Resident >2GB  :    12285    Page write rate:   .0/s
I/O rate       :  1.2/s    Proj. WSET     :    11986    Pgs moved >2GB>:   .0/s
DASD IO rate   :   .0/s    Reserved pgs   :        0    Main > XSTORE  :   .0/s
UR I/O rate    :   .0/s    Locked pages   :      287    XSTORE > main  :   .0/s
Diag. X'98'    :   .0/s    XSTORE dedic.  :        0MB  XSTORE > DASD  :   .0/s
*BLOCKIO       :   .0/s    XSTORE pages   :        0    SPOOL pg reads :   .0/s
Last IPL       : CMS       DASD slots     :        0    SPOOL pg writes:   .0/s
Config mode    : ESA390    IUCV X-fer/s   :       .0/s  MDC insert rate:   .0/s
Base CPU type  : CP        Share          :     3000    MDC I/O avoided:   .0/s
Base CPU affin.: ON        Max. share     :      ...

#I/O active    :    0      Active   :  50%    PSW wait : 100%   I/O act. :   0%
Stacked blk    :   ..      Page wait:   0%    CF wait  :   0%   Eligible :   0%
Stat.: ESA,P06,PSWT        I/O wait :   0%    Sim. wait:   0%   Runnable :   0%

Proc. %CPU  %CP  %EM   IO/S  Status       Type Aff SRel.  SAbs. Limit MRel.  MAbs.
00 BI   .0   .0   .0   1.2   ESA,P06,PSWT CP   ON    500 ...... ..... ..... ......
01      .0   .0   .0    .0   ESA,P06,DORM CP   ON    500 ...... ..... ..... ......
02      .0   .0   .0    .0   ESA,P06,DORM CP   ON    500 ...... ..... ..... ......
03      .0   .0   .0    .0   ESA,P06,DORM CP   ON    500 ...... ..... ..... ......
04      .0   .0   .0    .0   ESA,P06,DORM CP   ON    500 ...... ..... ..... ......
05      .0   .0   .0    .0   ESA,P06,DORM CP   ON    500 ...... ..... ..... ......

Data Space Name            Size Mode  PgRd/s PgWr/s XRd/s XWr/s Migr/s Steal/s
BASE                      128MB Priv      .0     .0    .0    .0     .0      .0

Device activity and status:
0009 3215   .0                                 000C 254R      CL *, EOF    NOH NCNT
000D 254P      CL A, CO 01, NOH NCNT           000E 1403      CL A, CO 01, NOH NCNT
0190 3390   .0 B8A0,RR,    214Cyl,------->0  0191 3390   .0 B877,WR,      2Cyl,------->0
0198 3390   .0 B877,RR,     20Cyl,------->0  019D 3390   .0 B8A0,RR,    292Cyl,------->0
019E 3390   .0 B8A0,RR,    500Cyl,------->0  0500 CTCA   .0 NOT READY
0501 CTCA  1.2 NOT READY                     0551 3390   .0 B8A2,RR,     40Cyl,------->0
0591 3390   .0 B8A1,RR,    122Cyl,------->0  0592 3390   .0 B8A1,RR,    140Cyl,------->0
5050 OSA    .0 QDIO->SUBNT240 SYSTEM         5051 OSA    .0 QDIO->SUBNT240 SYSTEM
5052 OSA    .0 QDIO->SUBNT240 SYSTEM

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 21. Layout of User Resource Details Screen (FCX115)

- A first block which always has the same layout for all users, and which shows general performance information for that user. Fields which indicate any user activity are highlighted on the screen.
- *For virtual MP users only* a second block displaying the CPU and I/O load of each of the virtual processors, and the corresponding status information.

```
Proc. %CPU  %CP  %EM   IO/S  Status       Type Aff SRel.  SAbs. Limit MRel.  MAbs.
00 BI   .0   .0   .0   1.2   ESA,P06,PSWT CP   ON    500 ...... ..... ..... ......
01      .0   .0   .0    .0   ESA,P06,DORM CP   ON    500 ...... ..... ..... ......
02      .0   .0   .0    .0   ESA,P06,DORM CP   ON    500 ...... ..... ..... ......
03      .0   .0   .0    .0   ESA,P06,DORM CP   ON    500 ...... ..... ..... ......
04      .0   .0   .0    .0   ESA,P06,DORM CP   ON    500 ...... ..... ..... ......
05      .0   .0   .0    .0   ESA,P06,DORM CP   ON    500 ...... ..... ..... ......
```

- A block with detailed information on the paging activity for each of the data spaces owned by the user, as follows:

```
Data Space Name            Size Mode  PgRd/s PgWr/s XRd/s XWr/s  ...
BASE                       32MB Priv      .3     .0   4.6   5.9  ...
....                        ... ....     ...    ...   ...   ...  ...
```

- *If you have selected an SFS server* a block with summary information about shared file system load and performance, as follows:

```
SFS Load   REQ. Servr   <- Load / Req.->   <- Elapsed Time per -->
USERID     /sec %BUSY   SEC.   I/O   SAC   BLKIO  LKWT  CKPT  ESMC  ..
EDLBACK    21.0     9   .085  2.78   5.0    .051  .011 1.296   ...  ..
```

  This is an extract from the 'General Shared File System Screen'. The information shown is available only when the necessary pre-requisites (CP MONITOR data collection activated) are met, otherwise it will be omitted. See “SFS” on page 281 for details.

- A last block listing all virtual devices which are currently defined for the user. Where possible, the activity of individual devices is also calculated and displayed. Devices which have been active during the last measuring interval will be highlighted.

The detailed virtual device data may extend beyond the number of lines that can be shown simultaneously on the screen, in which case the 'FORWARD' and 'BACKWARD' subcommands (or the corresponding PF-keys) can be used to view the remaining output.

Field Descriptions:

General User Performance Information

The following information can be appended to the header line with the userid of the virtual machine being analyzed:

sec. user:
ID of a virtual machine which is receiving console output from our user by means of the Single Console Image Facility (SCIF) if the facility has been activated

alt. user:
ID of an alternate virtual machine for which work is being done (set via Diagnose X'D4')

Actual performance fields:

Total CPU
Percent of total CPU used.

All the CPU load percentages are based on the utilization of a single processor. Values exceeding 100% are possible for virtual MP users.

Note that the CPU load value for 'user' `SYSTEM` is taken from the %SYS column of the general CPU screen. It is updated only when an automatic update causes re-calculation of all performance values, but not when an update for the detailed user display alone is forced by pressing the ENTER key.

Superv. CPU
Percent of supervisor CPU used

Emulat. CPU
Percent of emulation mode CPU used (virtual CPU)

I/O rate
Average number of non-spooled I/O operations per second during the last interval.

DASD IO rate
Average number of I/O operations per second to disk during the last interval.

UR I/O rate
Average I/O rate to virtual unit record devices (spooled)

Diag. X'98'
Average rate of Diagnose X'98' instructions per second

***BLOCKIO rate**
Average rate of block I/Os executed per second, using the *BLOCKIO service

Last IPL
Indicates the device number (DEV vdev) of the last IPLed device for the virtual configuration, or the name (sysname) of the last named saved system to be IPLed. (The named saved system was previously saved through the SAVESYS command.) DEV NONE indicates that no device or named saved system was IPLed.

Config mode
Displays the virtual configuration mode for the virtual machine: ESA390, LINUX, VM, or CF.

Base CPU type
Indicates the base virtual CPU type:

CP Central processor

ZAAP IBM System z Application Assist processor (zAAP)

IFL Integrated Facility for Linux processor

ZIIP IBM System z Integrated Information processor (zIIP)

Storage def.
Virtual storage size of the machine, as defined in the directory or by the 'DEFINE STORAGE' subcommand

Where the user's storage consists of discontiguous extents, this is the number of bytes addressable by the user, *not* the highest address that can be referenced.

Resident <2GB
Number of pages that were resident below 2GB at the end of the last measuring interval

Resident >2GB
Number of pages that were resident in main storage above the 2GB line at the end of the last measuring interval.

Proj. WSET
Number of pages in the projected working set at the end of the interval.

Reserved pgs
Number of main storage pages reserved for this user.

Locked pages
Number of main storage pages locked for this user.

XSTORE dedic.
Amount of expanded storage which is dedicated to this user

XSTORE pages
Number of expanded storage blocks occupied by this user's pages

DASD slots
Number of page slots used on system page areas on DASD

IUCV X-fer/s
Number of IUCV data transfers per second (from and to this machine)

Share User's share, either in the format *nnnnn* for relative share, or as *nnnnn%* for an absolute share percentage..

For special cases this field contains:

STOP All virtual processors are in stopped state.

DED All running virtual processors are dedicated to logical (host) processors.

MIX All running virtual processors have mixed types. Actual values of share per CPU type are shown in the Activity of Virtual Processors for Virtual MP Users block.

Note that this field does not display the value of the maximum share; it may contain only an indicator of maximum share settings (no limit, soft limit, or hard limit). For related information, see the Share field description under"FCX112, User Resource Usage Screen – USER" on page 420.

Max. share
User's max. share, if available, either in the format *nnnnn* for a relative share, or as *nnn%* for an absolute maximum share percentage.

The character "H" will be appended if the share setting is 'hard'.

Page fault rate
Number of page faults per second during the last measuring interval

Page read rate
Number of pages read per second during the last measuring interval

Page write rate
Number of pages written per second during the last interval

Pgs moved >2GB>
Number of pages moved below the 2GB line per second for translation during the last interval.

Main > XSTORE
Number of pages migrated per second from main storage to expanded storage during the last measuring interval

XSTORE > main
Number of pages migrated per second from expanded storage to main storage during the last interval

XSTORE > DASD
Number of pages migrated per second from expanded storage to external paging devices (paging disks)

SPOOL pg reads
Number of SPOOL pages read per second during the last measuring interval

SPOOL pg writes
Number of SPOOL pages written per second during the last interval

MDC insert rate
Number of minidisk cache inserts per second during the last measuring interval

MDC I/O avoided
Average rate of I/Os avoided because the requested data were found in storage, in the minidisk cache

MDC setting
This string will be inserted only if a special minidisk cache setting is active for the user. The settings tested for and inserted are

NOMDCFS
If the NOMDCFS option has been set for the virtual machine, indicating that its use of the minidisk cache is not to be throttled by 'fair share' considerations

Set OFF
If minidisk caching has been disabled for the virtual machine.

#I/O active
Number of active high speed I/O devices at the end of the measuring interval. This number has little meaning for ordinary CMS machines working with CMS files where only one disk I/O can be active at a time (executed via Diagnose call to CP), but it gives an indication on I/O overlap for other operating systems like VSE or MVS.

Stacked blk
Type of block stacked by CP for this user. Block types can be

- `CPEBK` : a CPEBK (CP Task Execution Block) has been stacked
- `IORBK` : an IORBK (I/O Request Block) or `TRQBK` (Timer Request Block) has been stacked

Stat. Virtual machine status. For more information on the status values shown here, see the values described for the User Status field in "FCX112, User Resource Usage Screen – USER" on page 420. The following values are possible. Note that the status indicators are in the format *xxx,yyy,zzzz*.

For *xxx*:

V=R Machine is V=R user.

V=F Machine is V=F user.

XC Machine working in XC-mode.

ESA Machine working in ESA/370 mode (32-bit).

EME Machine working in 64-bit mode.

XA Machine working in XA-mode.

370 Machine working in /370 mode.

For *yyy*:

P*nn* *nn* is the number of defined virtual processors. This value is displayed for Virtual MP users.

QDS The user is designated as a quick dispatcher (QUICKDISP).

DCS The user is disconnected.

SHR The machine was IPLed from a shared system.

DEV The machine was IPLed from a device.

For *zzz*:

DORM
The machine is in DORMANT state.

IDLE The machine is idle.

PEND The machine is in disconnected wait state.

SLP The machine is sleeping.

ELIG The machine is in the eligible list.

PGWT
The machine is in page wait.

TIO The machine is in a TIO loop.

TSCH The machine is in a TSCH loop.

IOWT The machine is in I/O wait.

PSWT The machine is in enabled PSW wait.

CFWT The machine is in console function wait.

SIMW The machine is in instruction simulation wait.

IUCV The machine is in IUCV wait.

RNBL The machine is runnable.

STOP The machine is stopped.

A status of 'LOGOFF' will be shown for virtual machines which are no longer active, but whose data will still be included when displaying 'average' data because their last session fell within the 'average' period processed. A status of 'LOGON' will be shown for virtual machines that are in the process of logging on.

A merged status will be shown for MP users.

Active
Percent of samples where the machine was found in queue, i.e. active at the moment when data was collected. This value, and also the next six user status values, are identical to the status information given on the general user status display ("USTAT / USTATG" on page 339). They are calculated based on all samples collected since the user logged on, or since the status counters were last reset. You can find the time of the last RESET by displaying the USTAT screen: the time during which user status sample counts have been accumulated is shown in the top line of the USTAT display.

Page wait
Percent of in-queue samples where the machine was found in page wait

I/O wait
Percent of in-queue samples where the machine was found in I/O wait. A machine is considered to be in I/O wait when it is either

- Flagged as being in I/O wait (e.g. CCW translation)

- In instruction simulation wait with a high speed I/O outstanding, or
- In PSW wait and not idle, and has a high speed I/O outstanding.

PSW wait
Percent of in-queue samples where the machine was found in enabled PSW wait but not idle, and not waiting for a high-speed I/O operation to end.

CF wait
Percent of in-queue samples where the machine was found in console function wait

Sim. wait
Percent of in-queue samples where the machine was found in instruction simulation wait, i.e. waiting for CP to simulate a privileged instruction with no outstanding high-speed I/O

I/O act.
Percent of in-queue samples where a high speed I/O operation was still active (field 'VMDIOACT' field in VMDBK > 0), and where the machine was *not* in an I/O wait state.

Eligible
Percent of in-queue samples where the machine was found to be in the eligible list, i.e. waiting for a constrained resource.

Runnable
Percent of in-queue samples where the machine was found to be runnable, i.e. not waiting for pages, I/O, completion of a console function, instruction simulation or storage, and not idle. This value also includes any other wait states not mentioned in the above list (e.g. IUCV soft wait).

Activity of Virtual Processors for Virtual MP Users

One line with CPU performance data, the I/O activity generated, and with the processor status will be shown for each of the virtual processors. None of this data will be shown for ordinary UP users, where the load generated by the single processor would equal the totals inserted above anyway.

Proc Processor number, in the format P*nn*

%CPU
Percent of total CPU used

%CP Percent of supervisor mode CPU used

%EM Percent of emulation CPU used

IO/S Virtual I/O rate for the processor. Note that the I/O rates shown for each processor do not include I/O counts of devices running under I/O assist.

Status
Status information for the VMDBK which describes the virtual processor. For more information on the status values shown here, see the Stat field described previously; also see the values described for the User Status field in “FCX112, User Resource Usage Screen – USER” on page 420.

The Status field in this section contains only a "zzzz" indicator.

Type See previous description of the "Base CPU type" field.

Aff Indicates CPU affinity for the virtual processor:

ON CPU affinity has been set on with the SET CPUAFFINITY command and this virtual CPU is dispatched on a real CPU of the same TYPE.

SUP CPU affinity is suppressed. CPU affinity has been set on with the SET CPUAFFINITY command but there is currently no matching real processor on which to run.

OFF CPU affinity has not been set on.

SRel. The machine's relative share summary value for this CPU, if set. Dots will be inserted if an absolute share has been set for this CPU type for the virtual machine, or if the processor is in stopped state.

SAbs. The machine's absolute share (%) summary value for this CPU, if set. Dots will be inserted if a relative share has been set for this CPU type for the virtual machine, or if the processor is in stopped state.

Limit The type of limit set for the maximum share: either "Soft" or "Hard".

MRel. The machine's maximum share relative value, if set.

MAbs.
The machine's maximum share absolute value (in %), if set.

When the virtual processor is dedicated to a logical CPU, the string `(dedicated on logical CPU ##)` will be shown instead of all share parameters.

Data Space Information

One line with data space information will be shown for each of the data spaces owned by the user.

Data Space Name
The name given to the data space.

Size The size of the data space

Mode The mode in which the data space is used. It can be

Priv For a 'private' data space which can be accessed only by its owner

Publ For a 'public' data space which can be accessed by all users

Shrd For a 'shared' data space which can be accessed by users which have been specifically authorized to work with the data space.

PgRd/s
The page read rate for the data space

PgWr/s
The page write rate for the data space

XRd/s
The rate at which pages for the data space have been moved in from expanded storage to main storage

XWr/s
The rate at which pages for the data space have been moved from main storage to expanded storage

Migr/s
The rate at which pages have been migrated from expanded storage to auxiliary storage (DASD)

Steal/s
The page steal rate for the data space

Shared File System Load and Performance

The information shown is extracted from the 'General Shared File System Screen'; it is just the summary information for the selected user. Please see “SFS” on page 281 for the description of the different fields. Be aware that the load information shown will usually be based on different periods: the SFS data are based on the CP MONITOR data collection interval, not on the normal data collect interval of Performance Toolkit.

View the 'Detailed Shared File System Screen' for more detailed information on this SFS server's performance: you can select it by either:

- Entering the subcommand 'SFS *userid*' on the command line, or
- Placing the cursor on the `USERID` field of the output data line, and then pressing ENTER.

Device Activity and Status Information

Two virtual device entries fit onto each line. The general format of these entries is:

xxxx tttt nn.n sssssssssssssssssssssssss a

where:

xxxx Is the virtual device number

tttt Is the virtual device type. The string 'VDSK' will be inserted for 'virtual disks' in storage.

nn.n Is the average I/O rate for the device during the last measuring interval. This field is calculated only for devices where virtual I/O counts are available in the VDEVBLOK of the device (e.g. MDISKs, VCTCA and all dedicated devices, including dialed screens). Where it cannot be calculated (e.g. for virtual UR devices), the I/O rate field will be left blank.

sss...sss
Contains device specific status information. The format of the information shown in this field varies with the device type. The following data can be expected:

Virtual UR equipment:

The format is always 'CL x, eeee hhhh cccc', where:

```
x          is the spooling class of the device
eeee       is either 'EOF' or 'NOEOF' for UR input devices,
```

depending on whether the device has been set to EOF or NOEOF. For UR output devices the field defines the current copy count for the device in the format 'CO nn'.

```
hhhh       is either 'HLD' or 'NOH',
```

depending on whether the device has been set to HOLD or NOHOLD.

```
cccc       is either 'CONT' or 'NCNT',
```

depending on whether the device has been set to CONT or NOCONT.

Both the 'hhhh' and the 'cccc' field will be overlayed with the string 'NOT READY' if the device was found to be not ready at the end of the measuring interval.

Virtual CTCA:

The status field contains either the information 'NOT READY' if a virtual CTCA has been defined, but is not yet coupled to its equivalent in an other user's machine, or, if connected, the field has the format:

```
uuuuuu--->yyyy ssssssss
```

where

uuuuuu
: Is the userid on the other side of the virtual CTCA

yyyy
: Is the virtual device number of the CTCA in the other user's machine

ss..ss
: Is status information for the virtual CTCA. The field may be blank if there was no special status at the end of the measuring interval, or it may contain either of the following:

  HALT (Y)
  : If the CTC was halted by the Y-side

  READ WT
  : If a READ command was waiting in the adapter

  WRT WT
  : If a WRITE command was waiting in the adapter

  CNTL WT
  : If a CONTROL command was waiting in the adapter

  xxxx **ACT**
  : Indicates that the command indicated was *active* in the adapter

  xxxx **PND**
  : Indicates that the command was *pending* for the adapter

  The first status found will be inserted.

Virtual OSA: The general format of the status field is

```
tttt->llllllll uuuuuuuu
```

tttt
: Is the network device type. Currently the following are defined:

  HiSo For a hipersockets adapter

  QDIO
  : For a QDIO adapter

  VSwi For a QDIO VSWITCH connection

  INMN
  : For an INMN adapter

  IEDN For an IEDN adapter

  BRDG
  : For an IQD adapter for a Bridge Port

  ???? Unrecognized format.

llllllll
: Is the name of the guest LAN to which the virtual OSA adapter is coupled.

uuuuuuuu
Is the userid that owns the guest LAN.

The network device type is always shown but the remaining information can be displayed only for adapters that are coupled to a guest LAN.

Virtual screens (GRAF):

The status field contains either the information 'NOT READY' if a virtual GRAF device has been defined, but no DIAL has connected it yet to a real display terminal (directly or via PVM or VM/SNA), or, if connected, it contains a string of the format

```
yyyy,DIALED  ,h c ps
```

where

```
yyyy        can be either the real device number of a dialed
```

display terminal or either of the strings 'PVM' or 'SNA', depending on whether the screen from which the DIAL command was issued is connected locally or via PASSTHRU or VM/SNA. In the case of a DIAL command from an SNA terminal, the LU-name of the terminal may be inserted instead of the string 'SNA'.

```
DIALED     indicates that the real display terminal has been
```

connected via a 'DIAL' command as opposed to a direct ATTACH via DEDICATE directory statement or ATTACH command. If an LU-name was inserted for 'yyyy' above, the string will be shortened to 'DIAL'.

```
h           can be blank or 'H', in which case it indicates
```

that the display terminal has extended highlighting capability.

```
c           can be blank or 'C', in which case it indicates
```

that the display terminal has extended color capability.

```
ps          can be blank or 'PS', in which case it indicates
```

that the display terminal has programmed symbols capability.

Minidisks:

The usual format is:

```
yyyy,rr,ssssCYL,nnnnnn
```

where

yyyy Is the real device number of the disk pack on which the minidisk is located. The string '----' will be inserted for 'virtual disks' in storage.

rr Is the read/write status of the minidks. It can be either 'RR' for disks with read-only status or 'WR' for disks which are linked in write mode. The field only indicates the read/write status as defined from CP, the actual CMS access may cause the minidisk to be in read-only mode even though CP would allow a write access.

*ssss***CYL**
Is the size of the minidsk in cylinders.

For minidisks allocated on FBA-disks it will be shown in the format '*ssssss*B' to indicate the number of blocks in the minidisk.

The format '*ssssss*kB' will be used if the number of blocks exceeds 999999, where 'kB' means '1000 Blocks'.

nnnnnn
Indicates either the last virtual SEEK address on the device (address shown in the form '-->nnn' with a preceeding arrow), or it gives information on the actual minidisk status if a special status is found. The seek address has only little meaning for CMS minidisks where the user usually does not know where specific files have been allocated, but it provides an indication on the dataset being processed if the minidisk is in OS or DOS format.

If the minidisk status is shown, this status information can be one of the following:

BUSY
Indicates that the minidisk was busy at the end of the measuring interval

SUSP Indicates a 'subchannel suspended' condition at the end of the measuring interval

RPEND
Indicates 'resume pending' condition for the minidisk at the end of the measuring interval

QUED
Indicates that an SSCH request has been queued for the minidisk, and it was waiting for an unsollicited DE at the end of the measuring interval

TDISK
Indicates that the minidisk has been defined as a temporary minidisk

RS/RL
Indicates that the minidisk has been defined with virtual reserve/release

Both the *ssssCYL* and the *nnnnnn* part of the minidisk information can be replaced by the string:

```
nnn% MDC eff.
```

if less real I/Os are made to the minidisk than virtual I/Os, where

nnn Is the efficiency expressed as the percentage of the total number of virtual I/Os shown to the minidisk which did not result in a real I/O.

Although not absolutely correct (there is no fixed 1:1 relationship between the number of virtual and real I/Os even without caching, and especially for non-CMS minidisks), the information can serve as a rough indicator of minidisk cache efficiency for CMS minidisks.

Dedicated devices:

The format is always:

```
yyyy,ATTACHED
```

where *'yyyy'* is the real device number of the device that has been attached to the user. In the case of dedicated display terminals, the extended highlighting, color and programmed symbols capability of the terminal will be appended as described for dialed virtual screens above.

a Is an indicator which tells you whether I/O assist is available and active for a specific virtual device. The character 'A' will be inserted for I/O devices which are eligible for I/O assist, and this character will be highlighted if I/O assist is active for the device. An I/O rate of 0 will be shown for XA-mode guests.

Missing Interrupt detection:

The performance monitor checks the status of all virtual devices at the end of each measuring interval. An interrupt is considered to be missing if a device was found to be busy during two consecutive measurements, and if no I/O interrupt was received in between.

If a missing interrupt is detected on a virtual device in the user's machine configuration, the string 'INT.MISS' will be inserted at the end of the virtual device's status information field, and the message:

```
FCXPEU355M Interrupt(s) missing for device(s) of user uuuuuuuu
```

will be shown in the error message line at the bottom of the screen.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None. Averages cannot be shown for the detailed user display.

FCX116, Shared File System Server Screen – SFS

Performance Toolkit Subcommand: "SFS" on page 281.

The Shared File System Server Screen (FCX116), which shows summary performance data for all Shared File System server machines, will be shown if you enter the SFS subcommand with no *userid*. SFS servers which have been active during the last measuring interval will be highlighted on the screen.

```
FCX116      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

______         .     .     .                                        .     .
            REQ. Servr   <- Load / Req.->   <- Elapsed Time per -->   Actv  Nr.
USERID      /sec %BUSY   SEC.   I/O   SAC   BLKIO  LKWT  CKPT  ESMC   AGNT  RBK
EDLBACK     21.0     8   .085  2.78   5.0    .051  .011 1.296   ...    1.7    0
EDLSERV       .0   ...    ...   ...   ...     ...   ...   ...   ...     .0    0
EDLSRV        .0   ...    ...   ...   ...     ...   ...   ...   ...     .0    0
EPLREF        .0   ...    ...   ...   ...     ...   ...   ...   ...     .0    0
FLDTEST       .0   ...    ...   ...   ...     ...   ...   ...   ...     .0    0
SERVERW       .0   ...    ...   ...   ...     ...   ...   ...   ...     .0    0
SERVERX       .0   ...    ...   ...   ...     ...   ...   ...   ...     .0    0
SERVERY       .0   ...    ...   ...   ...     ...   ...   ...   ...     .0    0
SERVER3      2.2     1   .014  1.18   4.3    .011   ...   ...   ...     .0    0
SERVER7       .1     0   .005   .05   6.7    .019   ...   ...   ...     .0    0
SERVER8      9.8     5   .025  1.66   5.8    .015  .042   ...   ...     .2    0
SERVR7        .1     0   .018  1.09    .0     ...   ...   ...   ...     .0    0
SQLMACHZ      .0   ...    ...   ...   ...     ...   ...   ...   ...     .0    0
TEMPSERV     ...   ...    ...   ...   ...     ...   ...   ...   ...    ...   ...
TSTMACH1      .0   ...    ...   ...   ...     ...   ...   ...   ...     .0    0
VMSYS         .0   ...    ...   ...   ...     ...   ...   ...   ...     .0    0

Select an SFS server for server details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 22. Layout of Shared File System Server Screen (FCX116)

Performance analysis of SFS servers is based on CP monitor USER and APPLDATA domain SAMPLE data.

The sample shows a screen with a number of SFS server machines sorted in ascending userid sequence, as indicated by the underscore characters '_____' above the USERID header. Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

For more detailed information on one of the shared file system servers either

- Place the cursor on the USERID field of the server you are interested in and press ENTER, or
- Enter the subcommand 'SFS *userid*' on the command line

Field Description:

USERID
The userid of the SFS server machine

REQ./sec
Number of file pool requests handled per second

Servr %BUSY
Percent of time during which the server machine was active handling requests

<- Load / Req.->:

The columns under this heading give some information on the average load caused by one file pool request during the selected interval.

SEC. Total service time per average file pool request, in seconds

I/O Total number of I/Os per average file pool request

SAC Number of Storage Access Component calls per average file pool request

<- Elapsed Time per -->:

The columns under this heading give information on the elapsed time required for some key activities. They can give pointers to possible bottlenecks if the performance of the SFS server is not adequate.

BLKIO
The average service time per block I/O

LKWT
The average time spent in lock wait

CKPT
The average time spent in checkpoint wait

ESMC
The average wait time per External Security Manager call

Actv AGNT
The average number of active agents in the interval

Nr. RBK
The total number of roll-backs due to deadlocks

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields. All of a server's sessions during the selected period contribute to the averages shown. Note also that all of the activity fields (rates) are based on each server's connect time within the overall period, *not* the total elapsed time for the whole period.

FCX117, Shared File System Server Details Screen – SFS *userid*

Performance Toolkit Subcommand: "SFS" on page 281.

The Shared File System Server Details Screen (FCX117), which shows detailed performance data for Shared File System server machines, will be shown if you specify a *userid* on the SFS subcommand, or via cursor-selection of the server on the general Shared File System screen:

```
FCX117      CPU nnnn  SER nnnnn  Interval hh:mm:ss - hh:mm:ss    Perf. Monitor

Detailed Data for SFS Server EDLBACK
File Pool Req.:   6163      Blocks per BIO :  7.64      Avg. block I/O:  .059s
FP Request rate:  20.6/s    Blocks per I/O :  4.06      Avg. lock wait:  .005s
Agents held    :   2.3      SAC calls / FPR:   5.9      Avg. check pt.: 2.125s
Active agents  :   1.7      Deadlocks w RBK:     0      Avg. ESM call : .....s

Server States:
Total busy     :   8.3%     Page wait      :    .0%     QSAM I/O wait :    .0%
CPU (running)  :   7.1%     Checkpoint wait:   1.2%

Time per File Pool Request:
Total time     :  .085s     Lock wait time :  .000s     ESM call time :  .000s
CPU time       :  .003s     Block I/O time :  .083s     Other         :  .000s

I/Os per File Pool Request:
Total I/Os     :  2.63      Catalog reads  :   .01      Control Writes :  .00
File reads     :  2.14      Catalog writes :   .02      LOG reads      :  .00
File writes    :   .23      Control reads  :   .00      LOG writes     :  .20

File Pool Request Percentages:
Open read      :  10.4%     Get dir. entry :    .0%     Grant/rev auth.:   .0%
Open update    :   5.0%     Rename         :    .0%     Lock & unlock  :  2.0%
Read           :  51.0%     Create alias   :    .0%     Query          :   .0%
Write          :   8.5%     Cr/del direct. :    .0%     Refresh direct.:   .0%
Close          :  15.4%     O/G/C directory:   4.7%     Other requests :  1.8%
Delete         :    .7%

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 23. Layout of Shared File System Server Details Screen (FCX117)

Load fields for which some activity was found during the selected interval will be highlighted.

Performance analysis of SFS servers is based on CP monitor USER and APPLDATA domain SAMPLE data.

Field Description:

Detailed Data for SFS Server *userid*

The first block of data provides some general information on the activity and utilization of the shared file system server machine *userid*. More detailed information for specific areas is available in the other blocks.

File Pool Req.
: The number of file pool requests handled by this server during the selected interval

FP Request rate
: The number of file pool requests handled per second

Agents held
The average number of server agents in use

Active agents
The average number of server agents which were active, processing SFS requests

Blocks per BIO
The average number of blocks in a block I/O request issued by the server

Blocks per I/O
The average number of blocks per CP I/O operation

SAC calls / FPR
The number of calls to the Storage Access Component per file pool request

Deadlocks w RBK
The number of roll-backs due to deadlock situations

Avg. block I/O
The average service time per block I/O request

Avg. lock wait
The average time spent in lock wait

Avg. check pt.
The average time required per checkpoint

Avg. ESM call
The average wait time per call of an External Security Manager exit

Server States:

The fields under this heading show the total server utilization, and the contribution of different components to this utilization.

Total busy
Total server utilization, i.e. the percentage of elapsed time during which the server was either active or waiting for some service

CPU (running)
Percentage of elapsed time during which the server was running on a processor

Page wait
Percentage of time during which the server was found in page wait state (waiting for a page to be read by CP)

Checkpoint wait
Percentage of time needed for handling checkpoints

QSAM I/O wait
Percentage of time during which the server was waiting for QSAM I/O to complete

Time per File Pool Request:

The fields under this heading show the average time it took to service a file pool request, and the contribution of different components to this service time.

Total time
Total service time, in seconds, for an average file pool request during the selected interval

CPU time
The average CPU time per file pool request

Lock wait time
The average lock wait time per file pool request

Block I/O time
The average time needed for block I/O execution per file pool request

ESM call time
The average time spent in an External Security Manager exit per file pool request

Other The difference between the total time per file pool request, and the sum of the CPU, lock wait, block I/O and ESM call times

I/Os per File Pool Request:

The fields under this heading show the total number of I/Os required per file pool request, and how different activities contributed to this total.

Total I/Os
Total number of I/Os per file pool request during the selected interval

File reads
The number of I/Os needed for 'file reads' per file pool request

File writes
The number of I/Os needed for 'file writes' per file pool request

Catalog reads
The number of I/Os needed for catalog reads per file pool request

Catalog writes
The number of I/Os needed for catalog writes per file pool request

Control reads
The number of I/Os needed for control reads per file pool request

Control writes
The number of I/Os needed for control writes per file pool request

Log reads
The number of I/Os needed for log reads per file pool request

Log writes
The number of I/Os needed for log writes per file pool request

File Pool Request Percentages:

The fields under this heading show the percentages by which different request types contributed to the total number of file pool requests.

Open read
Percentage of open file read requests

Open update
Percentage of open update requests

Read Percentage of read file requests

Write Percentage of write file requests

Close Percentage of close file requests

Delete
Percentage of delete file requests

Get dir. entry
Percentage of get directory entry requests

Rename
Percentage of rename requests

Create alias
Percentage of create alias requests

Cr/del direct.
Percentage of create and delete directory requests

O/G/C directory
Percentage of open, get, and close directory requests

Grant/rev auth.
Percentage of grant and revoke authorization requests

Lock & unlock
Percentage of lock and unlock requests

Query
Percentage of query requests

Refresh direct.
Percentage of refresh directory requests

Other requests
Percentage of other requests for which no separate numbers are supplied above

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields. All of a server's sessions during the selected period contribute to the averages shown. Note also that all of the activity fields (rates) are based on the server's connect time within the overall period, *not* the total elapsed time for the whole period.

FCX119, SPOOL File Summary Screen – SPOOL or SPOOL NOSYSTEM

Performance Toolkit Subcommand: "SPOOL" on page 288.

The SPOOL File Summary Screen (FCX119) will be shown if you enter the SPOOL subcommand with no parameters at all, or with the NOSYSTEM parameter, in which case system files will be excluded from the display. It is available only in virtual machines with privilege class D (to run Diagnose code X'D8' and the CP 'PURGE' command).

```
FCX119      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

All Files
SPOOL File Overview       Reader    Printer      Punch     System        Total
Number of files             9028       1607          2        173        10810
Number of blocks          204883       3486        301      34251       242921
Number of records        8512610     128497      12558      33983      8687648

S Owner-ID File Class Que Ac Blocks Records Date       Time  Name      Type
. PKUN     0028 A PUN RDR      6651  279357 2003/10/19 18:48 BE552M0S LIST3820
. DMI      0450 A PUN RDR      4552  191222 2003/10/19 12:26 CT2DEF   LIST3820
. DMI      0448 A PUN RDR      3317  139284 2003/10/19 12:19 CT2RUN   LIST3820
. MAINT21  0012 A PRT RDR      2338   66012 2003/10/19 15:37
. CHRSCS   8072 T CON PRT OU   2234  172304 2003/10/21 06:26
. BMO      8407 A PUN RDR      1944   89644 2003/10/19 09:35 EXTERNAL DIRECTRY
. WIL      0006 A PUN RDR      1592   66940 2003/10/13 13:35 PTFCI71  JOB
 *NSS     1548 A SYS  -  AC   1027    1026 1996/08/23 22:42 ADMXSS 00 DCSS
. DDIRLIB  5579 X PUN RDR       901   45469 2003/10/21 08:27 CHICAGO  DIRECTRY
. WHU      0037 B PUN RDR       892   37423 2003/10/21 09:55 V116448B LIST3820
. TOP      0391 A PUN RDR       855   35902 2003/10/20 17:25 SMAN1    LIST3820
  *NSS     1607 A SYS  -        836     835 1996/09/22 10:36 BOOKMGRR DCSS
Select 'P' to purge files, or enter 'SPool User' for user summary
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 24. Layout of SPOOL File Summary Screen (FCX119)

The screen shown in the above figure is an example for a summary SPOOL file screen as you may get on a large system with many SPOOL files. The SPOOL file displays will be useful especially when the SPOOL space utilization on your system reaches a dangerous level (as indicated by the percentages shown on the DEVICE SYSOWN display or the utilization percentage shown on the REDISP screen) and when you have to decide which files to purge in order to keep the system running properly.

Two blocks of data are shown:

- A summary of the total SPOOL space utilization.
- A detailed list with the up to the 100 largest SPOOL files found, ordered in descending file size sequence (based on the SPOOL blocks used, not the number of records which is not relevant in this context). Active files (that is, files in use) will be highlighted.

To purge a file, you can enter a 'P' selection character in front of the file to be deleted. Enter the command 'SPool User' to select the SPOOL File User Summary Screen (FCX120), which will show you the SPOOL space utilization per user (see "FCX120, SPOOL File User Summary Screen – SPOOL USER" on page 455).

Field Description for SPOOL File Summary Data:

SPOOL File Overview

This first part of the screen shows the following:

- The total number of SPOOL files
- The total number of SPOOL blocks in use
- The total number of records

in the columns:

Reader
For files in a reader queue

Printer
For files in a print queue

Punch For files in a punch queue

System
For system files

Total For the overall totals of the system

Detailed SPOOL File Display

S This is the column where you can enter the selection character 'P' if you want to purge a file.

Caution: Make sure a file is no longer needed before purging it or save it first to tape (using the CP command SPXTAPE LOAD).

Owner-ID
The user identification of the file owner. The string `*NSS` will be shown for all kinds of saved segments.

File The SPOOL file identification number

Class The SPOOL file class, shown as a string

c ttt

where:

c Is the actual SPOOL file class

ttt Is the SPOOL file type. It can be

CON For console log files

PUN For punch files

PRT For print files

SYS For system files (shared segments)

Que The current queue where the file is found. It can be:

PUN For files on the punch queue

PRT For files on the print queue

RDR For files queued to a virtual machine's reader

- For system files (shared segments)

Ac The current status of the file, when active. It can be:

OU For files being written (open for output)

IN For files being read

AC For system files (shared segments) which are in use

Blocks
The number of SPOOL file blocks occupied by the file

Records
The number of records in the file

Date The date, in format *ccyy/mm/dd*, when the file was first opened (created)

Time The time, in format *hh/mm*, when the file was first opened (created)

Name The file name given to the file

Type The file type given to the file

Effect of 'AVERAGE' and 'INTERIM' subcommands: None. The ***current*** SPOOL utilization is always shown.

FCX120, SPOOL File User Summary Screen – SPOOL USER

Performance Toolkit Subcommand: "SPOOL" on page 288.

The SPOOL File User Summary Screen (FCX120) will be shown if you enter the SPOOL subcommand with the USER parameter. It is available only in virtual machines with privilege class D (to run Diagnose code X'D8' and the CP PURGE command).

```
FCX120    CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS  PERF. MONITOR

All Files
SPOOL File Overview       Reader    Printer      Punch     System        Total
Number of files             8942       1606          2        173        10723
Number of blocks          205850       4874         17      34251       244992
Number of records        8546103     206123        679      33983      8786888

Owner-ID Files  Blocks      Owner-ID Files  Blocks      Owner-ID Files  Blocks
>System<   173   34251      MCOG       432   11118      WID         93   11032
BEGL        27    9179      BMO         15    8178      DMI          7    7903
USWA         8    7335      PKUN        10    6672      BKAN        18    5860
WRO          2    5803      MBN         15    5802      BARSMGR    150    5514
PSPTOOLS   198    5011      MAINT21      7    5007      RNA          8    4794
DDIRLIB     21    4742      TOP         19    4476      DPE         18    4461
NBRU        15    3673      WIL         17    3309      ATR        165    2797
SALI        22    2744      BRUG        40    2557      JA          23    2400
TBEL         7    2264      SRUO        19    2152      MAKO        10    2138
HHUB        17    2022      ZK           9    1950      ECFDMGR      4    1829
ECFDMGRO     4    1823      FAM         41    1731      UHAL         1    1524
CHBITFFM  1110    1514      HSH         44    1503      CHRSCS      74    1335
Select a user for user details
Command ===> _
F1=Help  F2=Redisp  F3=Quit  F7=Back  F8=Forward  F9=Top F12=Bottom
```

Figure 25. Layout of SPOOL File User Summary Screen (FCX120)

The screen shown in the above figure is an example for a SPOOL file user summary screen you may get on a large system with many SPOOL files. The SPOOL file displays will be useful especially when the SPOOL space utilization on your system reaches a dangerous level (as indicated by the percentages shown on the DEVICE SYSOWN display or the utilization percentage shown on the REDISP screen) and when you have to decide which files to purge in order to keep the system running properly.

Two blocks of data are shown:

- A summary of the total SPOOL space utilization.
- A list with summaries of user SPOOL file utilization, ordered in descending sequence of SPOOL blocks used (the number of records is not relevant in this context). Up to 300 of the largest SPOOL space users will be shown, and users with active files (that is, files in use) will be highlighted.

To get more detailed information on the SPOOL file utilization of one specific user, just move the cursor to the selected userid and press ENTER, or enter the command 'SPOOL *userid*' (see "FCX121, SPOOL File User Details Screen – SPOOL *userid*" on page 457 for the screen layout).

Enter the command SPool to select the general SPOOL file summary, with the largest 100 SPOOL files on the system (see "FCX119, SPOOL File Summary Screen – SPOOL or SPOOL NOSYSTEM" on page 452).

Field Description for SPOOL File Summary Data:

SPOOL File Overview

This first part of the screen shows the following:

- The total number of SPOOL files
- The total number of SPOOL blocks in use
- The total number of records

in the columns:

Reader
For files in a reader queue

Printer
For files in a print queue

Punch For files in a punch queue

System
For system files

Total For the overall totals of the system

This part is identical to the first part of the general SPOOL file summary (see "FCX119, SPOOL File Summary Screen – SPOOL or SPOOL NOSYSTEM" on page 452).

User Summary

Three similar columns are shown with user summary information:

Owner-ID
The user identification of the file owner. The string `>System<` is shown as owner for all kinds of saved segments.

Files The number of SPOOL files owned by the user

Blocks
The total number of SPOOL file blocks occupied by a user's files

Effect of 'AVERAGE' and 'INTERIM' subcommands: None. The ***current*** SPOOL utilization will always be shown.

FCX121, SPOOL File User Details Screen – SPOOL *userid*

Performance Toolkit Subcommand: "SPOOL" on page 288.

The SPOOL File User Details Screen (FCX121) will be shown if you specify a *userid* on the SPOOL subcommand. It is available only in virtual machines with privilege class D (to run Diagnose code X'D8' and the CP PURGE command).

```
FCX121    CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS  PERF. MONITOR

Owner BARSMGR
SPOOL File Overview       Reader    Printer      Punch     System        Total
Number of files              149          1          0          0          150
Number of blocks            5513          1          0          0         5514
Number of records         252590         39          0          0       252629

S OriginID File Class Que Ac Blocks Records Date       Time  Name      Type
. BARSSUBA 7949 T CON RDR      1420   67675 2003/10/20 18:31
. BARSSUB7 7947 T CON RDR        72    3203 2003/10/20 18:32
. BARSSUB2 7955 T CON RDR        70    3176 2003/10/20 18:31
. BARSSUB1 7954 T CON RDR        69    3088 2003/10/20 18:31
. BARSSUB5 7946 T CON RDR        69    3103 2003/10/20 18:31
. BARSSUB6 7956 T CON RDR        67    3044 2003/10/20 18:31
. BARSSUB9 7953 T CON RDR        66    2956 2003/10/20 18:32
. ...       ... . ... ...        ..    .... .....      ....
. ...       ... . ... ...        ..    .... .....      ....
. BARSSUB3 7932 T CON RDR         1      15 2003/10/20 06:36
. BARSSUBC 8015 A PUN RDR         1      13 2003/10/21 06:39 QUERY    ALL
. BARSMGR  7995 T CON PRT OU      1      39 2003/10/21 06:32

Select 'P' to purge files
Command ===> _
F1:HELP  F2:REDISP  F3:QUIT  F7:BACK  F8:FORW  F9:TOP F12:BOT
```

Figure 26. Layout of SPOOL File User Details Screen (FCX121)

The screen shown is an example for the 'SPOOL File User Details' display, showing all SPOOL files owned by the selected user.

Two blocks of data are shown:

- A summary of the total SPOOL space utilization by this user
- A detailed list with all SPOOL files owned by this user, in descending file size sequence (based on the SPOOL blocks used, not the number of records which is not relevant in this context). Active files (that is, files in use) will be highlighted.

To purge a file, enter a 'P'' selection character in front of the file to be deleted.

Field Description for SPOOL File Summary Data:

SPOOL File Overview

This first part of the screen shows the following:

- The total number of SPOOL files
- The total number of SPOOL blocks in use
- The total number of records

for the selected user in the columns:

Reader
For files in the reader queue

Printer
For files in the print queue

Punch For files in the punch queue

System
For system files

Total For the overall totals of the user

Detailed SPOOL File Display

S This is the column where you can enter the selection character 'P' if you want to purge a file.

Caution: Make sure a file is no longer needed before purging it or save it first to tape (using the CP command SPXTAPE LOAD).

OriginID
The userid of the SPOOL file originator

File The SPOOL file identification number

Class The SPOOL file class, shown as a string

c ttt

where:

c Is the actual SPOOL file class

ttt Is the SPOOL file type. It can be:

CON For console log files

PUN For punch files

PRT For print files

SYS For system files (shared segments)

Que The current queue where the file is found. It can be:

PUN For files on the punch queue

PRT For files on the print queue

RDR For files queued to a virtual machine's reader

- For system files (shared segments)

Ac The current status of the file, when active. It can be:

OU For files being written (open for output)

IN For files being read

AC For system files (shared segments) which are in use

Blocks
The number of SPOOL file blocks occupied by the file

Records
The number of records in the file

Date The date, in format *yyyy/mm/dd*, when the file was first opened (created)

Time The time, in format *hh/mm*, when the file was first opened (created)

Name The file name given to the file

Type The file type given to the file

Effect of 'AVERAGE' and 'INTERIM' subcommands: None. The *current* SPOOL utilization is always shown.

FCX122, Remote CP Command Execution Screen – CP

Performance Toolkit Subcommand: "CP" on page 106.

You will see this screen after entering an explicit CP command (with the CP prefix) while in remote monitoring mode, provided that you have been given 'command' authorization on the remote system (CMD specification in the requestor's entry of file FCONRMT AUTHORIZ on the remote system).

```
FCX122      CPU 3090  SER 11619   Command executed : 15:04:55    CHVM4

cp ind user perfsvm
USERID=PERFSVM    MACH=XA  STOR=0010M VIRT=V XSTORE=NONE
IPLSYS=CMS      DEVNUM=00009
PAGES: RES=000480 WS=000605 LOCK=000000 RESVD=000000
NPREF=000437 PREF=000000 READS=002389 WRITES=002436
XSTORE=000139 READS=650442 WRITES=652672 MIGRATES=002089
CPU 00: CTIME=13:55 VTIME=003:28 TTIME=004:50 IO=080046
       RDR=000000 PRT=000000 PCH=000000
R;









Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 27. Layout of Remote CP Command Execution Screen (FCX122)

The information shown on this screen is the output of the CP command entered. Only up to 8kB of the output will be processed; any remainder will simply be discarded.

FCX123, Remote CMS Command Execution Screen – CMS

Performance Toolkit Subcommand: "CMS" on page 105.

You will see the Remote CMS Command Execution Screen (FCX123) after entering an explicit CMS command (with the CMS prefix) while in remote monitoring mode with an APPC/VM session, provided that you have been given 'command' authorization on the remote system (CMD specification in the requestor's entry of file FCONRMT AUTHORIZ on the remote system).

```
FCX123      CPU 3090  SER 11619   Command executed : 15:17:32    CHVM4

cms q disk a









CHVM4   : Stacked for execution
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 28. Layout of Remote CMS Command Execution Screen (FCX123)

You will see only the confirmation message:

```
Nodeid  : Stacked for execution
```

after entering a CMS command in a remote monitoring session via RSCS links.

Description:

This screen only confirms that the CMS command entered has been stacked for execution. Any output of the CMS command will be written to the basic mode display of the remote system, but is not retrieved and included on this screen.

FCX124, Performance Data Selection Menu – MONITOR, MENU

Performance Toolkit Subcommand: "MONITOR" on page 114, "MENU" on page 233.

The Performance Data Selection Menu (FCX124):

```
FCX124                Performance Screen Selection  (FL630       )    Perf. Monitor

General System Data       I/O Data                   History Data (by Time)
1. CPU load and trans.    11. Channel load           31. Graphics selection
2. Storage utilization    12. Control units          32. History data files*
3. SSI data menu*         13. I/O device menu*       33. Benchmark displays*
4. Priv. operations       14. Reserved               34. Correlation coeff.
5. System counters        15. Cache extend. func.*   35. System summary*
6. CP IUCV services       16. Reserved               36. Auxiliary storage
7. SPOOL file display*    17. DASD seek distance*    37. CP communications*
8. LPAR data menu*        18. I/O prior. queueing*   38. DASD load
9. Shared segments        19. I/O configuration      39. Minidisk cache*
A. Shared data spaces     1A. I/O config. changes    3A. Storage mgmt. data*
B. Virt. disks in stor.                              3B. Proc. load & config*
C. Transact. statistics   User Data                  3C. LPAR logs menu*
D. Monitor data           21. User resource usage*   3D. Response time (all)*
E. Monitor settings       22. User paging menu*      3E. RSK data menu*
F. System settings        23. User wait states*      3F. Scheduler queues
G. System configuration   24. User response time*    3G. Scheduler data
H. VM Resource Manager    25. Resources/transact.*   3H. SFS/BFS logs menu*
                          26. User communication*    3I. System log
I. Exceptions             27. Multitasking users*    3K. TCP/IP data menu*
                          28. User configuration*    3L. User communication
K. User defined data*     29. Linux systems*         3M. User wait states

            Pointers to related or more detailed performance data
            can be found on displays marked with an asterisk (*).


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 29. Layout of Performance Data Selection Menu (FCX124)

See the "Operation in Performance Monitor Mode" chapter in the *z/VM: Performance Toolkit Guide* for more information.

FCX126, LPAR Load Screen – LPAR

Performance Toolkit Subcommand: "LPAR" on page 218.

The LPAR Load Screen (FCX126) provides a list of the logical partitions defined for the system and the load for each of the defined processors:

```
FCX126      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

LPAR Data, Collected in Partition FCFT

Processor type and model    : 2097-742
Nr. of configured partitions:      17
Nr. of physical processors  :      64
Dispatch interval (msec)    : dynamic

Partition Nr.  Upid #Proc Weight Wait-C Cap %Load CPU %Busy %Ovhd %Susp %VMld %Logld Type TypeCap
EPLX2      11    10     8     45     NO  NO    .0   0    .4    .1   ...   ...    ... IFL   6400.0
                               45         NO         1    .3    .0   ...   ...    ... IFL   6400.0
                               45         NO         2    .4    .1   ...   ...    ... IFL   6400.0
                               45         NO         3    .4    .1   ...   ...    ... IFL   6400.0
                               45         NO         4    .3    .0   ...   ...    ... IFL   6400.0
                               45         NO         5    .3    .0   ...   ...    ... IFL   6400.0
                               45         NO         6    .3    .0   ...   ...    ... IFL   6400.0
                               45         NO         7    .3    .0   ...   ...    ... IFL   6400.0
EPLX3      15    11     6     45     NO  NO    .0   0    .4    .0   ...   ...    ... IFL   6400.0
                               45         NO         1    .4    .0   ...   ...    ... IFL   6400.0
                               45         NO         2    .4    .0   ...   ...    ... IFL   6400.0
                               45         NO         3    .4    .0   ...   ...    ... IFL   6400.0
                               45         NO         4    .4    .0   ...   ...    ... IFL   6400.0
                               45         NO         5    .4    .0   ...   ...    ... IFL   6400.0
EPRF1       2    04     4    DED    YES  NO   6.3   0 100.0    .0   ...   ...    ... CP    6400.0
                              DED         NO         1 100.0    .0   ...   ...    ... CP    6400.0
                              DED         NO         2 100.0    .0   ...   ...    ... CP    6400.0
                              DED         NO         3 100.0    .0   ...   ...    ... CP    6400.0
EPRF2       3    05     4    DED    YES  NO   6.3   0 100.0    .0   ...   ...    ... CP    6400.0
                              DED         NO         1 100.0    .0   ...   ...    ... CP    6400.0
...
...
General LPAR mgmt overhead .2
Overall physical load 16.2

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 30. Layout of LPAR Load Screen (FCX126)

The information shown is based on CP monitor SYSTEM domain SAMPLE data. The name of active LPARs will be highlighted.

Field Descriptions for LPAR Display:

Header Lines:

`LPAR Data, Collected in Partition` *xxxxxxxx* - The partition name of the partition which collected the LPAR data.

`Processor type and model:` *nnnn-ccc* - The processor type *nnnn* and model designation *ccc*

`Nr. of configured partitions:` *n* - The number of logical partitions configured in this processor complex.

`Nr. of physical processors : n` - The number of processors in the processor complex, or in the physical partition if the system is running in physically partitioned mode.

`Dispatch interval (msec) : xxxxx` - The dispatch interval, as set when the logical partitions were defined, in milliseconds. The string `dynamic` is shown when the interval can be dynamically adapted by the PR/SM microcode.

The next two lines give information about overall system load:

- `General LPAR mgmt. overhead:` This is general LPAR management time, expressed as a percentage of the available CPU time (elapsed time times the number of physical processors); it does not include LPAR management overhead for specific logical processors which is already shown in column `%Ovhd`.
- `Overall physical load:` This is the sum of the `%Load` values for all active logical partitions plus the `General LPAR mgmt. overhad` overhead (if available), i.e. it gives you the overall load for normal processors in the processor complex and doesn't include the load of partitions with IFL or ICF processors.

NOTE: Correct overall physical load figures for normal processors will be calculated on systems with enhanced LPAR monitor support. Otherwise the numbers will be misleading on systems with IFL and/or ICF processors because IFL and ICF processors are not counted as part of the 'Number of physical processors' but they are treated like normal processors when providing logical processor data. Since the overall physical load is calculated based on the assumption that there is no data from IFL or ICF processors, the resulting value will be too high.

Partition Details:

Partition
The name given to the logical partition. It will be highlighted if the partition is active, that is, if at least one logical processor is assigned to the partition.

Nr. The number of the logical partition

Upid The user partition ID number for the logical partition.

#Proc The number of processors defined for the partition.

Weight
The weight defined for this CPU type in the partition. Weight values range from 1 to 999, with a default of 10. The string "DED" will be inserted when the partition is dedicated.

Wait-C
The 'wait completion' definition for the logical processor. It can be:

YES If the wait completion flag has been set on, indicating that the logical processor will keep running on a real processor until its time slice is up even though it is waiting

NO If the wait completion flag is off

Cap The 'capping' definition for the partition. It can be:

YES If 'capping' has been set on for the partition, indicating that CPU cycles are to be allocated only up to the specified maximum

NO If 'capping' is not active.

%Load
The relative load of the partition on the whole processor complex, expressed as the relation of the total time that logical processors were dispatched for this partition compared to the totally available processor time (number of processors times elapsed time), expressed in percent. If the enhanced LPAR monitor support for secondary processors such as zIIPs, zAAPs, IFLs, and ICFs is not available, then a load value will be inserted for only those partitions having CP processors, while dots will be shown for the relative load of partitions not having any CP processors.

CPU The CPU identification character allocated to each of the logical processors which were defined.

%Busy
Percentage of time the logical processor was busy, defined as the percentage of elapsed time during which a real processor was assigned to the logical processor. Note that the value will also include wait time in the system that is running in the partition if 'wait completion' has been enabled for the processor.

%Ovhd
Percentage of elapsed time the logical processor spent for LPAR management.

%Susp
Percentage of elapsed time the logical processor was 'suspended', that is, could not give service to the guest system due to LPAR management time and contention for real processors, where the 'suspended' time is calculated as the difference between elapsed time and the sum of processor busy time and voluntary wait time for the same processor as seen by the VM system that is active in the partition. This value, and also the `%VMld` and `%Logld` values, can be calculated only for your own partition, where the VM system is running that is also collecting its own internal data.

%VMld
Processor load *as seen by the guest VM system*, based on processor busy time seen by the guest system and *elapsed time*.

%Logld
'Logical processor load' *as seen by the guest VM system*, based on processor busy time seen by the guest system and *the sum of wait time and processor busy time* perceived by the guest VM system. This is the logic used for the calculation of the 'INDICATE LOAD' output. Note, however, that the resulting value depends not only on the actual activity of the guest system (the processor time used), but also on the activity of systems in other logical partitions of the same physical system: The 'suspended' time (see `%Susp` value) will increase if there is more contention for the real processors, thus causing less voluntary wait time. Less voluntary wait time in turn will result in a higher 'Logical processor load' being calculated, *even if the actual CPU time used by a processor is the same*.

Type The CPU type of the logical processors defined for the partition, as follows:

CP Central Processor

ICF Internal Coupling Facility Processor

IFL Integrated Facility for Linux Processor

ZIIP IBM System z Integrated Information Processor (zIIP)

ZAAP IBM System z Application Assist Processor (zAAP)

Note: For the ZIIP and ZAAP processor types, the monitor data will actually show 'IIP' and 'IFA', respectively. For better consistency, Perfkit translates these values to 'ZIIP' and 'ZAAP'.

TypeCap

The maximum amount of CPU power of this type the partition is permitted to use, where a value of 100 represents one whole physical CPU's worth of CPU power.

When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all processor load fields.

FCX127, User Response Time Screen – URESP

Performance Toolkit Subcommand: "URESP" on page 335.

The User Response Time Screen (FCX127) shows user response time information for each active user on the system who completed at least one transaction in a sample interval. Information for users which have been active in the interval is shown highlighted on the screen.

```
FCX127      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
______         .      .      .      .      .      .      .      .      .      .
           Think  <- Response Time ->  <- Transact/Hour ->  <-- Total Trans -->
Userid      Time  Triv. N-Triv   Mean  Trv/h Ntrv/h Totl/h  Trv-T Ntrv-T Totl-T
>System<   12.7   .041   .179   .099  58604  42036   100k   7835   5620  13455
AAL         ...   .001    ...   .001      3      0      3      1      0      1
ABE        12.0   .090   .117   .102     11      9     20      7      6     13
ABLU        3.6   .003   .094   .048     10     10     20      3      3      6
ABRI        ...   .003    ...   .003      2      0      2      2      0      2
ABSTSSW    60.5   .006    ...   .006     52      0     52      7      0      7
ACN       743.6    ...   .309   .309      0      6      6      0      2      2
ADE        40.6   .105   .227   .122     45      7     52      6      1      7
AEB         9.7   .041   .208   .106     81     52    134     14      9     23
AFL       107.0   .001   .091   .057     12     20     33      3      5      8
AFRE        2.6    ...   .374   .374      0      6      6      0      3      3
AG          ...    ...    ...    ...    ...    ...    ...      0      0      0
AHUE      468.8   .007    ...   .007      8      0      8      2      0      2
AKRO        3.7   .057   .094   .071    559    355    915     74     47    121
ALG        96.7   .002   .019   .008     13      6     20      2      1      3
ALK         ...    ...    ...    ...    ...    ...    ...      0      0      0
AM          7.0   .043   .182   .120    217    270    488     29     36     65
Select a user for user details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 31. Layout of User Response Time Screen (FCX127)

The information shown is based on CP monitor USER domain EVENT data.

Note that EVENT data collection for all users can cause considerable overhead on a large system. Activate this part of data collection only for periods where you really need the information for analysis.

The sample shows a screen with the users sorted in ascending userid sequence, the initial setting (indicated by the underscore characters '____' above the `Userid` header). Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the appropriate column heading as sort argument (see "SORT" on page 287), or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

The first entry is reserved for the overall system average for all users, regardless of the current sorting sequence. It is identified by the `>System<`-'userid'.

Some additional lines with user class averages will be shown at the top when user classes have been defined (see "FCONTROL UCLASS" on page 91). The 'userid' shown will then be the user class name.

Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

For more detailed information on one specific user either:

- Place the cursor on the `Userid` field of the virtual machine you are interested in and press ENTER, or
- Enter the subcommand 'USER *userid*' on the command line

Field Description:

The following field descriptions apply to both the URESP and URESPLOG *userid* displays, with the exception of the `Userid` field which will be replaced by the field `Interval End Time` on the URESPLOG display.

Userid
User identification

Think Time
The think time in seconds, i.e. the time between transactions. Think times of more than 15 minutes are ignored when calculating this value.

Response Time show response times in seconds:

Triv. The response time for trivial transactions.

'Trivial' transactions with a duration of more than 5 seconds are ignored.

N-Triv
The response time for non-trivial transactions

Non-trivial transactions with a duration of more than 60 seconds are ignored.

Mean The average response time for all transactions

Transact/Hour shows transaction rates, in transactions per hour:

Trv/h The trivial transaction rate

Ntrv/h
The non-trivial transaction rate

Totl/h The total transaction rate

Total Trans:

Trv-T The total number of trivial transactions

Ntrv-T
The total number of non-trivial transactions

Totl-T
The total number of transactions

Nr of users
The number of users which contributed to the average shown on this line (values are inserted only for lines with averages, the field remains empty for normal user data lines).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages or totals will be shown. All of a user's sessions during the selected period contribute to the averages shown. Note also that all of the activity fields (rates) are based on each user's connect time within the overall period, *not* the total elapsed time for the whole period.

FCX128, Graphics Selection Menu – GRAPHICS

Performance Toolkit Subcommand: "GRAPHICS" on page 183.

See "Graphics Selection Menu" on page 892 for more information on this specific display, and Appendix A, "Graphical Displays of Performance History Data," on page 889 for more general information.

FCX129, User Resources per Transaction Screen – UTRANS

Performance Toolkit Subcommand: "UTRANS" on page 345.

The User Resources per Transaction Screen (FCX129) shows the average user resource consumption per transaction for each user. Information for users which have been active in the interval is shown highlighted on the screen.

```
FCX129      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
______         .       .      .      .      .      .      .      .      .      .
           <-Transact->   <------ Resource Utilization per Transaction ------->
           Total   Rate    CPU  Disk   Page  Xpage  <-Spooling->  <-IUCV/VMCF->
Userid     Count  /hour   msec   I/O   Flts  Reads  SP_RD  SP_WR  IU_BY   IU_TO
>System<  15267   115k   82.5  16.7     .1    5.2     .8     .5     .3      .5
AAL           0      0    ...   ...    ...    ...    ...    ...    ...     ...
ABE          13     98  122.1  43.8     .3   15.6     .0     .0     .0      .0
ABRD          1      7   12.6   2.0    3.0   75.0     .0     .0     .0      .0
ABSTSSW       6     45    3.8    .0     .0    .0     .0     .0     .0      .0
ABU          18    136   29.6  14.6     .6    8.9     .2     .1     .6      .6
ACN           1      7   21.9   3.0    3.0   78.0     .0     .0     .0      .0
AD           10     75    .9    .0     .0    .0     .0     .0     .0      .0
ADE           8     60   5.2    .0     .0    .0     .0     .0     .0      .0
AEB          27    204   87.1  20.8     .1    8.6     .0     .2     .2      .2
AFRE          5     37  257.3  70.6    2.4   25.0     .0     .4    1.6     1.6
AG            0      0    ...   ...    ...    ...    ...    ...    ...     ...
AHUE          1      7    .7    .0     .0     .0     .0     .0     .0      .0
AKES         22    166   96.5  19.9     .1   10.9     .1     .1     .0      .0
AKRO        136   1028   53.4   9.4     .0    4.4     .7     .3     .0      .0
ALK           0      0    ...   ...    ...    ...    ...    ...    ...     ...
Select a user for user details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 32. Layout of User Resources per Transaction Screen (FCX129)

The information shown is based on CP monitor USER domain EVENT data.

Note that EVENT data collection for all users can cause considerable overhead on a large system. Activate this part of data collection only for periods where you really need the information for analysis.

The sample shows a screen with the users sorted in ascending userid sequence, the initial setting (indicated by the underscore characters '____' above the `Userid` header). Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the appropriate column heading as sort argument (see "SORT" on page 287), or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

The first entry is reserved for the overall system average for all users, regardless of the current sorting sequence. It is identified by the `>System<`-'userid'.

Some additional lines with user class averages will be shown at the top when user classes have been defined (see "FCONTROL UCLASS" on page 91). The 'userid' shown will then be the user class name.

Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

For more detailed information on one specific user, either:

- Place the cursor on the `Userid` field of the virtual machine you are interested in and press ENTER, or
- Enter the subcommand 'USER *userid*' on the command line.

Field Description:

The following field descriptions apply to both the UTRANS and UTRANLOG *userid* displays, with the exception of the `Userid` field which will be replaced by the field `Interval End Time` on the UTRANLOG display.

Userid
User identification

Transact gives informations on the number of transactions and their frequency:

Total Count
The number of transactions

Rate/hour
The transactione rate, in transactions per hour

Resource Utilization per Transaction Utilization figures for a variety of resources are shown under this heading:

CPU msec
The average CPU used per transaction, in msec

Disk I/O
The average number of disk I/O requests per transaction

Page Flts
The average number of page faults per transaction

Xpage Reads
The average number of pages moved from expanded storage to central storage per transaction

SP_RD
The average number of UR read operations from spool per transaction

SP_WR
The average number of UR write operations to spool per transaction

IU_BY
The average number of IUCV data transfers from this user to another virtual machine, or to CP, per transaction

IU_TO
The average number of IUCV data transfers to this user, per transaction

Nr of users
The number of users which contributed to the average shown on this line (values are inserted only for lines with averages; the field remains empty for normal user data lines).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages or totals will be shown. All of a user's sessions during the selected period contribute to the averages shown. Note also that all of the activity fields (rates) are based on each user's connect time within the overall period, *not* the total elapsed time for the whole period.

FCX130, System Counters Screen – SYSTRANS

Performance Toolkit Subcommand: "SYSTRANS" on page 308.

The System Transaction Statistics Screen (FCX130):

```
FCX130      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

System Transaction Statistics:

Response Time Statistics (Percent of Samples Below Threshold)

Resp. time (s)  <.01 <.02 <.04 <.06 <.10 <.20 <.40 <.60 <1.0  <2.0  <4.0  <6.0
Triv. % in range  69    4    4    2    3    7    8    3    0     0     0     0
Triv. accum. %    69   73   77   79   82   89   97  100  100   100   100   100
N-trv % in range  16    7    5    3    3   10   19    9   11    10     5     1
N-trv accum. %    16   23   28   31   34   44   62   71   83    93    97    99

Resource Usage / Transaction (Percent of Samples Below Threshold)

CPU msec/trans.   <1   <2   <5  <10  <20  <50 <100 <200 <500 <1000 <2000 <5000
Triv. % in range  55    6   11    9    7    7    3    1    0     0     0     0
Triv. accum. %    55   61   72   82   89   96   98  100  100   100   100   100
N-trv % in range   8    2   13   13    9   16   12   10    9     6     2     1
N-trv accum. %     8   10   23   36   45   61   73   83   92    97    99   100

.
.
.
IUCV xfers/trn.   <1   <2   <4   <6  <10  <20  <40  <60 <100  <200  <400  <600
Triv. % in range  90    3    6    0    1    0    0    0    0     0     0     0
Triv. accum. %    90   93   98   99  100  100  100  100  100   100   100   100
N-trv % in range  94    1    2    1    1    1    0    0    0     0     0     0
N-trv accum. %    94   95   97   98   99   99  100  100  100   100   100   100

VMCF xfers/trn.   <1   <2   <4   <6  <10  <20  <40  <60 <100  <200  <400  <600
Triv. % in range  92    0    5    1    2    1    0    0    0     0     0     0
Triv. accum. %    92   92   96   97   99   99  100  100  100   100   100   100
N-trv % in range  85    0    4    2    5    2    2    0    0     0     0     0
N-trv accum. %    85   85   89   91   96   98  100  100  100   100   100   100

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 33. Layout of System Transaction Statistics Screen (FCX130)

The information shown is based on CP monitor USER domain EVENT data. It can be displayed only when data collection for that domain is active and when monitor data extraction by Performance Toolkit has been activated.

Note that EVENT data collection for all users can cause considerable overhead on a large system. Activate this part of data collection only for periods where you really need the information for analysis.

Field Description:

This screen gives you some statistics on the frequency with which response times and the resources used per transaction fall within certain ranges of values. This should give you information on the distribution of these values which could not be obtained by giving just simple averages.

Numbers are given in each case for:

Triv. % in range
The percentage of all measurements for trivial transactions in the interval which did fall into the respective range of values.

Triv. accum. %
The percentage of all measurements for trivial transactions in the interval which was found to be *lower* than the upper boundary of the range, that is, this is the accumulated total percentage of all measurements below and within the range shown.

N-trv % in range
The percentage of all measurements for non-trivial transactions in the interval which did fall into the respective range of values.

N-trv accum. %
The percentage of all measurements for non-trivial transactions in the interval which was found to be *lower* than the upper boundary of the range, that is, this is the accumulated total percentage of all measurements below and within the range shown.

Response Time Statistics (Percent of Samples Below Threshold) shows the measured response time, in seconds.

Resource Usage / Transaction (Percent of Samples Below Threshold) shows the resources used per transaction for the following:

CPU msec/trans.
The amount of CPU used per transaction, in msec.

Disk I/Os/trans.
The number of disk I/O operations per transaction.

SPOOL reads/trn.
The number of UR read operations per transaction.

SPOOL wrts/trns.
The number of UR write operations per transaction.

Page faults/trn.
The number of page faults encountered per transaction.

XSTORE reads/tr.
The number of page-in operations from expanded storage per transaction.

IUCV xfers/trn.
The number of IUCV data transfer operations per transaction (both directions).

VMCF xfers/trn.
The number of VMCF data transfer operations per transaction (both directions).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields.

FCX131, I/O Device Configuration Screen – DEVCONF

Performance Toolkit Subcommand: "DEVCONF" on page 168.

In the I/O Device Configuration Screen (FCX131), information for I/O devices which are online is shown highlighted on the screen:

```
FCX131      CPU nnnn  SER nnnnn        Status   HH:MM:SS        Perf. Monitor

<----  Ranges  ---->   Device      <- Channel Path Ids  ->   Control
Device-No  Subch.-ID   Type         1  2  3  4  5  6  7  8   Unit      Status
04C0-04C3  0093-0096   CTCA         .  .  .  .  .  .  .  .   ....      Offline
04C4-04CF  0097-00A2   CTCA        16  .  .  .  .  .  .  .   3088      Online
04D0-04D7  00A3-00AA   CTCA         .  .  .  .  .  .  .  .   ....      Offline
04D8-04DB  00AB-00AE   CTCA        16  .  .  .  .  .  .  .   3088      Online
04DC       00AF        CTCA         .  .  .  .  .  .  .  .   ....      Offline
04DD-04DE  00B0-00B1   CTCA        16  .  .  .  .  .  .  .   3088      Online
04DF       00B2        CTCA        16  .  .  .  .  .  .  .   3088      Online
0580-0585  00E3-00E8   3480        0B 4B  .  .  .  .  .  .   3480-02   Offline
0586-0587  00E9-00EA   3480         .  .  .  .  .  .  .  .   ....      Offline
0588-058D  00EB-00F0   3480        0B 4B  .  .  .  .  .  .   3480-02   Offline
058E-058F  00F1-00F2   3480         .  .  .  .  .  .  .  .   ....      Offline
0600-061F  0103-0122   3380-K      06 4E  .  .  .  .  .  .   3880-23   Online
0720-073F  0163-0182   3380-K      07 4F  .  .  .  .  .  .   3880-23   Online
081A       0183        37x5        04  .  .  .  .  .  .  .   3745-D1   Online
0840-085F  0184-01A3   3390-3      14 20 54 60  .  .  .  .   3990-3    Online
0860-087F  01A4-01C3   3390         .  .  .  .  .  .  .  .   ....      Offline
0B19       0206        37x5        0D 4D  .  .  .  .  .  .   3745-01   Online

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 34. Layout of I/O Device Configuration Screen (FCX131)

The information shown is based on CP monitor MONITOR domain SAMPLE data.

The I/O devices are sorted in ascending device number sequence; that sequence cannot be changed (no SORT subcommand for this screen).

Field Description:

Ranges
Information for a single device or for a range of similar I/O devices, with similar channel paths and status, can be shown on one line. The following data will be shown:

Device-No
The device number(s) of the I/O device(s)

Subch.-ID
The subchannel ID(s) of the I/O device(s)

Device Type
The device type and model number.

The string '(E)' will be inserted for devices which are emulated on some other device type. The string '(X)' will be inserted for devices which support XRC. These flags may be combined, for example, '(EX)'.

Channel Path Ids
Shows which channels are active for data transfer to the device. Up to eight channel connections are supported by the architecture; dots will be inserted for the ones which are not active (not installed or offline).

Control Unit
The control unit type and model number. For different models of IBM DASD subsystems, they will be recognized and displayed as such only if the only if they are operating in enhanced mode; otherwise they will be displayed as 3990-3 control units.

Status
The device status (online or offline).

The information shown is initially provided by a MONITOR domain record when Performance Toolkit connects to the *MONITOR service. If the program has been set up to collect the monitor data from another machine's disk file, the program will attempt to obtain the monitor domain data from the first monitor sample in the disk file; the data cannot be shown if the required information is not found in that first sample.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX132, User Communication Screen – UCOMM

Performance Toolkit Subcommand: "UCOMM" on page 322.

The User Communication Screen (FCX132) shows information on the use made of the IUCV and VMCF communication facilities by individual users. Information for users which have been active in the interval is shown highlighted on the screen.

```
FCX132      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
.                 S _____     .     .     .     .     .     .     .     .
          Msg     V Total <- IUCV Msg/s -->  <- VMCF Msg/s -->  <-- IUCV in Q
Userid    Target  M Msg/s ISend IRecv IFail  VSend VRecv VFail  SendQ RecvQ R
>System<  ......  .  .323  .165  .150  .000   .004  .004  .000   .017  .117
VMPRWAYT  *SPL    N 83.68 41.72 41.96  .000   .000  .000  .000      0     0
VSCS21    *CCS    Y 76.32 36.17 40.14  .000   .000  .000  .000      0    79
EMEA24    DE014911 Y 51.29 27.74 23.55  .000   .000  .000  .000      0     0
RESI      SHRIEB  N 47.47 40.89 6.578  .000   .000  .000  .000      0     0
VTAM10    *SIGNAL Y 46.92 20.06 26.86  .000   .000  .000  .000      0     0
EMEA21    VMPRW04 Y 43.87 24.14 19.73  .000   .000  .000  .000      0     0
VTAM20    *SIGNAL Y 43.74 24.89 18.85  .000   .000  .000  .000      0     0
VMPRW04   EMEA21  N 31.49 17.47 14.02  .000   .000  .000  .000      0     0
DCSSERV   SERBINE N 28.82 15.57 13.24  .000   .000  .000  .000      3     2
AVS010    DCSSERV N 24.07 11.02 13.04  .000   .000  .000  .000      0     0
VSCS20    *CCS    Y 24.01 11.12 12.89  .000   .000  .000  .000      0    32
EMEA25    83827108 Y 21.34 11.22 10.13  .000   .000  .000  .000      0     0
VSCS31    *CCS    Y 21.32 9.622 11.69  .000   .000  .000  .000      0    39
TCPIPP04  VMPRW04 N 20.80 8.478 12.06  .267   .000  .000  .000      0     0
RSCSEHN2  *SIGNAL Y 19.38 10.60 8.778  .000   .000  .000  .000      0     0
TCPIP     SMTP3   Y 13.47 2.522 2.583  .039  3.406 4.922  .000      0     7
Select a user for user details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 35. Layout of User Communication Screen (FCX132)

The information shown is based on CP monitor USER domain SAMPLE data.

The sample shows a screen with the users sorted in descending sequence of the total message rate (indicated by the underscore characters '____' above the `Msg/s` header). Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the appropriate column heading as sort argument (see "SORT" on page 287), or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

The first entry is reserved for the overall system average for all users, regardless of the current sorting sequence. It is identified by the `>System<`-'userid'.

Some additional lines with user class averages will be shown at the top when user classes have been defined (see "FCONTROL UCLASS" on page 91). The 'userid' shown will then be the user class name.

Note that the information extends beyond the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

For more detailed information on one specific user, either:

- Place the cursor on the `Userid` field of the virtual machine you are interested in and press ENTER, or
- Enter the subcommand 'USER *userid*' on the command line

Field Description:

The following field descriptions apply to both the UCOMM and UCOMMLOG *userid* displays, with the exception of the `Userid` field which will be replaced by the field `Interval End Time` on the UCOMMLOG display.

Userid
User identification

Msg Target
The target address for the last IUCV or VMCF data transfer (not inserted for system average and user class lines)

SVM Indicates whether this is a service virtual machine as defined by the SVMSTAT option in the user's directory entry ('Y') or not ('N')

A dot will be inserted if the SVM status is not available for users that logged on after starting data collection.

Total Msg/s
The total IUCV and VMCF message rate per second

IUCV Msg/s:

ISend
The rate of IUCV data transfers from this user to another user, or to CP

IRecv The rate of IUCV data transfers to this user by other users or CP

IFail The rate of IUCV data transfer failures

VMCF Msg/s:

VSend
The rate of VMCF data transfers from this user to another user

VRecv
The rate of VMCF data transfers to this user by other users

VFail The rate of VMCF data transfer failures

IUCV in Q:

SendQ
The number of IUCV send requests queued for the user

RecvQ
The number of IUCV requests in the user's receive queue

ReplQ
The number of IUCV requests in the user's reply queue

VMCF Queue
The number of VMCF messages queued for the user

Connections Total
The number of IUCV connections for the user.

Connections Max.
The maximum number of IUCV connections allowed.

Per Message: Shows load per IUCV or VMCF message (statistical information only, not necessarily related to the IUCV or VMCF data transfer operations).

CPUsec
The total CPU time spent per IUCV or VMCF data transfer

DasdIO
The number of DASD I/Os executed per IUCV or VMCF data transfer

Paging
The number of page reads and writes per IUCV or VMCF data transfer

Nr of users
The number of users which contributed to the average shown on this line (values are inserted only for lines with averages; the field remains empty for normal user data lines).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields. All of a user's sessions during the selected period contribute to the averages shown. Note also that all of the activity fields (rates) are based on each user's connect time within the overall period, *not* the total elapsed time for the whole period.

FCX133, Shared Segments Screen – NSS

Performance Toolkit Subcommand: "NSS" on page 239.

In the Shared Segments Screen (FCX133), information for segments for which some activity was found during the last interval is shown highlighted on the screen.

```
FCX133      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

_______                      .     .    .    .     .     .    .     .     .     .     .     .     .     .     .     .     .
                               <--------------- Number of Pages ----------------> <------------ Rate per Sec. ------------>
        Spool   Creation <- Users ->                 <Resident> <-Aliases->
Name     File       Date Share N-Shr Savd NDat Resvd  Res. R<2G Count Lockd XSTOR  DASD Trans Steal Pgrds Pgwrt X-rds X-wrt X-mig
>System< ---- ---- -- --    15     0  689 1573    93   663    0   125     8     0    88  .331  .000  .000  .000  .000  .000  .000
CMS      3903 2012/10/22    27     0 1298    0   512  1298    0  1279     0     0   708  .000  .000  .000  .000  .000  .000  .000
CMSFILES 3889 2012/10/22     4     0  768    0     0   631    0     0     0     0     0  .000  .000  .000  .000  .000  .000  .000
CMSPIPES 3890 2012/10/22    37     0  256    0   256   256    0     2     0     0     0  .000  .000  .000  .000  .000  .000  .000
CMSVMLIB 3891 2012/10/22    37     0  256    0     0   256    0     2     0     0     0  .000  .000  .000  .000  .000  .000  .000
GCS      5536 2012/10/23     2     0  120  917   256  1037    0     0     0     0     0  .000  .000  .000  .000  .000  .000  .000
INSTSEG  3894 2012/10/22    37     0  768    0     0   463    0     4     0     0   256  .000  .000  .000  .000  .000  .000  .000
MONDCSS  3895 2012/10/22     2     0    0  16k     0    92    0    92    85     0     0 3.643  .000  .000  .000  .000  .000  .000
NLSAMENG 3896 2012/10/22     9     0  256    0     0   128    0     0     0     0     0  .000  .000  .000  .000  .000  .000  .000
SCEE     3900 2012/10/22     3     0  256    0     0   128    0     0     0     0     0  .000  .000  .000  .000  .000  .000  .000
SCEEX    3901 2012/10/22     3     0 2304    0     0  1986    0     0     0     0     0  .000  .000  .000  .000  .000  .000  .000
ZCMS     3904 2012/10/22     5     0 1298    0     0  1015    0     0     0     0     0  .000  .000  .000  .000  .000  .000  .000

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 36. Layout of Shared Segments Screen (FCX133)

The information on this screen is based on CP monitor STORAGE domain SAMPLE data.

The sample shows a screen with the shared segments sorted in ascending segment name sequence, the initial setting. Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the SORT subcommand with the appropriate column heading (see "SORT" on page 287), or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

The first entry is reserved for the overall averages/totals for all active segments, regardless of the current sorting sequence. It is identified by the 'name' `>System<`.

Field Descriptions:

Segment Name
Name of the NSS or DCSS.

Spool File
Spool file number of the segment.

Creation Date
Date when the segment was created. The string `(Member)` will be inserted where the information shown is for a member of a segment space.

Users:

Share The number of users which access the segment in shared mode

N-Shr
The number of users which access the segment in non-shared mode

Note that both the 'Share' and 'N-Shr' values will be zero for segment spaces. Information on the number of users is then obtained by means of a 'Q NSS NAME

..... MAP' subcommand, and the resulting information inserted per member on the following lines. The number of users will always be inserted under 'Share' for segment members.

Pages:

Savd The number of pages saved in this segment.

NDat The number of pages defined with a 'no data saved' page descriptor.

Resvd The number of frames reserved via the SET RESERVED command.

Res. Total number of pages resident in central storage.

R<2GB
The number of pages resident in central storage below the 2GB line.

Count The number of SXS alias pages associated with 'pageable FRMTEs'. They may be stealable if not last translated or locked.

Lockd The number of locked SXS alias pages.

XSTOR
The number of expanded storage blocks occupied by pages of the segment

DASD
The number of slots occupied on auxiliary storage.

Rate per Sec.:

Trans Number of page translations per second

Steal Number of page frames stolen per second

Pgrds Number of page reads per second

Pgwrt Number of page writes per second

X-rds Number of page-ins per second from expanded storage

X-wrt Number of page-outs per second to expanded storage

X-mig Number of pages migrated from expanded storage to disk per second

The string `Initial sample` will be inserted for segments where no valid delta values could be calculated because only one sample has been obtained so far.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields. Note that not all the segments shown may have been loaded during the whole period. However, the activity shown (for example, page rates) is always based on the common overall elapsed time. This allows showing each segment's contribution to the overall load, but it may not show the average load for a segment while it was active.

FCX134, Shared Data Spaces Screen – DSPACESH

Performance Toolkit Subcommand: "DSPACESH" on page 172.

In the Shared Data Spaces Screen (FCX134), information for data spaces for which some activity was found during the last interval is shown highlighted on the screen:

```
FCX134      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

______                                    .      .     .     .     .     .     .
Owning                                 Users  <--------- Rate per Sec. --------->
Userid   Data Space Name               Permt  Pgstl Pgrds Pgwrt X-rds X-wrt X-mig
>System< 5                                 0   .243  .007 1.194  .211  .243  .188
SYSTEM   ISFCDATASPACE                     0   .000  .000  .000  .000  .000  .000
SYSTEM   SYSTEM                            0   .668  .020 3.570  .575  .668  .550
SYSTEM   VDISK$FCONMNT$$0999$0015          0   .000  .000  .000  .000  .000  .000
SYSTEM   VDISK$MAINT$$$$0500$0002          0   .000  .000  .000  .000  .000  .000
SYSTEM   VIRTUAL$FREE$STORAGE              0   .060  .000  .013  .057  .060  .013

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 37. Layout of Shared Data Spaces Screen (FCX134)

The information shown is based on CP monitor STORAGE domain SAMPLE data.

The sample shows a screen with the shared data spaces sorted in ascending owner name sequence, the initial setting. Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the SORT command with the appropriate column heading (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Note that the information extends beyond the 80 columns of an ordinary screen. Use the LEFT/RIGHT commands, or the corresponding PF-keys, to shift the display window to view the remaining data.

The first entry is reserved for the overall averages for all the shared data spaces shown, regardless of the current sorting sequence. It is identified by the 'name' >System<.

Field Description:

Owning Userid
: userid of the owner of the shared data space.

Data Space Name
: The name of the data space, or, on the ">System<" line, the number of data spaces over which the ">System<" line was calculated.

Users Permt
Number of users permitted to access the data space.

Rate per Sec.:

Pgstl The number of pages stolen per second.

Pgrds The number of pages read from DASD per second.

Pgwrt The number of pages written to DASD per second.

X-rds The number of pages moved from expanded storage to central storage, per second

X-wrt The number of pages moved from central storage to expanded storage, per second.

X-mig The number of pages migrated from expanded storage to DASD, per second.

Nr of Pages:

Total The total number of pages defined for the data space.

Resid The number of resident pages.

R<2GB
The number of pages resident in central storage below the 2GB line.

Lock The number of locked pages.

L<2GB
The number of pages locked in central storage below the 2GB line.

Count The number of SXS alias pages associated with 'pageable FRMTEs'. They may be stealable if not last translated or locked.

Lockd The number of locked SXS alias pages.

XSTOR
The number of XSTORE blocks occupied by the data space.

DASD
The number of slots occupied on auxiliary storage.

The string `Initial sample` will be inserted for data spaces for which no valid delta values could be calculated because only one sample has been obtained so far.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields. Note that not all the data spaces shown may have been loaded during the whole period. However, the activity shown (for example, page rates) is always based on the common overall elapsed time. This allows showing each data space's contribution to the overall load, but it may not show the average load for a data space while it was active.

FCX135, User Wait State Log Screen – USTLOG

Performance Toolkit Subcommand: "USTLOG" on page 342.

The User Wait State Log Screen (FCX135) shows system-wide user wait state information by time:

```
FCX135      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

                                                          <-SVM and->
End Time   %ACT  %RUN %CPU %LDG %PGW %IOW %SIM %TIW %CFW %TI %EL %DM %IOA %OTH
>>Mean>>     3     3    5    0    0    0   10   25   33   4   0  17    3    0
09:05:00     2     5    5    0    0    0   11   35   21   4   0  16    3    0
09:15:00     2     5    4    0    0    0   10   32   26   4   0  16    4    0
09:25:00     3     6    7    0    0    0   12   29   27   3   0  14    3    0
09:35:00     3     5    4    0    0    0   11   30   32   4   0  13    2    0
09:45:00     2     4    2    0    0    0    8   32   34   4   0  13    2    0
09:55:00     3     3    7    0    0    0    9   23   40   3   0  12    2    0
10:05:00     3     2    8    0    0    0   10   23   38   4   0  13    2    0
10:15:00     3     3    7    0    0    0   12   26   34   4   0  12    2    0
10:25:00     3     4    8    0    0    0   11   25   35   4   0  11    3    0
10:35:00     3     4    8    0    0    0    9   22   41   3   0  11    2    0
10:45:00     3     4    3    0    0    0    6   23   48   2   0  11    3    0
10:55:00     3     4    3    0    0    0   10   26   39   3   0  13    3    0
11:05:00     3     4   11    0    0    0   13   21   33   3   0  13    2    0
11:15:00     3     4    8    0    0    0   12   25   34   3   0  11    2    0
11:25:00     3     3    9    0    0    0   15   22   33   3   0  12    1    0
11:35:00     3     4    9    0    0    0   12   24   37   3   0  11    1    0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 38. Layout of User Wait State Log Screen (FCX135)

The information shown is based on CP monitor USER domain SAMPLE data.

The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Note that the information extends beyond the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

%ACT
Percent of samples during which the user was found to be active, either consuming CPU or waiting for some service.

%RUN
Percent of 'active' samples during which the user was found to be running on a real processor.

%CPU
Percent of 'active' samples during which the user was found to be waiting to run on the real CPU

%LDG
Percent of 'active' samples during which the user was found in 'loading' state, i.e. with a very high page read activity

%PGW
Percent of 'active' samples during which the user was found in page wait state

%IOW
Percent of 'active' samples during which the user was found in 'I/O wait' state.

The 'I/O wait' time is only the time required for CCW translation; any time spent by the virtual machine waiting for the completion of the I/O operation *after* the start of the actual I/O operation is accounted for in the `%IOA` field. Look at instruction wait (field `%SIM`) for I/O wait information if the I/O was requested via diagnose function by a CMS machine.

%SIM
Percent of 'active' samples during which the user was found in instruction simulation wait, i.e. waiting for CP to complete simulation of a privileged instruction.

%TIW
Percent of 'active' samples during which the user was found in 'test idle' wait, i.e. waiting to be dropped from the dispatch list.

%CFW
Percent of 'active' samples during which the user was found in 'console function' wait, i.e. waiting for CP to execute one of the console function commands which allow a user to alter the state and configuration of the virtual machine (e.g. LINK, ATTACH, DETACH).

%TI Percent of 'active' samples during which the user was found in both SVM wait and 'test idle' wait. SVM wait state indicates that the user was waiting for the completion of a communication with a service virtual machine.

%EL Percent of 'active' samples during which the user was found in both SVM wait and in the eligible list (resource wait).

%DM
Percent of 'active' samples during which the user was found in both SVM wait and in the dormant list. (This status is counted as 'active' since the machine is actually waiting for something, and not just idle.)

%IOA
Percent of 'active' measurements during which the user was found waiting for something other than the above while an I/O operation started by this machine had not yet completed.

%OTH
Percent of 'active' measurements during which the user was found in other states.

%LIM

Percent of 'active' measurements during which the user was found in the 'limit list', i.e. in the dispatch list waiting for CPU but prevented from running by a maximum share setting.

%PGA

Percent of 'page active' wait, i.e. the virtual machine has loaded a wait PSW while waiting for the completion of a page read operation. This state is to be expected for guest systems running with PAGEX ON.

%Time spent in: The columns under this header show the relative frequency with which a machine was found in the different lists and classes:

Q0 Percent of 'active' measurements during which the user was found in Q0 (in the dispatch list as class 0 user)

Q1 Percent of 'active' measurements during which the user was found in Q1 (in the dispatch list as class 1 user)

Q2 Percent of 'active' measurements during which the user was found in Q2 (in the dispatch list as class 2 user)

Q3 Percent of 'active' measurements during which the user was found in Q3 (in the dispatch list as class 3 user)

E0-3 Percent of 'active' measurements during which the user was found in the eligible list (any class)

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX136, Response Time Log (All) Screen – RESPALL

Performance Toolkit Subcommand: "RESPALL" on page 263.

The Response Time Log (All) Screen (FCX136) shows system-wide response time information by time:

```
FCX136      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <------- Response Time (s) ------->  <----- Transaction rate (/s) ---
Interval  <- Triv. -> <- N-Trv -> Quick        <- Triv. -> <- N-Trv -> Quick
End Time     UP    MP    UP    MP  Disp  Mean     UP    MP    UP    MP  Disp To
>>Mean>>   .066  .000 1.160  .000  .830  .576  14.29   .00 12.16   .00   .72 27
09:15:00   .041  .000 1.371  .000  .585  .631  19.93   .00 15.95   .00   .74 36
09:25:00   .051  .000 1.478  .000 1.005  .683  21.19   .00 16.57   .00   .70 38
09:35:00   .049  .000  .736  .000  .586  .375  20.48   .00 18.06   .00   .74 39
09:45:00   .045  .000  .674  .000  .473  .342  19.43   .00 17.07   .00   .77 37
09:55:00   .075  .000 1.429  .000  .455  .714  16.62   .00 15.14   .00   .81 32
10:05:00   .086  .000 1.104  .000  .560  .567  17.54   .00 15.68   .00   .81 34
10:15:00   .090  .000 1.246  .000  .471  .626  17.33   .00 15.21   .00   .85 33
10:25:00   .085  .000 1.055  .000  .506  .542  17.19   .00 15.34   .00   .89 33
10:35:00   .094  .000 1.077  .000  .436  .553  17.92   .00 15.88   .00   .84 34
10:45:00   .051  .000  .909  .000  .424  .448  17.92   .00 15.49   .00   .80 34
10:55:00   .054  .000  .731  .000  .397  .370  17.53   .00 15.27   .00   .73 33
11:05:00   .101  .000 1.337  .000  .679  .678  18.94   .00 16.57   .00   .85 36
11:15:00   .088  .000  .985  .000  .552  .498  19.51   .00 16.31   .00   .80 36
11:25:00   .108  .000 1.753  .000  .565  .855  18.15   .00 15.38   .00   .88 34
11:35:00   .107  .000 1.345  .000  .501  .683  15.42   .00 13.64   .00   .81 29
See RESPUP display for UP response time details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 39. Layout of Response Time Log (All) Screen (FCX136)

The information shown is based on CP monitor SYSTEM domain SAMPLE data.

The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Response Time (s) provides information on response times, in seconds:

Triv. UP
The average response time in the interval for trivial transactions of uniprocessor virtual machines, in seconds

Triv. MP
The average response time in the interval for trivial transactions of multiprocessor virtual machines, in seconds

N-Trv UP
The average response time in the interval for non-trivial transactions of uniprocessor virtual machines, in seconds

N-Trv MP
The average response time in the interval for non-trivial transactions of multiprocessor virtual machines, in seconds

Quick Disp
The average response time in the interval for virtual machines with the quick dispatch option (QUICKDSP), in seconds

Mean The average response time in the interval for all transactions, in seconds

Transaction Rate (/s) provides information on transaction rates, in transactions per second:

Triv. UP
The transaction rate for trivial transactions of uniprocessor virtual machines, in transactions per second

Triv. MP
The transaction rate for trivial transactions of multiprocessor virtual machines, in transactions per second

N-Trv UP
The transaction rate for non-trivial transactions of uniprocessor virtual machines, in transactions per second

N-Trv MP
The transaction rate for non-trivial transactions of multiprocessor virtual machines, in transactions per second

Quick Disp
The transaction rate for virtual machines with the quick dispatch option (QUICKDSP), in transactions per second

Total The total transaction rate for all transactions

Total Transactns
The total number of transactions in the interval

Percent shows the relative frequency of the different transaction types:

Triv. UP
The percentage of all transactions which were trivial UP transactions

Triv. MP
The percentage of all transactions which were trivial MP transactions

N-Trv UP
The percentage of all transactions which were non-trivial UP transactions

N-Trv MP
The percentage of all transactions which were non-trivial MP transactions

Quick Disp
The percentage of all transactions which were issued by virtual machines with the quick dispatch option

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX137, Response Time Log (UP) Screen – RESPUP

Performance Toolkit Subcommand: "RESPUP" on page 264.

The Response Time Log (UP) Screen (FCX137) shows system-wide response time information of uniprocessor virtual machines by time:

```
FCX137      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Interval <- Resp. Time -->  <- Trans. Rate ->  <-- Transactions -->  <-- % -->
End Time Trv_s Ntr_s Ave_s  Trv/s Ntr/s Tot/s   Triv.  N-Trv  Total  Triv N-Tr
>>Mean>>  .107 1.345  .688  14.29 12.16 26.45  282991 240733 523724  54.0 46.0
09:05:00  .042 1.192  .562  21.68 17.89 39.57   13005  10734  23739  54.8 45.2
09:15:00  .041 1.371  .632  19.93 15.95 35.88   11956   9572  21528  55.5 44.5
09:25:00  .051 1.478  .677  21.19 16.57 37.76   12715   9941  22656  56.1 43.9
09:35:00  .049  .736  .371  20.48 18.06 38.54   12288  10836  23124  53.1 46.9
09:45:00  .045  .674  .339  19.43 17.07 36.50   11676  10258  21934  53.2 46.8
09:55:00  .075 1.429  .721  16.62 15.14 31.76    9972   9086  19058  52.3 47.7
10:05:00  .086 1.104  .567  17.54 15.68 33.22   10524   9406  19930  52.8 47.2
10:15:00  .090 1.246  .630  17.33 15.21 32.54   10398   9124  19522  53.3 46.7
10:25:00  .085 1.055  .543  17.19 15.34 32.53   10332   9218  19550  52.8 47.2
10:35:00  .094 1.077  .556  17.92 15.88 33.81   10754   9529  20283  53.0 47.0
10:45:00  .051  .909  .449  17.92 15.49 33.41   10754   9294  20048  53.6 46.4
10:55:00  .054  .731  .369  17.53 15.27 32.80   10519   9160  19679  53.5 46.5
11:05:00  .101 1.337  .678  18.94 16.57 35.51   11361   9944  21305  53.3 46.7
11:15:00  .088  .985  .497  19.51 16.31 35.82   11723   9802  21525  54.5 45.5
11:25:00  .108 1.753  .863  18.15 15.38 33.53   10891   9229  20120  54.1 45.9
11:35:00  .107 1.345  .688  15.42 13.64 29.06    9252   8186  17438  53.1 46.9
See RESPALL display for UP + MP response times
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 40. Layout of Response Time Log (UP) Screen (FCX137)

The information shown is based on CP monitor SYSTEM domain SAMPLE data.

The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Resp. Time shows information on response times for uniprocessor virtual machines:

Trv_s The average response time in the interval for trivial UP transactions, in seconds

Ntr_s The average response time in the interval for non-trivial UP transactions

Ave_s The average response time in the interval for all UP transactions, in seconds

Trans. Rate:

Trv/s The average transaction rate in the interval for trivial UP transactions, in transactions per second

Ntr/s The average transaction rate in the interval for non-trivial UP transactions, in transactions per second

Tot/s The total transaction rate in the interval for all UP transactions, in transactions per second

Transactions:

Triv. The number of trivial UP transactions

N-Trv The number of non-trivial UP transactions

Total The total number of UP transactions in the interval

'%' shows the relative frequency of the different transaction types:

Triv The percentage of all UP transactions which were trivial transactions

N-Tr The percentage of all UP transactions which were non-trivial transactions

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX138, Minidisk Cache Log Screen – MDCACHE

Performance Toolkit Subcommand: "MDCACHE" on page 231.

The Minidisk Cache Log Screen (FCX138):

```
FCX138      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
              CP <--- MDC Blocks --->  <--- MDC Requests ----> <--------- MDC B
Interval    Par-                 Fair  Reads  Full Part.       Reads Read  Hit
End Time  tition    Max Actual  Share     /s  Hit%  Hit% Miss%    /s    %    %
>>Mean>>  458240 131072 130922   3082    409  95.8    ..   ...   ... .... ....
09:15:00  458240 131072 131072    916    503  94.9    ..   ...   ... .... ....
09:25:00  458240 131072 131072    862    560  95.6    ..   ...   ... .... ....
09:35:00  458240 131072 131072    873    486  96.1    ..   ...   ... .... ....
09:45:00  458240 131072 131072   1032    482  95.9    ..   ...   ... .... ....
09:55:00  458240 131072 131072    970    406  94.2    ..   ...   ... .... ....
10:05:00  458240 131072 131072    992    433  96.2    ..   ...   ... .... ....
10:15:00  458240 131072 131072   1129    404  95.8    ..   ...   ... .... ....
10:25:00  458240 131072 131026   1016    404  95.8    ..   ...   ... .... ....
10:35:00  458240 131072 131055    978    430  96.5    ..   ...   ... .... ....
10:45:00  458240 131072 131072   1065    432  95.6    ..   ...   ... .... ....
10:55:00  458240 131072 131072   1159    403  94.3    ..   ...   ... .... ....
11:05:00  458240 131072 131072    834    465  96.4    ..   ...   ... .... ....
11:15:00  458240 131072 131072    970    465  96.7    ..   ...   ... .... ....
11:25:00  458240 131072 131072    916    448  95.8    ..   ...   ... .... ....
11:35:00  458240 131072 131072   1394    384  97.0    ..   ...   ... .... ....
See MDCSTOR display for MDC storage utilization log
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 41. Layout of Minidisk Cache Log Screen (FCX138)

The information shown is based on CP monitor SYSTEM domain SAMPLE data.

The display shows minidisk cache usage by time. The leftmost column contains the end time:

(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

CP Partition
: The size of the CP partition in expanded storage, in blocks

MDC Blocks:

MDC Blocks Max
The maximum number of expanded storage blocks that can be used for minidisk caching

MDC Blocks Actual
The number of expanded storage blocks used for minidisk caching at the end of the interval

MDC Blocks Fair Share
The fair share limit for the minidisk cache, i.e. the max. number of blocks any one user is allowed to insert into the minidisk cache per fair share interval

MDC Requests:

Reads/s
The number of read requests per second

Full Hit%
The percentage of requests which were full hits, i.e. where all the requested blocks were found in the cache

Part. Hit%
This value is no longer available.

Miss%
This value is no longer available.

MDC Blocks:

Reads/s
This value is no longer available.

Read %
This value is no longer available.

Hit %
This value is no longer available.

PGIN/s
The rate at which minidisk cache blocks are moved from expanded storage to central storage

PGOUT/s
The rate at which minidisk cache blocks are moved from central storage to expanded storage

Block Life
The estimated average age, in seconds, of a minidisk cache block, based on Little's Law (cache size divided by PGOUT rate). Dots will be shown if the age cannot be calculated because the PGOUT rate is zero.

Fair Share Exc/s
The rate, per second, that blocks could not be moved into the minidisk cache because their user's fair share limit was exceeded

In Trnsit Ins/s
Insertions per seconds into the in-transit waiting queue (which keeps track of users requesting blocks which are already on their way to the minidisk cache)

Invalidates:

Request Rate/s
The number of requests per second to invalidate minidisk cache blocks, due to an I/O to a virtual device via a non-cachable I/O interface

Blocks Rate/s
The number of blocks per second which were invalidated following an invalidation request.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX139/140/141/142, CP IUCV Services Log Screen – CPSALL, CPSTOCP, CPSTOVM, CPSFAIL

Performance Toolkit Subcommand: "CPSALL" on page 158.

The CP IUCV Services Log Screen (FCX139/140/141/142) is shown after entering the CPSALL, CPSTOCP, CPSTOVM, CPSFAIL subcommand. Note that the layout of these four displays is almost identical. Only a CPSALL sample is included here.

```
FCX139      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <-Total rates/s->  <--------------- Total System Services Activity, R
Interval   IUCV                      *MSG-              *BLO- *MON- *SIG-
End Time  +VMCF  VMCF  IUCV  Total   ALL  *MSG  *RPI  CKIO  ITOR   NAL  *CCS  *
>>Mean>>  239.4  28.7 210.8  186.7    .0   3.9   7.3   8.5    .0  94.0  72.9
09:15:00  315.3  31.3 284.0  264.9    .0   3.5   7.8  34.1    .0 123.0  96.5
09:25:00  296.6  32.3 264.3  247.5    .0   6.0   9.1   9.4    .0 121.3 101.6
09:35:00  354.2  34.7 319.5  246.6    .0   4.9   7.1   6.6    .0 123.7 104.1
09:45:00  261.9  33.2 228.7  224.5    .0   4.9   6.7   1.0    .0 112.9  98.8
09:55:00  267.0  36.4 230.6  226.2    .0   5.2   5.8  26.7    .0 103.8  84.7
10:05:00  300.2  29.9 270.3  231.2    .0   4.5   6.6  29.8    .0 100.4  89.7
10:15:00  273.3  32.2 241.2  205.4    .0   3.2   5.3   2.1    .0 106.3  88.3
10:25:00  243.5  33.9 209.7  207.2    .0   4.1   6.0   1.2    .0 104.9  90.8
10:35:00  332.9  34.3 298.6  234.7    .0   5.9   5.5  10.1    .0 117.1  96.1
10:45:00  253.5  34.3 219.3  218.7    .0   5.8   5.8    .2    .0 114.0  92.7
10:55:00  282.4  30.3 252.1  234.6    .0   4.9   5.3   1.0    .0 128.9  94.4
11:05:00  282.4  41.3 241.1  220.5    .0   4.9   6.5   1.7    .0 111.5  95.7
11:15:00  274.7  36.3 238.4  232.1    .0   4.9   6.1   1.8    .0 119.6  99.4
11:25:00  340.6  35.5 305.1  224.3    .0   5.9   6.2  19.2    .0 104.2  88.6
11:35:00  276.1  24.5 251.6  208.7    .0   3.5   5.4  18.6    .0 102.2  78.8
See CPSTOVM / CPSTOCP / CPSFAIL for other CP comm. data subsets
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 42. Layout of CP IUCV Services Log Screen (FCX139/140/141/142)

The information shown is based on CP monitor SYSTEM domain SAMPLE data.

The display shows usage of CP IUCV services by time. The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on an ordinary screen with 80 columns: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Total rates/s: Information on overall IUCV and VMCF activities, in transfers per second (the strings `Total CP>VM/s`, `Total VM>CP/s` and `Total Fails/s` will be shown instead for the CPSTOVM, CPSTOCP and CPSFAILS displays respectively).

IUCV+VMCF
The sum of all IUCV and VMCF activity

VMCF
The sum of all VMCF activity

IUCV The sum of all IUCV activity

Total System Services Activity, Rates/s: Provides more detailed information on the participation of specific CP IUCV system services to the total IUCV activity. The strings

- `System Services CP to Users, Rates/s`
- `System Services Users to CP, Rates/s`
- `System Services Failures, Rates/s`

will be shown instead for the CPSTOVM, CPSTOCP and CPSFAILS displays respectively.

Total The sum of all IUCV activity by CP services

***MSGALL**
Overall activity for the *MSGALL IUCV service (Message All System Service)

***MSG**
Overall activity for the *MSG IUCV service (Message System Service)

***RPI** Overall activity for the *RPI IUCV service (Access Verification System Service)

***BLOCKIO**
Overall activity for the *BLOCKIO IUCV service (DASD Block I/O System Service)

***MONITOR**
Overall activity for the *MONITOR IUCV service (Monitor System Service)

***SIGNAL**
Overall activity for the *SIGNAL IUCV service (Signal System Service)

***CCS** Overall activity for the *CCS IUCV service (Console Communication Service)

***SPL** Overall activity for the *SPL IUCV service (Spool System Service)

***SYMPTOM**
Overall activity for the *SYMPTOM IUCV service (Symptom System Service)

***ACCOUNT**
Overall activity for the *ACCOUNT IUCV service (Account System Service)

***LOGREC**
Overall activity for the *LOGREC IUCV service (Error Logging System Service)

***CRM**
Overall activity for the *CRM IUCV service (Collection Resource Management System Service)

***IDENT**
Overall activity for the *IDENT IUCV service (Identify System Service)

***CONFIG**
Overall activity for the *CONFIG IUCV service (Enterprise Systems Connection Manager Service)

***VSWITCH**
Overall activity for the *VSWITCH IUCV service (Virtual Switch System Service)

***ASYNCMD**
Overall activity for the *ASYNCMD IUCV service (Asynchronous CP Command Response System Service)

***SCLP** Overall activity for the *SCLP IUCV service (SCLP System Service)

***VMEVENT**
Overall activity for the *VMEVENT IUCV service (VM Event System Service)

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX143, Paging Log Screen – PAGELOG

Performance Toolkit Subcommand: "PAGELOG" on page 240.

The Paging Log Screen (FCX143):

```
FCX143      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <----------- Expanded Storage -----------> <-Real Stor-> <----------- Paging to DASD ------------> <Page Table>
                       Fast-              Est.  Page     DPA  Est.                          <-Single Reads--> <Management>
Interval  Paging  PGIN  Path PGOUT Total  Life  Migr Pagable  Page Reads Write Total  Shrd Guest Systm Total Reads Writes
End Time  Blocks    /s     %    /s    /s   sec    /s  Frames  Life    /s    /s    /s    /s    /s    /s    /s    /s    /s
>>Mean>>       0    .0    .0    .0    .0  ....    .0  77975k 31025  2818  2513  5331  34.2 437.4  29.6 467.0  13.1  10.1
04:39:19       0    .0    .0    .0    .0  ....    .0  77975k  9138  5815  8533 14348  32.3 245.1  27.6 272.7  22.9  22.2
04:44:19       0    .0    .0    .0    .0  ....    .0  77975k  8105 10991  9620 20611  53.4 165.8  48.7 214.5  43.5  38.4
04:49:19       0    .0    .0    .0    .0  ....    .0  77975k 15281  2834  5103  7937  20.2 354.8  15.4 370.1   8.6   1.5
04:54:19       0    .0    .0    .0    .0  ....    .0  77975k 69467  1039  1123  2161  56.3 186.7  51.8 238.5  37.2   5.6
04:59:19       0    .0    .0    .0    .0  ....    .0  77975k 60094  1717  1298  3015  19.9 405.0  15.8 420.8   6.3   8.5
05:04:19       0    .0    .0    .0    .0  ....    .0  77975k 82892  2123 940.7  3064  18.2 563.9  14.1 578.1   8.2   7.4
05:09:19       0    .0    .0    .0    .0  ....    .0  77975k 35795  2599  2178  4777  21.5 712.0  17.1 729.1  10.4   7.7
05:14:19       0    .0    .0    .0    .0  ....    .0  77975k 27891  4169  2796  6964  26.5  1241  22.4  1263  16.6  14.7
05:19:19       0    .0    .0    .0    .0  ....    .0  77975k 39141  3347  1992  5339  24.9 695.6  20.7 716.3  15.2  10.8
05:24:19       0    .0    .0    .0    .0  ....    .0  77975k 37289  2631  2091  4722  27.4 447.6  16.8 464.4  11.7  12.9
05:29:19       0    .0    .0    .0    .0  ....    .0  77975k 85402  1489 913.0  2402  17.1 222.1  13.2 235.3   6.8   7.1
05:34:19       0    .0    .0    .0    .0  ....    .0  77975k 73999  1082  1054  2135  12.6 162.5   8.8 171.4   4.8   4.0
05:39:19       0    .0    .0    .0    .0  ....    .0  77975k 83231  1166 936.8  2103  14.2 182.0  10.2 192.1   5.3   4.7
05:44:19       0    .0    .0    .0    .0  ....    .0  77975k  131k 649.8 593.9  1244  13.4  78.9   8.1  87.0   2.8   2.9
05:49:19       0    .0    .0    .0    .0  ....    .0  77975k 53973  1849  1445  3294  17.2 378.0  13.4 391.4   8.5   6.4
05:54:19       0    .0    .0    .0    .0  ....    .0  77975k 34778  2797  2242  5039  24.5 795.1  19.8 814.9  12.1  10.5


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 43. Layout of Paging Log Screen (FCX143)

The information shown is based on CP monitor SYSTEM and STORAGE domain SAMPLE data.

The display shows paging activity by time. The leftmost column contains the end time:

(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Expanded Storage:

Paging Blocks
The number of paging blocks in expanded storage

PGIN/s
The PGIN rate, i.e. the number of expanded storage blocks moved to central storage, per second

Fast Path %
The percentage of PGIN operations which could be handled by the fastpath routine

PGOUT/s
The PGOUT rate, i.e. the number of central storage pages moved to expanded storage, per second. This figure does not include PGOUT operations done for the minidisk cache.

Total/s
The total of the PGIN and PGOUT rates

Est. Life sec
The estimated life of a paging block in expanded storage, in seconds, based on Little's law (i.e. number of paging blocks divided by the PGOUT rate)

Page Migr
The rate at which pages are migrated from expanded storage to auxiliary storage, for dormant and non-dormant users, for shared systems and for the CP system address space

Real Storage:

DPA Pgable Frames
Number of pageable frames in the DPA

Est. Page Life
The estimated average age of a page in central storage, in seconds, based on Little's law (DPA size divided by the sum of PGOUT and page write rates)

Paging to DASD:

Reads/s
The page read rate per second, including directory, nucleus and warmstart I/O, but no spool I/O

Write/s
The page write rate per second, including directory, nucleus and warmstart I/O, but no spool I/O

Total/s
The total paging rate per second (sum of reads and writes)

Shrd The number of pages read per second for shared segments

Single Reads Guest
The rate of single page reads, per second, for virtual machines

Single Reads Systm
The rate of single page reads, per second, for the system (system pages are always read as single pages)

Single Reads Total
The total rate of single page reads (the sum of guest reads and system reads)

Page Table Management:

Reads/s
The number of page table translations per second that resulted in a page read from auxiliary storage.

Writes/s
The number of page tables paged out to auxiliary storage per second.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX144, Processor Log Screen – PROCLOG

Performance Toolkit Subcommand: "PROCLOG" on page 250.

The Processor Log Screen (FCX144):

```
FCX144       CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

             <--- Percent Busy ----> <-- Rates per Sec.--> <-------- PLDV --------> <------ Paging ------> <Co> < Di>
          C                                                Pct Mean <-VMDBK-->   To Below       Fast  Page <mm> < ag>
Interval  P                          Inst                  Em- when Mast Stoln Mast   2GB  PGIN Path Reads Msgs X'9C'
End Time  U Type Total  User  Syst  Emul  Siml  DIAG  SIGP  SSCH pty Non0 only    /s   /s    /s   /s    %    /s   /s    /s
>>Mean>>  0 CP     5.4   2.8   2.6    .6 368.1 761.4 988.7  96.7 ---  ---  ---   ---  ---    .0    .0 ....    .0  1.2    .0
>>Mean>>  1 CP     2.0    .8   1.3    .6  64.6 632.7 940.4   1.2 ---  ---  ---   ---  ---    .0    .0  100    .0  3.2    .0
>>Mean>>  2 CP      .3    .1    .2    .1   1.0 120.4  78.9    .2 ---  ---  ---   ---  ---    .0    .0 ....    .0   .2    .0
>>Mean>>  3 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>>  4 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>>  5 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>>  6 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>>  7 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>>  8 ZAAP    .1    .0    .1    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>>  9 ZIIP    .1    .0    .1    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>> 10 ICF     .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>> 11 IFL    2.3   1.3   1.0    .8    .8    .5 171.3    .3 ---  ---  ---   ---  ---    .0    .0 ....    .0   .1    .0
>>Mean>> 12 IFL    1.6   1.1    .4    .7    .4    .3 210.4    .3 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>> 13 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>> 14 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>> 15 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>> 16 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>> 17 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>> 18 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>> 19 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Mean>> 20 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Total> 16 CP     7.7   3.7   4.0   1.3 433.7  1515  2008  98.0 ---  ---  ---   ---  ---    .0    .0  100    .0  4.6    .1
>>Total>  1 ZAAP    .1    .0    .1    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Total>  2 IFL    3.9   2.5   1.4   1.5   1.2    .7 381.7    .6 ---  ---  ---   ---  ---    .0    .0 ....    .0   .1    .0
>>Total>  1 ZIIP    .1    .0    .1    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
>>Total>  1 ICF     .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0

09:23:52  0 CP     5.4   2.8   2.6    .6 368.1 761.4 988.7  96.7 ---  ---  ---   ---  ---    .0    .0 ....    .0  1.2    .0
09:23:52  1 CP     2.0    .8   1.3    .6  64.6 632.7 940.4   1.2 ---  ---  ---   ---  ---    .0    .0  100    .0  3.2    .0
09:23:52  2 CP      .3    .1    .2    .1   1.0 120.4  78.9    .2 ---  ---  ---   ---  ---    .0    .0 ....    .0   .2    .0
09:23:52  3 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
09:23:52  4 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
09:23:52  5 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
09:23:52  6 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
09:23:52  7 CP      .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
09:23:52  8 ZAAP    .1    .0    .1    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
09:23:52  9 ZIIP    .1    .0    .1    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
09:23:52 10 ICF     .0    .0    .0    .0    .0    .0    .0    .0 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
09:23:52 11 IFL    2.3   1.3   1.0    .8    .8    .5 171.3    .3 ---  ---  ---   ---  ---    .0    .0 ....    .0   .0    .0
09:23:52 12 IFL    1.6   1.1    .4    .7    .4    .3 210.4    .3 ---  ---  ---   ---  ---    .0    .0 ....    .0   .1    .0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 44. Layout of Processor Log Screen (FCX144)

The information shown is based on CP monitor SYSTEM and PROCESSOR domain SAMPLE data.

The display shows processor activity by time. The leftmost column contains the end time:

(format *hh:mm:ss*)

of the monitor interval for which the values were calculated.

The displayed data contains three parts:

- Overall data grouped by processor number (">>Mean>>") since the last RESET subcommand, or since data collection was activated. This section shows data for

every processor that was active in the overall interval. All rates and percent loads are calculated by active period time; that is, between the first and last active times.

- Overall data grouped by processor type (">>Total>") since the last RESET subcommand, or since data collection was activated. This section shows data for all processors types that were active in the overall interval when the count of active processors in this interval was more than one. All rates and percent loads are calculated by total interval time since the last RESET subcommand or since data collection was activated.
- Regular data based on sample interval time when BYTIME interval is set to zero, or the BYTIME interval when it is specified.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> and >>Total> entries, you can find the relevant interval in the header line.

The >>Mean>> line shows the overall average values per processor number. The >>Total> line shows the overall average values per processor type when the count of active processors in overall interval is more than one.

CPU The processor number to which the following figures apply.

For the >>Total> line only, it is the number of logical CPUs of this type in the partition.

TYPE The processor type, as follows:

CP Central Processor

ICF Internal Coupling Facility Processor

IFL Integrated Facility for Linux Processor

ZIIP IBM System z Integrated Information Processor (zIIP)

ZAAP IBM System z Application Assist Processor (zAAP)

Percent Busy:

Total The percentage of total elapsed time that the processor was busy.

User The percentage of total elapsed time that the processor time was attributed to specific users (includes emulation time and CP time).

Syst The percentage of total elapsed time that the processor was charged to the system (CP time not attributed to specific users).

Emul The percentage of total elapsed time that the processor was in emulation mode, doing work for users.

Note: All of the above percentages are based on ***elapsed time***. For a system running in an LPAR this could mean that it is running at maximum capacity even though none of the values have reached 100%. See "FCX100, CPU Load and Transactions Screen – CPU" on page 357 for %busy values which are based on the sum of 'busy' and voluntary wait time, instead of on elapsed time.

Rates per Sec.:

Inst Siml
Number of instructions simulated per second.

DIAG
Number of diagnose instructions executed per second.

SIGP Rate at which this CPU is the target of SIGP External Call instructions.

SSCH
Number of start subchannel and resume subchannel executions per second.

PLDV:

Pct Empty
Percent of elapsed time that the local dispatch vector had no VMDBKs.

Mean when Non0
The mean number of VMDBKs in the processor local dispatch vector when it was not empty.

VMDBK Mast only
The mean number of VMDBKs in the master-only local dispatch vector when it was not empty.

VMDBK Stoln/s
The rate at which VMDBKs were stolen from this processor's local dispatch vector, to be dispatched on another processor.

To Mast/s
The rate, per second, at which VMDBKs had to be moved to the master processor for the execution of 'master only' work.

The processor with a nonzero value in this field is the current master processor (usually the IPL processor).

Paging:

Below 2GB/s
The number of pages moved below the 2GB line for translation, per second. The field is available only for z/VM systems running in 64-bit mode.

PGIN/s
The number of PGINs per second (page moves from expanded to central storage).

Fast Path %
The percentage of PGINs which could be handled by fastpath logic.

Page Reads/s
The number of pages read from auxiliary storage, including directory, nucleus and warmstart I/O but no spool I/O.

Msgs/s:

Comm Msgs/s
The number of IUCV and VMCF data transfers per second (successful and unsuccessful) for this processor.

Diag:

Diag X'9C'/s
The number of times Diagnose X'9C' was issued by CP per second for this processor.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX145, Scheduler Queue Log Screen – SCHEDLOG

Performance Toolkit Subcommand: "SCHEDLOG" on page 273.

The Scheduler Queue Log Screen (FCX145) shows information on scheduler queue lengths by time:

```
FCX145      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

         Total <-- Users in Dispatch List ---> Lim <- In Eligible List --> Clas
Interval VMDBK                 <- Loading -->  it              <Loading-> Elap
End Time  in Q  Q0  Q1  Q2  Q3  Q0  Q1  Q2  Q3 Lst  E1  E2  E3  E1  E2  E3 T-Sl
>>Mean>>    19 3.5  10 4.2 1.5  .0  .0  .0  .0  .0  .0  .0  .0  .0  .0  .0    .
13:11:00    16   3  10   2   1   0   0   0   0   0   0   0   0   0   0   0    .
13:21:00    25   4  13   7   1   0   0   0   0   0   0   0   0   0   0   0    .
13:31:00    30   4  17   8   1   0   0   0   0   0   0   0   0   0   0   0    .
13:41:00    27   4   9  12   2   0   0   0   0   0   0   0   0   0   0   0    .
13:51:00    18   3  13   2   0   0   0   0   0   0   0   0   0   0   0   0    .
14:01:00    27   4  13   4   6   0   0   0   0   0   0   0   0   0   0   0    .
14:11:00    21   3  17   1   0   0   0   0   0   0   0   0   0   0   0   0    .
14:21:00    15   2   9   3   1   0   0   0   0   0   0   0   0   0   0   0    .
14:31:00    28   4   9  11   4   0   0   0   0   0   0   0   0   0   0   0    .
14:41:00    22   5   9   6   2   0   0   0   0   0   0   0   0   0   0   0    .
14:51:00    18   3  12   3   0   0   0   0   0   0   0   0   0   0   0   0    .
15:01:00    17   4   5   5   3   0   0   0   0   0   0   0   0   0   0   0    .
15:11:00    22   3   7   7   5   0   0   0   0   0   0   0   0   0   0   0    .
15:21:00    16   4   9   2   1   0   0   0   0   0   0   0   0   0   0   0    .
15:31:00    19   4  10   4   1   0   0   0   0   0   0   0   0   0   0   0    .

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 45. Layout of Scheduler Queue Log Screen (FCX145)

The information shown is based on SYSTEM domain SAMPLE data.

The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Total VMDBK in Q
The total number of VMDBKs found in both the dispatch and eligible lists

Users in Dispatch List shows the number of VMDBKs in the dispatch list for each class:

Q0 Number of class 0 (QUICKDSP) users

Q1 Number of class 1 users in the dispatch list (interactive)

Q2 Number of class 2 users in the dispatch list

Q3 Number of class 3 users in the dispatch list

Loading Q0
Number of loading class 0 (QUICKDSP) users

Loading Q1
Number of loading class 1 users in the dispatch list (interactive)

Loading Q2
Number of loading class 2 users in the dispatch list

Loading Q3
Number of loading class 3 users in the dispatch list

Limit Lst
Number of users in the limit list.

In Eligible List shows the number of VMDBKs in the eligible list for each class:

E1 Number of class 1 users in the eligible list (interactive)

E2 Number of class 2 users in the eligible list

E3 Number of class 3 users in the eligible list

Loading E1
Number of loading class 1 users in the eligible list (interactive)

Loading E2
Number of loading class 2 users in the eligible list

Loading E3
Number of loading class 3 users in the eligible list

Class 1 Elapsed T-Slice
The length of the class 1 elapsed time slice. This is the elapsed time which a class 1 user can spend in the dispatch list, and which should allow 85% of all transactions to complete. The value is continuously adapted to changing system load conditions, and it can be a good response time indicator as long as you compare only periods with a similar 'job mix'.

Sum of Abs. Shares
The sum of the absolute shares set for all users which were in the dispatch list

Sum of Rel. Shares
The sum of the relative shares set for all users which were in the dispatch list

Storage (Pages) provides information on storage utilization by each class:

Total Consid
Number of pages to consider when selecting VMDBKs for the dispatch list.

Total WSS
Number of pages in all working sets of a specific class:

Q0 Class 0 users

Q1 Class 1 users

Q2 Class 2 users

Q3 Class 3 users

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX146, Auxiliary Storage Log Screen – AUXLOG

Performance Toolkit Subcommand: "AUXLOG" on page 135.

The Auxiliary Storage Log Screen (FCX146):

```
FCX146      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <Page Slots>  <Spool Slots>  <Dump Slots>  <----- Spool Files ----->  <Average MLOAD> <---- Paging ---->
Interval    Total Used    Total  Used    Total Used  <-Created--> <--Purged-->  Paging Spooling <-Overruns->   Max
End Time    Slots    %    Slots     %    Slots    %   Total    /s  Total    /s    msec      msec  Total    /s Queue
>>Mean>>  168716k   28  3004872    41   82555k   28     549   .07    636   .08    134k        .2    112   .01 38651
04:39:19  168716k   25  3004872    41   82555k   28      32   .11     39   .13    134k        .4      7   .02 66645
04:44:19  168716k   26  3004872    41   82555k   28      35   .12     27   .09    134k        .4     17   .06 56333
04:49:19  168716k   27  3004872    41   82555k   28      48   .16     56   .19    134k        .4      9   .03 31137
04:54:19  168716k   27  3004872    41   82555k   28      42   .14     47   .16    134k        .5      2   .01 52908
04:59:19  168716k   27  3004872    41   82555k   28      19   .06     18   .06    134k        .5      1   .00 73842
05:04:19  168716k   27  3004872    41   82555k   28      23   .08     23   .08    134k        .5      1   .00 16057
05:09:19  168716k   27  3004872    41   82555k   28      46   .15     47   .16    134k        .5      4   .01 49070
05:14:19  168716k   27  3004872    41   82555k   28      19   .06     17   .06    134k        .3      4   .01 30910
05:19:19  168716k   27  3004872    41   82555k   28      40   .13     42   .14    134k        .2      5   .02 35241
05:24:19  168716k   27  3004872    42   82555k   28      75   .25     12   .04    134k        .2      2   .01 24277
05:29:19  168716k   27  3004872    42   82555k   28       5   .02      3   .01    134k        .1      4   .01 46670
05:34:19  168716k   28  3004872    42   82555k   28       5   .02      5   .02    134k        .1      0   .00 13558
05:39:19  168716k   28  3004872    42   82555k   28       5   .02      6   .02    134k        .1      1   .00 13908
05:44:19  168716k   28  3004872    42   82555k   28      24   .08      7   .02    134k        .1      1   .00 16240


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 46. Layout of Auxiliary Storage Log Screen (FCX146)

The information shown is based on CP monitor SYSTEM domain SAMPLE data.

The display shows usage of auxiliary storage by time. The leftmost column contains the end time:
(format *hh:mm:ss)*

of the monitor interval for which the values were calculated.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Page Slots:

Total Slots
The total number of slots allocated for PAGE areas

Used %
The percentage of allocated slots which are in use

Spool Slots:

Total Slots
The total number of slots allocated for SPOL areas

Used %
The percentage of allocated slots which are in use

Dump Slots:

Total Slots
The total number of slots allocated for SPOL areas on special DUMP disks

Used %
The percentage of allocated dump slots which are in use

Spool Files:

Created Total
The number of spool files created in the interval

Created /s
The rate at which spool files were created in the interval, in files per second

Purged Total
The number of spool files purged in the interval

Purged /s
The rate at which spool files were purged in the interval, in files per second

Average MLOAD: Information on the 'modified device load' value upon which CP bases its decisions when selecting paging and spooling devices (the I/O device service time for read/write requests multiplied by the number of queued requests for that same device):

Paging msec
The average MLOAD value for paging devices, in msec

Spooling msec
The average MLOAD value for spooling devices, in msec

Paging:

Overruns Total
The total number of times a paging overrun was detected (that is, the queue length has exceeded the point necessary to keep the bandwidth full).

Overruns /s
Paging overruns as a rate.

Max Queue
The maximum queue length in the interval.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX147, Virtual Disks in Storage Screen – VDISKS

Performance Toolkit Subcommand: "VDISKS" on page 346.

In the Virtual Disks in Storage Screen (FCX147), information for virtual disks in storage for which some activity was found during the last interval is shown highlighted on the screen.

```
FCX147      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

______              .     .     .     .     .     .     .     .     .     .     .     .     .     .
Owning    <---- Virtual Disk ----> P <--- Data Space, Rate per Sec. ---> <------- Nr of Pages ------->
Userid    Devno Blocks LINKs  IO/s V Pgstl Pgrds Pgwrt X-rds X-wrt X-mig Resid   IBR Lockd XSTOR  DASD Data Space Name
>System<   ....  21882     1  .247 -  .000  .019  .106  .000  .000  .000    20    16     0     0   265 17
APCSCIF    0291  60000     1  .000 N  .000  .000  .000  .000  .000  .000     7     0     0     0     0 VDISK$APCSCIF$$0291$0168
CHG00001   0291  60000     1 2.933 Y  .000  .000  .073  .000  .000  .000    12    12     0     0   887 VDISK$CHG00001$0291$00F2
CHG00006   0291  60000     1 1.250 Y  .000  .000  .063  .000  .000  .000    10     1     0     0   434 VDISK$CHG00006$0291$0157
CHG00008   0291  60000     1  .000 Y  .000  .000  .000  .000  .000  .000     0     0     0     0    15 VDISK$CHG00008$0291$0184
D2501      01B1   6000     3  .000 N  .000  .000  .000  .000  .000  .000    47     0     0     0     0 VDISK$D2501$$$$01B1$0158
D2501      01A1  60000     1  .013 Y  .000  .330 1.667  .000  .000  .000   265   265     0     0  2071 VDISK$D2501$$$$01A1$0159
D2501      01A2   6000     1  .000 Y  .000  .000  .000  .000  .000  .000     0     0     0     0     3 VDISK$D2501$$$$01A2$015A
D2501      01A6   6000     1  .000 Y  .000  .000  .000  .000  .000  .000     0     0     0     0   257 VDISK$D2501$$$$01A6$015B
D2501      01A7   6000     1  .000 Y  .000  .000  .000  .000  .000  .000     0     0     0     0   257 VDISK$D2501$$$$01A7$015C
D2501      01A8   6000     1  .000 Y  .000  .000  .000  .000  .000  .000     0     0     0     0    47 VDISK$TH200003$01CC$0007
TH200006   01CC   6000     1  .000 Y  .000  .000  .000  .000  .000  .000     0     0     0     0    47 VDISK$TH200006$01CC$0006
TH200009   01CC   6000     1  .000 Y  .000  .000  .000  .000  .000  .000     0     0     0     0    47 VDISK$TH200009$01CC$0034
TH300002   01CC   6000     1  .000 Y  .000  .000  .000  .000  .000  .000     0     0     0     0    47 VDISK$TH300002$01CC$0008
TH300007   01CC   6000     1  .000 Y  .000  .000  .000  .000  .000  .000     0     0     0     0    47 VDISK$TH300007$01CC$000A
TH300010   01CC   6000     1  .000 Y  .000  .000  .000  .000  .000  .000     0     0     0     0    47 VDISK$TH300010$01CC$0009
TH400008   01CC   6000     1  .000 Y  .000  .000  .000  .000  .000  .000     0     0     0     0    47 VDISK$TH400008$01CC$000B



Select a user for user details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 47. Layout of Virtual Disks in Storage Screen (FCX147)

The information shown is based on CP monitor STORAGE domain SAMPLE data.

The sample shows a screen with the VDISKs sorted in ascending owner name sequence, the initial setting. Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the appropriate column heading (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

The first entry is reserved for the overall averages for all the shared data spaces shown, regardless of the current sorting sequence. It is identified by the 'name' `>System<`.

Because virtual disks in storage are built internally using shared data spaces, this performance display is very similar in its layout to the shared data spaces display, and you will also find all the VDISK data spaces again on the DSPACESH screen, but without the VDISK-specific information.

For more specific information on one VDISK user do one of the following:

- Place the cursor on the `Userid` field of the virtual machine you are interested in and press ENTER
- Enter the subcommand 'USER *userid*' on the command line

Field Descriptions:

Owning Userid
: Userid of the owner of the VDISK

Virtual Disk:

Devno
The virtual device number of the VDISK

Blocks
The size of the VDISK, expressed as the number of 512-byte blocks for which it was defined

LINKs
The number of LINKs to the virtual disk

IO/s The virtual I/O rate to the VDISK

P:

V Private VDISK indicator: Y = (Yes) - a private VDISK, N = (No) - a shared VDISK

Data Space, Rate per Sec.:

Pgstl The number of pages stolen per second

Pgrds The number of pages read from DASD per second

Pgwrt The number of pages written to DASD per second

X-rds The number of pages moved from expanded storage to central storage, per second

X-wrt The number of pages moved from central storage to expanded storage, per second

X-mig The number of pages migrated from expanded storage to DASD, per second

Nr of Pages:

Resid The number of pages resident in central storage

IBR The number of IBR (invalid-but-resident) pages for this VDISK.

Lockd The number of locked pages

XSTOR
The number of XSTOR blocks occupied by the data space. Available only on z/VM V5.2 and later.

DASD
The number of slots occupied on auxiliary storage

Data Space Name
The name of the data space, or, on the ">System<" line, the number of VDISKs over which the ">System<" line was calculated.

The string `Initial sample` will be inserted for VDISKs for which no valid delta values could be calculated because only one sample has been obtained so far.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields. Note that not all the VDISKs may have been defined during the whole period. However, the activity shown (I/O rates, page rates) is always based on the common overall elapsed time. This allows showing each VDISK's contribution to the overall load, but it may not show the average load for a virtual disk while it was active.

FCX148, User Defined Performance Screen – FCONTROL DEFSCRN

Performance Toolkit Subcommand: "FCONTROL DEFSCRN" on page 24.

This screen can contain selected performance data fields from other 'standard' displays. The specified fields will be copied at the end of each monitor sample interval.

Since the layout of the resulting screen is, by definition, determined by the user, any example will merely illustrate some of the possibilities. The following figure shows such an example:

```
FCX148      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

CPU Load                                                 Vector Facility    Status or
PROC  %CPU  %CP %EMU  %WT %SYS  %SP %SIC %LOGLD   %VTOT %VEMU  REST  ded. User
P00     46   25   21   54    8    0   97     ..     not installed    Master
P01     48    7   41   52    1    0   95     ..     not installed    Alternate
P02     42    6   36   58    1    0   96     ..     not installed    Alternate
P03     46    7   39   54    1    0   96     ..     not installed    Alternate
P04     43    6   37   57    1    0   96     ..     not installed    Alternate
P05     49    7   42   51    2    0   95     ..     not installed    Alternate

<-- Device Descr. -->  Mdisk Pa- <-Rate/s-> <------- Time (msec) -------> Req.
Addr Type   Label/ID   Links ths  I/O Avoid Pend Disc Conn Serv Resp CUWt Qued
4B05 3745   >VTAM80      ...   1 32.7   ...   .1  1.8  3.2  5.1  5.1  ...  .00
1947 3380-K SPOOLB CP      0   4 13.3    .0   .2 12.0  2.4 14.6 14.6  ...  .00
1A74 3380-K CSYS04        48   4 12.1  10.6   .3 14.7  4.1 19.1 22.4  ...  .04
1A67 3380-K SPOOLA CP      0   4 11.7    .0   .2 12.4  2.4 15.0 15.0  ...  .00

CHPID    %Busy            Channel %Busy Distribution 13:53:12-14:33:12
 Nr.    Cur Ave    0-10 11-20 21-30 31-40 41-50 51-60 61-70 71-80 81-90 91-100
 55      29  25       0    25    62    12     0     0     0     0     0     0
 15      22  24       0    25    75     0     0     0     0     0     0     0

Userid    %CPU  TCPU  VCPU Ratio %Vec Total DASD Avoid   UR Pg/s  User Status
VSCS80    17.9  53.7  37.8   1.4   .0    .0   .0    .0   .0   .0  ESA,CL0,DISP
ICAMWSCH  17.1  51.3  50.7   1.0   .0   3.5  2.0   1.6   .0   .3  ESA,---,DORM
QUA        6.7  20.1  18.9   1.1   .0   9.6  9.5   4.3   .0   .0  ESA,---,DORM
HWAL       5.9  17.8  16.9   1.1   .0  10.7 10.3  10.1   .0   .0  ESA,---,DORM

User-defined screen - no HELP text available
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 48. Example of a User Defined Performance Screen (FCX148)

As mentioned above, you use the command 'FC DEFSCRN' to define your own performance screens. You have to specify:

- The name you want to give to the screen
- Any of your own header lines
- The blocks to be inserted into the screen, where each block requires:
  - The line number of the first and last line of the block in our new screen
  - Source screen name and the first line number on the source screen where copying is to start

The subcommands used for defining the above screen have been included in the sample FCONX $PROFILE delivered with the program, as follows:

```
FC DEFSCRN SYSSUM LINE  2 TO  9 COPY CPU     FROM 1
FC DEFSCRN SYSSUM LINE 11 TO 12 COPY DEVICE  FROM 2
FC DEFSCRN SYSSUM LINE 13 TO 16 COPY DEVICE  FROM 5
```

```
FC DEFSCRN SYSSUM LINE 18 TO 21 COPY CHANNEL FROM 1
FC DEFSCRN SYSSUM LINE 23 TO 23 COPY USER    FROM 4
FC DEFSCRN SYSSUM LINE 24 TO 27 COPY USER    FROM 6
```

i.e. you would select this sample log by entering the command SYSSUM on the command line. See "FCONTROL DEFSCRN" on page 24 for a detailed description of the command.

Field Description:

Please refer to the descriptions of the performance screens which have contributed to this combined screen.

FCX149, Monitor Settings Screen – MONSET

Performance Toolkit Subcommand: "MONSET" on page 235.

The Monitor Settings Screen (FCX149):

```
FCX149      CPU nnnn  SER nnnnn        Monitor  Settings         Perf. Monitor

Initial Settings    <--------- Active --------->    <--- Seconds --->
2003/03/04 08:00                                      High       Sample       HF
Nr  Domain          Event     Sample   Frequency    Interval     Rate
 0  SYSTEM           ---        YES       YES          300       1.00
 1  MONITOR          YES        YES       ---          300        ---
 2  SCHEDULER         NO        ---       ---          ---        ---
 3  STORAGE          YES        YES       ---          300        ---
 4  USER              NO        YES       YES          300       1.00
 5  PROCESSOR        YES       SOME       YES          300       1.00
 6  I/O              YES        YES       YES          300       1.00
 7  SEEK             YES        ---       ---          ---        ---
 8  NETWORK          YES         NO       ---          300       1.00
 9  ISFC             YES        YES       ---          300        ---
10  APPLDATA          NO         NO       ---          300        ---
11  SSI              YES        YES       ---          300        ---

Changed Monitor Settings
Date  Time        Command Line
03/04 08:01:25    MONITOR EVENT DISABLE ALL
03/04 08:01:30    MONITOR EVENT ENABLE STORAGE
03/04 08:00:45    MONITOR SAMPLE ENABLE STORAGE
03/04 08:00:55    MONITOR SAMPLE ENABLE USER ALL
03/04 08:01:05    MONITOR SAMPLE ENABLE PROCESSOR
03/04 08:01:10    MONITOR SAMPLE ENABLE I/O ALL
03/04 08:01:15    MONITOR SAMPLE RATE 6 SECONDS
03/04 08:01:20    MONITOR SAMPLE INTERVAL 5 MINUTES
03/04 08:01:35    MONITOR EVENT ENABLE PROCESSOR
03/04 08:01:40    MONITOR EVENT ENABLE I/O ALL
03/04 08:01:45    MONITOR EVENT ENABLE SEEKS ALL
03/04 08:03:50    MONITOR EVENT DISABLE ALL

Not applicable in Trend Scan mode,
... (oldest lines not displayed) ...,
*** Status refreshed ***.

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 49. Layout of Monitor Settings Screen (FCX149)

The display shows the initial monitor settings and it also shows commands which were entered at a later time to change these settings. The information is based on CP monitor MONITOR domain SAMPLE and EVENT data.

Field Description:

Initial Settings
Shows date (*yyyy/mm/dd*) and time (*hh:mm*) of the initial monitor sample for which the settings are displayed.

Nr The number of the domain for which the initial settings are displayed

Domain
The name of the domain for which the initial settings are displayed.

Active:

The initial status of the different monitor domains is shown under this heading.

Event Shows the initial settings for collecting event records, where:

YES Indicates event record creation is enabled for the domain

NO Indicates event record creation is disabled for the domain

SOME
Indicates that only a subset of the users or I/O devices have been enabled for event record creation.

--- Indicates 'not applicable', that is, event data cannot be created for the domain

Sample
Shows the initial settings for collecting sample records, where:

YES Indicates sample record creation is enabled for the domain.

NO Indicates sample record creation is disabled for the domain.

SOME
Indicates only a subset of the users or I/O devices has been enabled for sample record creation. For the PROCESSOR domain it indicates that the CPU Measuring Facility Counters are disabled.

--- Indicates 'not applicable', that is, sample data cannot be created for the domain.

High Frequency
shows the initial settings for high-frequency sampling, where:

YES Indicates there are high-frequency fields in the domain.

NO Indicates there are high-frequency fields in the domain, but high-frequency sampling is stopped.

--- Indicates there are no high-frequency fields in the domain, or the corresponding sample domain is disabled.

Seconds:

The following fields show sampling intervals, in seconds.

Sample Interval
The interval for collecting sample records, in seconds

HF Rate
The high-frequency sampling interval, also in seconds.

Changed Monitor Settings:

Here, you will find a collection of the MONITOR subcommands which were entered after collection of the initial monitor settings.

Date The month and day of the change (*mm/dd*).

Time The time (format *hh:mm:ss:*) when the MONITOR subcommand was entered.

Command Line
The MONITOR subcommand entered. Note that any abbreviations are automatically expanded to the full length.

The following messages can appear in the Changed Monitor Settings area, depending on the circumstances:

- **Not applicable in Trend Scan mode:** Displayed when viewing data using the TRNDSCAN command. Because the corresponding change status events are not written to the history files, they therefore are not available for redisplay.
- **... (oldest lines not displayed) ... :** Displayed when the count of the change status lines exceeds the REDISP number (set with the FC MONCOLL REDISP command).
- *** **Status refreshed** *** **:** Displayed when the new configuration record for this particular report has been received.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX150, Shared File System Log Screen – SFSLOG

Performance Toolkit Subcommand: "SFSLOG" on page 283.

The Shared File System Log Screen (FCX150):

```
FCX150      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

                                <-- Time per File Pool Request --->  <--- Ser
Interval                 FPR   FPR                    Block
End Time Server        Count  Rate  Total   CPU  Lock   I/O   ESM Other  Total
>>Mean>> RWSERV1       65820  31.4   .025  .000  .000  .019  .000  .006    1.7
>>Mean>> RWSERV2       66017  31.5   .023  .000  .000  .018  .000  .005    1.5
>>Mean>> ROSERV1        1948    .9   .011  .000  .000  .000  .000  .011     .0
>>Mean>> CRRSERV1        782    .4   .012  .000  .000  .010  .000  .002     .0

06:44:04 RWSERV1        1817  30.3   .023  .002  .000  .020  .000  .001    8.9
06:44:04 RWSERV2        1545  25.8   .021  .002  .000  .018  .000  .001    7.5
06:44:04 ROSERV1          60   1.0   .013  .003  .000  .000  .000  .010     .3
06:44:04 CRRSERV1         22    .4   .011  .001  .000  .010  .000  .000     .0

06:45:04 RWSERV1        1727  28.8   .027  .002  .000  .017  .000  .008   10.9
06:45:04 RWSERV2        1948  32.5   .028  .002  .000  .020  .000  .006   18.4
06:45:04 ROSERV1          36    .6   .052  .003  .000  .000  .000  .049    3.5
06:45:04 CRRSERV1         15    .3   .012  .002  .000  .008  .000  .002     .0

06:46:04 RWSERV1        1662  27.7   .021  .002  .000  .019  .000  .000    8.0
06:46:04 RWSERV2        2008  33.5   .019  .002  .000  .017  .000  .000    9.0
06:46:04 ROSERV1          60   1.0   .015  .002  .000  .000  .000  .013     .2
06:46:04 CRRSERV1         24    .4   .009  .001  .000  .008  .000  .000     .0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 50. Layout of Shared File System Log Screen (FCX150)

The information shown is based on CP monitor APPLDATA and USER domain SAMPLE data.

The display shows information on the activity and performance of shared file system servers by time. The leftmost column contains the end time (format *hh:mm:ss*) of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column. The relative activity shown is based on each server's actual connect time, not the overall elapsed time in the interval.

Field Description:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Server
: The userid of the shared file system or CRR server to which the following figures apply.

FPR Count
The number of file pool requests handled by the server.

FPR Rate
The number of file pool requests handled per second.

Time per File Pool Request:

The following fields show the average time spent in a specific area per file pool request, in seconds.

Total The total service time per file pool request.

CPU The CPU time used by the server per file pool request.

Lock The time spent in lock wait per file pool request.

Block I/O
The time needed for block I/O per file pool request.

ESM The processing time of an external security manager per file pool request.

Other Other time (the remainder of total service time minus the other times specifically mentioned above). If the Other field value is negative, Performance Toolkit displays dots in this field instead of a negative value.

Server Utilization:

The following fields show server utilization as a percentage of elapsed time during which the server was busy in the area specified.

Total The total server utilization.

CPU The percentage of time the server was actively using CPU.

Page Read
The percentage of time spent in page wait.

Checkpoint
The percentage of time spent for file pool checkpointing.

QSAM
The percentage of time the server was waiting for QSAM I/O.

Agents:

Active
The average number of active agents, calculated as the total service time for all file pool requests divided by elapsed time.

Held The average number of held agents, calculated as the LUW (logical unit of work) holding time divided by elapsed time.

Deadlocks
Number of roll-backs due to deadlocks.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX151, Shared File System I/O Log Screen – SFSIOLOG

Performance Toolkit Subcommand: "SFSIOLOG" on page 282.

The Shared File System I/O Log Screen (FCX151):

```
FCX151      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

                        <---------- I/Os per File Pool Request ------------>
Interval              FPR       <--File---> <-Catalog-> <Cntrl MD-> <---Log--->
End Time Server     Count Total  Read Write  Read Write  Read Write  Read Write
>>Mean>> RWSERV1    65820  1.48   .24   .18   .45   .19   .00   .00   .00   .42
>>Mean>> RWSERV2    66017  1.49   .24   .18   .45   .19   .00   .00   .00   .42
>>Mean>> ROSERV1     1948   .00   .00   .00   .00   .00   .00   .00   .00   .00
>>Mean>> CRRSERV1     782  1.00   .00   .00   .00   .00   .00   .00   .00  1.00

06:44:04 RWSERV1     1817  1.53   .23   .20   .44   .23   .00   .00   .00   .44
06:44:04 RWSERV2     1545  1.59   .23   .19   .46   .23   .00   .00   .00   .47
06:44:04 ROSERV1       60   .00   .00   .00   .00   .00   .00   .00   .00   .00
06:44:04 CRRSERV1      22  1.00   .00   .00   .00   .00   .00   .00   .00  1.00

06:45:04 RWSERV1     1727  1.40   .25   .18   .41   .13   .00   .01   .00   .42
06:45:04 RWSERV2     1948  1.45   .25   .19   .43   .17   .00   .01   .00   .41
06:45:04 ROSERV1       36   .00   .00   .00   .00   .00   .00   .00   .00   .00
06:45:04 CRRSERV1      15   .93   .00   .00   .00   .00   .00   .00   .00   .93

06:46:04 RWSERV1     1662  1.60   .25   .19   .48   .24   .00   .00   .00   .43
06:46:04 RWSERV2     2008  1.41   .26   .18   .41   .19   .00   .00   .00   .38
06:46:04 ROSERV1       60   .00   .00   .00   .00   .00   .00   .00   .00   .00
06:46:04 CRRSERV1      24  1.00   .00   .00   .00   .00   .00   .00   .00  1.00

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 51. Layout of Shared File System I/O Log Screen (FCX151)

The information shown is based on CP monitor APPLDATA and USER domain SAMPLE data.

The display shows information on I/O activity of shared file system servers by time. The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column. The relative activity shown is based on each server's actual connect time, not the overall elapsed time in the interval.

Field Description:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Server
The userid of the shared file system or CRR server to which the following figures apply

FPR Count
The number of file pool requests handled by the server

I/Os per File Pool Request:

The following fields show the number of I/Os which were required for processing an average file pool request.

Total The total number of I/Os required

File Read
The number of file read requests per file pool request

File Write
The number of file write requests per file pool request

Catalog Read
The number of catalog read requests per file pool request

Catalog Write
The number of catalog write requests per file pool request

Cntrl MD Read
The number of control MD read requests per FPR

Cntrl MD Write
The number of control MD write requests per FPR

Log read
The number of log read requests per file pool request

Log write
The number of log write requests per file pool request

Blocks/BIO
The number of blocks in an average block I/O request

Blocks/IO
The number of blocks in an average I/O request issued by CP on behalf of the file pool server

SAC calls/FPR
The number of calls to the Storage Access Component per file pool request

SAC calls/FPR
The number of calls to the Storage Access Component per file pool request

Mean Time: The following fields show the average time required for handling certain events, in seconds.

Block I/O
The average time per block I/O request

Lock Wait
The average duration of a lock wait. This is the time spent waiting for a lock held by another SFS request to become available.

Checkpoint
The time required for processing a checkpoint

ESM Call

The average time spent per call to an external security manager.

This value will be zero unless the file pool server is started with the ESECURITY parameter in the DMSPARMS file.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX152, Shared File System Requests Log Screen – SFSREQ

Performance Toolkit Subcommand: "SFSREQ" on page 285.

The Shared File System Requests Log Screen (FCX152):

```
FCX152      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

                        <-------------- File Pool Request Percentages ------
                                                                       Get
Interval                FPR  Open   Open                              Dir        C
End Time Server        Count  Read Update  Read Write Close Delete Entry Rename
>>Mean>> RWSERV1       65820  19.7   13.2  13.2   4.6  32.9    6.7    .0     .4
>>Mean>> RWSERV2       66017  19.8   13.1  13.2   4.6  32.9    6.7    .0     .4
>>Mean>> ROSERV1        1948    .0     .0    .0    .0    .0     .0    .0     .0
>>Mean>> CRRSERV1        782    .0     .0    .0    .0    .0     .0    .0     .0

06:44:04 RWSERV2        1545  17.3   13.9  13.9   5.0  31.6    7.2    .0     .6
06:44:04 ROSERV1          60    .0     .0    .0    .0    .0     .0    .0     .0
06:44:04 CRRSERV1         22    .0     .0    .0    .0    .0     .0    .0     .0

06:45:04 RWSERV1        1727  20.4   12.9  13.3   4.2  33.7    6.5    .0     .3
06:45:04 RWSERV2        1948  19.5   13.2  13.8   4.8  32.4    6.8    .0     .4
06:45:04 ROSERV1          36    .0     .0    .0    .0    .0     .0    .0     .0
06:45:04 CRRSERV1         15    .0     .0    .0    .0    .0     .0    .0     .0

06:46:04 RWSERV1        1662  18.5   14.0  13.1   4.8  32.1    6.7    .0     .5
06:46:04 RWSERV2        2008  21.5   12.4  12.8   5.1  33.6    6.0    .0     .4
06:46:04 ROSERV1          60    .0     .0    .0    .0    .0     .0    .0     .0
06:46:04 CRRSERV1         24    .0     .0    .0    .0    .0     .0    .0     .0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 52. Layout of Shared File System Requests Log Screen (FCX152)

The information shown is based on CP monitor APPLDATA domain SAMPLE data.

The display shows information on the nature of file pool requests to shared file system servers by time. The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column. The relative activity shown is based on each server's actual connect time, not the overall elapsed time in the interval.

Field Description:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Server
The userid of the shared file system or CRR server to which the following figures apply

FPR Count
The number of file pool requests handled by the server

File Pool Request Percentages:

The following fields show which percentage of the file pool requests to a server falls into the different request categories.

Open Read
The percentage of file pool requests which were 'open file read' requests

Open Update
The percentage of file pool requests which were 'open update' requests

Read The percentage of file pool requests which were 'read file' requests

Write The percentage of file pool requests which were 'write file' requests

Close The percentage of file pool requests which were 'close file' requests

Delete
The percentage of file pool requests which were 'delete file' requests

Get Dir Entry
The percentage of file pool requests which were 'get directory entry' requests

Rename
The percentage of file pool requests which were 'rename' requests

Create Alias
The percentage of file pool requests which were 'create alias' requests

Creat/Delete Dir
The percentage of file pool requests which were 'create directory' or 'delete directory' requests

O/G/C Dir
The percentage of file pool requests which were 'open', 'get' or 'close' directory requests

Grant/Revoke Auth
The percentage of file pool requests which were 'grant' or 'revoke authorization' requests

Lock/Unlock
The percentage of file pool requests which were 'lock' or 'unlock' requests

Query
The percentage of file pool requests which were 'query' requests

Refrsh Dir
The percentage of file pool requests which were 'refresh directory' requests

Other The percentage of the remaining file pool requests which do not fall into any of the above categories.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX153, Exception Log Screen – EXCEPT

Performance Toolkit Subcommand: "EXCEPT" on page 178.

The Exception Log Screen (FCX153):

```
FCX153      CPU nnnn  SER nnnnn        Except.  Log              Perf. Monitor

10:50:12 FCXDEV320A Device 0853: resp. time 83ms exceeds limit 40ms (9.4 IO/s)
11:55:15 FCXPEU317A User RVS %CPU 48.0 exceeded threshold 40.0 for 2 min.
12:00:38 FCXPEU317A User RVS %CPU 47.3 exceeded threshold 40.0 for 7 min.
13:23:26 FCXPEU317A User GJA %CPU 61.7 exceeded threshold 40.0 for 2 min.
14:03:59 FCXPEU317A User PBO %CPU 57.3 exceeded threshold 40.0 for 2 min.
14:08:08 FCXPEU317A User PBO %CPU 82.1 exceeded threshold 40.0 for 2 min.
14:12:17 FCXPEU317A User PBO %CPU 72.9 exceeded threshold 40.0 for 2 min.
14:39:09 FCXPEU317A User PBO %CPU 90.1 exceeded threshold 40.0 for 2 min.
14:50:33 FCXPEU317A User PCHA %CPU 45.3 exceeded threshold 40.0 for 2 min.
15:00:12 FCXDEV319A Device 0847: queue length .66 exceeds limit of .40
15:00:12 FCXDEV320A Device 0847: resp. time 65ms exceeds limit 40ms (6.1 IO/s)
15:00:12 FCXDEV319A Device 0853: queue length .64 exceeds limit of .40
15:00:12 FCXDEV320A Device 0853: resp. time 91ms exceeds limit 40ms (0.0 IO/s)
16:11:21 FCXPEU338A User ZO in WSS loop during last 10 minutes
16:27:01 FCXPEU338A User ZO in WSS loop during last 10 minutes
16:46:42 FCXPEU317A User HMO %CPU 85.6 exceeded threshold 40.0 for 2 min.
16:50:49 FCXPEU338A User HMO in CPU loop during last 5 minutes
16:51:50 FCXPEU317A User HMO %CPU 82.7 exceeded threshold 40.0 for 7 min.
16:53:54 FCXPEU317A User PBO %CPU 65.2 exceeded threshold 40.0 for 2 min.
17:36:07 FCXPEU317A User CORADS %CPU 68.5 exceeded threshold 40.0 for 2 min.

Command ===>
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 53. Layout of Exception Log Screen (FCX153)

Provided that suitable thresholds have been defined for the system ('FC SET LIMIT ...' subcommand) the display will tell you which performance variables exceeded the set thresholds, by how much, and how long the exceptions have persisted (messages with time stamps).

The last (most recent) part of the system's exception log file will be shown first. Use the scrolling PF-keys or subcommands to browse through the remainder of the day's exception messages.

Error message `FCXxxx422E No exceptions logged` will be shown instead when the exception log file is empty.

Three generations of the EXCPLOG file are kept: '*yyyymmdd* EXCPLOG A', '*yyyymmdd* EXCPLOG1 A', and '*yyyymmdd* EXCPLOG2 A', for the current day and two previous days respectively.

The files are automatically renamed at midnight, and the oldest one erased; you can copy them onto another disk if you want to keep more than these three generations.

You can control insertion of exception messages into the exception log file to some extent:

- Exception messages can be suppressed by entering the appropriate FC PROCESS ... subcommands with an output display type other than `ERRMSG` or `CPAMSG`, or with the NODISP argument.
- Because the system will log *all* alert messages, both of the `ERRMSG` type created by Performance ToolkitPerformance Toolkit's exception monitoring function, *and*

any CP 'alert' messages of the type CPAMSG, you can cause other output lines to be included in the exception log file by changing their output display type to CPAMSG.

- User-generated exception messages of any kind will also be included in the EXCPLOG file. See the "Submitting User-generated Exceptions" section in the *z/VM: Performance Toolkit Guide* for details.

Working with the Exception Log Display:

When exception messages appear in the exception log, you will usually want to proceed with some kind of analysis in order to determine where the problem is and whether it still persists. Code has been included in the program to help you in this task in the case of alert messages which have been generated by the threshold and user monitoring functions of Performance ToolkitPerformance Toolkit. To begin analysis, do the following:

1. Place the cursor on the time stamp field of the message for the problem you want to analyze.
2. Press the ENTER key.

A selection subcommand will automatically be generated for the performance data display which is most likely to help you in analyzing that particular problem. Examples include::

- The general I/O device display will be selected when the message indicated that the total I/O rate threshold, or the percentage of users in I/O wait, were exceeded
- The CP owned device display will be selected when the message indicated that either the SPOOL or PAGE space utilization threshold was exceeded
- The detailed user display will be selected when the user monitoring function indicated that a specific user was either looping or had exceeded its thresholds

The general CPU screen which will be shown for many of the 'threshold exceeded' messages anyway, will also be shown for all non-Performance ToolkitPerformance Toolkit alert messages, for which the program cannot determine the course of action to take.

Note that the time stamp fields are not intended for entering subcommands (all data entered will be ignored) and you must not enter a subcommand on the command line if you intend to use the selection subcommand. If a subcommand is found on the command line, *only* that subcommand will be run, and the cursor position ignored.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX154, System Settings Screen – SYSSET

Performance Toolkit Subcommand: "SYSSET" on page 305.

The System Settings Screen (FCX154):

```
FCX154      CPU nnnn  SER nnnnn        System   Settings         Perf. Monitor

Initial Scheduler Settings: 2010/04/22 at 07:02:26
DSPSLICE (minor) 5.000 msec.             IABIAS Intensity    90 Percent
Hotshot T-slice  1.999 msec.             IABIAS Duration      2 Minor T-slices
DSPBUF Q1        32767 Openings          STORBUF Q1 Q2 Q3   300 % Main storage
DSPBUF Q1 Q2     32767 Openings          STORBUF Q2 Q3      250 % Main storage
DSPBUF Q1 Q2 Q3  32767 Openings          STORBUF Q3         200 % Main storage
LDUBUF Q1 Q2 Q3    100 % Paging exp.     Max. working set  9999 % Main storage
LDUBUF Q2 Q3       100 % Paging exp.     Loading user         5 Pgrd / T-slice
LDUBUF Q3          100 % Paging exp.     Loading capacity     5 Paging expos.
LIMITHARD algorithm    Deadline

POLARIZATION:          Vertical
GLOBAL Perf. Data:     ON
EXCESSUSE: CP    MEDIUM  CPUPAD:  CP    100%
           ZAAP  MEDIUM           ZAAP  100%
           IFL   MEDIUM           IFL   100%
           ICF   MEDIUM           ICF   100%
           ZIIP  MEDIUM           ZIIP  100% Changed Scheduler Settings
Date  Time      Changed
04/22 07:03:33  IABIAS  90   2, DSPSLICE 5.000, Hotshot 1.999,  LdUser  5, LdCap   5
                STORBUF 300 250 200, LDUBUF 100 100 100, DSPBUF 32767 32767 32767
                LIMITHARD algorithm    Consumption
                POLARIZATION: Vertical   GPD: ON
                EXCESSUSE: CP-MEDIUM  ZAAP-MEDIUM  IFL-MEDIUM  ICF-MEDIUM  ZIIP-MEDIUM
                CPUPAD: CP-100%  ZAAP-100%  IFL-100%  ICF-100%  ZIIP-100

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 54. Layout of System Settings Screen (FCX154)

The information on this screen is based on CP monitor MONITOR domain SAMPLE data and on SCHEDULER domain EVENT data. Complete data can be shown only when data collection for both these domains is active.

The display shows the initial system resource manager settings and it also shows changes to SRM settings and users' SHARE and QUICKDSP settings, which were made at a later time.

Field Description:

The following fields describe the scheduler settings as they were initially found:

Initial Scheduler Settings
Shows date (*yyyy/mm/dd*) and time (*hh:mm*) of the initial monitor sample for which the settings are displayed.

DSPSLICE (minor)
Duration of the minor dispatch time slice, in milliseconds.

Hotshot T-slice
Duration of the 'hot shot' time slice which a hotshot user is given when running an immediate '#CP' command.

DSPBUF Q1
The number of dispatch list openings for class 1 users. DSPBUF values can be set by the 'SET SRM DSPBUF' command.

DSPBUF Q1 Q2
The number of dispatch list openings available to class 1 and class 2 users.

DSPBUF Q1 Q2 Q3
The number of dispatch list openings available to class 1, class 2 and class 3 users.

LDUBUF Q1 Q2 Q3
The percentage of 'Load Capacity' which can be taken by class 1, class 2, and class 3 users. LDUBUF values can be set by the 'SET SRM LDUBUF' command.

LDUBUF Q2 Q3
The percentage of 'Load Capacity' which can be taken by class 2 and class 3 users.

LDUBUF Q3
The percentage of 'Load Capacity' which can be taken by class 3 users.

IABIAS Intensity
The interactive bias intensity. It can be set by the SET SRM IABIAS command.

IABIAS Duration
The interactive bias duration which defines the number of minor timeslices during which interactive bias is to remain effective. It can be set by the SET SRM IABIAS command.

STORBUF Q1 Q2 Q3
The percentage of the dynamic paging area which is available to class 1, class 2, and class 3 users. It can be set by the SET SRM STORBUF command.

STORBUF Q2 Q3
The percentage of the dynamic paging area which is available to class 2 and class 3 users.

STORBUF Q3
The percentage of the dynamic paging area which is available to class 3 users.

Max. working set
The maximum percentage of the dynamic paging area which any single user's working set may occupy. The value can be set by the SET SRM MAXWSS command.

Loading user
The number of page reads per minor time slice which will let a user be classified as a 'loading user'.

Loading capacity
The loading user capacity of the system. This value is equal to the number of paging exposures, that is, the number of paging IOs that can be executing concurrently.

LIMITHARD algorithm
Sets the algorithm used within the CP scheduler to enforce hard limiting of scheduled system resources. This setting only affects users with absolute maximum shares defined with the LIMITHARD option.

DEADLINE
The classic CP algorithm for enforcing hard limiting. It enforces limits

based on a calculated deadline defining the projected instant in time when a guest should complete a time slice.

CONSUMPTION
An algorithm that enforces hard limiting based on the guest's measured processor utilization.

When running on z/VM systems earlier than V6.2, you will see dashes ("---") in this field.

POLARIZATION
The polarization mode for this partition:

VERTICAL
The system is running in vertical polarization.

HORIZONTAL
The system is running in horizontal polarization.

When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

GLOBAL Perf. Data
The indicator of state of Global Performance Data mode that was set up for this partition:

ON The GPD is enabled.

OFF The GPD is disabled.

N/A The GPD is not applicable.

When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

EXCESSUSE
SET SRM EXCESSUSE settings indexed by CPU type.

When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

CPUPAD
SET SRM CPUPAD settings indexed by CPU type.

When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

Changed Scheduler Settings:

Here you will find a list of changes to scheduler settings, and to users' SHARE and QUICKDSP settings which were made after collection of the initial scheduler settings, or after refreshing the settings at the last RESET.

Date The month and day (format *mm/dd*) of a change.

Time The time (format *hh:mm:ss*) when the command was entered which changed the settings.

Changed
The new settings after the change. One entry is created for each SET SRM command, SET SHARE command, and SET QUICKDSP command, provided that SCHEDULER EVENT has been enabled. The information shown is:

for SET SRM (for all z/VM releases:

- **IABIAS** - the intensity and duration of the interactiva bias.
- **DSPSLICE** - the duration of the minor timeslice, in msec.
- **Hotshot** - the duration of the 'hotshot' timeslice.
- **LdUser** - the number of page reads per minor time slice which make a user a 'loading user'.
- **LdCap** - the loading capacity of the system.
- **STORBUF** - the STORBUF percentages.
- **LDUBUF** - the LDUBUF percentages.
- **DSPBUF** - the DSPBUF percentages.
- **LIMITHARD algorithm** - Consumption or Deadline.

for SET SRM (for z/VM release V6.3 and later only):

- **POLARIZATION** – Vertical or Horizontal.
- **GPD** – the state of Global Performance Data: ON, OFF, or N/A.
- **EXCESSUSE** – the actual SET SRM EXCESSUSE settings.
- **CPUPAD** – the actual SET SRM CPUPAD settings.

for SET SHARE:

The userid whose relative or absolute SHARE value was set and the new share values are shown.

for SET QUICKDSP:

The userid for which the QUICKDSP setting was changed and the new QUICKDSP status are shown.

For an explanation of the messages that can appear in this area, see "FCX149, Monitor Settings Screen – MONSET" on page 513.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX155, Monitor Data Statistics Screen – MONDATA

Performance Toolkit Subcommand: "MONDATA" on page 234.

The Monitor Data Statistics Screen (FCX155):

```
FCX155      CPU nnnn  SER nnnnn  Interval 06:05:00 - 10:25:00    Perf. Monitor

                                                <--Records--> <--Rec. Length--> <-Total Bytes->
Domain    Rec Samp/Ev Record Name                 Count     %   Min   Max  Mean      Count   Pct

System      1 Sample  System data                  21   .19   116   116   116       2436   .08
            2 Sample  Processor data                21   .19   152   152   152       3192   .11
            3 Sample  Global real storage            1   .01   492   492   492        492   .02
            4 Sample  Real storage (per proc.)      21   .19    72    72    72       1512   .05
            5 Sample  Expanded storage data         21   .19    56    56    56       1176   .04
            6 Sample  Global auxiliary storage       1   .01    92    92    92         92   .00
            7 Sample  Shared storage data            1   .01    72    72    72         72   .00
            8 Sample  User data                      1   .01   108   108   108        108   .00
            9 Sample  Channel path contention        1   .01  1252  1252  1252       1252   .04
           10 Sample  Global scheduler data          1   .01   152   152   152        152   .01
           11 Sample  Processor communications      21   .19   272   272   272       5712   .19
           12 Sample  User wait states               1   .01   180   180   180        180   .01
           13 Sample  Scheduler activity            21   .19    56    56    56       1176   .04
           14 Sample  Global expanded storage        1   .01   204   204   204        204   .01
           15 Sample  Logical CPU utilization        1   .01    56    56    56         56   .00
           16 Sample  CPU util. in an LPAR          17   .16   160  1072   417       7088   .24
           17 Sample  CPU util. for LPAR mgmt.       1   .01  2340  2340  2340       2340   .08
           19 Sample  System data (global)           1   .01   132   132   132        132   .00
           20 Sample  Extended channel meas.       138  1.27   180   180   180      24840   .83
           21 Sample  SXS data, global              1   .01    84    84    84         84   .00
           22 Sample  SXS data, by processor        21   .19    88    88    88       1848   .06
           23 Sample  Formal spin lock data         1   .01  1080  1080  1080       1080   .04
           24 Sample  Sched. Act. by processor       5   .05   364   364   364       1820   .06

Monitor    11 Sample  Interval end                  2   .02    20    20    20         40   .00
           13 Both    End of frame indicator      748  6.90    20    20    20      14960   .50

Scheduler   4 Event   Add user to disp. list       13   .12   232   232   232       3016   .10
            5 Event   Drop from dispatch list      12   .11   196   196   196       2352   .08
            6 Event   Add user to elig. list       13   .12   136   136   136       1768   .06
           ...
           ...
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 55. Layout of Monitor Data Statistics Screen (FCX155)

The information shown is obtained while scanning CP monitor records during monitor data extraction by the Performance ToolkitPerformance Toolkit.

The display provides some statistical information on the monitor data read by Performance ToolkitPerformance Toolkit. Note that a monitor record will appear in this list only if at least one such record has been found in the input data.

Field Descriptions:

Domain
The name of the domain. A line with the heading `Overall` at the bottom of the list shows the values for *all* the scanned monitor records.

Rec The record number.

Samp/Ev
Indicates whether the record is part of SAMPLE or EVENT data collection, or both.

Record name
The description of the monitor record.

Records:

Information on absolute and relative monitor record counts is shown under this heading.

Count The number of records found.

% The percentage to which a record contributed to the total record count.

Record Length:

Information on monitor record lengths is shown under this heading.

Min The length of the shortest record found for the record type.

Max The length of the longest record found for the record type.

Mean The average record length for this record type, calculated by dividing the total byte count for the record by the number of records.

Total Bytes:

Information on monitor record space requirements is shown under this heading.

Count The number of bytes occupied by the record type.

% The percentage to which this record type contributed to the total monitor record space requirements.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period totals of all monitor records will be shown.

FCX156, DASD Seeks Locations Screen – SEEKLOC

Performance Toolkit Subcommand: "SEEKLOC" on page 280.

The DASD Seeks Locations Screen (FCX156) shows DASD seeks statistics on the frequency with which seeks were made to specific locations for each monitored disk:

```
FCX156      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
____ .               .    .         .    .     .      .
<--------- Device ---------->     <------ Seeks -------> <----------- Percent
                    Size Disc                 Mean               Within Perce
     Device Volume    in Time Cach  Pct  Pct Non-0  Total  0<=  10<  20<  30<
Addr Type   Serial  Cyls msec   ed Read Non0  Dist  Seeks <=10 <=20 <=30 <=40
>> Mean <<                        32   61   146 174223   29   24    9    6

0600 3380-K PROFSA  2655 21.2  Yes   13   31   199   4227    6   11   15    0
0601 3380-K VMPRA1  2655 19.3  Yes   25   38   169    484   35   23    1    3
0602 3380-K PROFSB  2655 21.6  Yes   13   50   147   5680    1   14   14    7
0603 3380-K VMPRA3  2655 21.6  Yes   24   48   280  10910   24   31    5    7
0604 3380-K VMPRA4  2655 13.9  Yes   57   48   177   1613   44    0    1   16
0605 3380-K VMPRA5  2655 21.4  Yes   19   50   217   5017   11   23   13    6
0606 3380-K VMPRA6  2655 22.8  Yes   18   49   257   5845    8   17   11    1
0607 3380-K VMPRA7  2655 20.5  Yes   17   44   217   8071   16    4   12   13
0608 3380-K ESA111  2655 10.8  No     5    4   814     80    0    0   95    0
060A 3380-K VMPRAA  2655 21.6  Yes   17   43   213   3133   24   14   22    5
060B 3380-K VMPRAB  2655 10.7  Yes   54   53   117   6299    3   11    7    4
060C 3380-K VMPG1N  2655 13.3  No    55   98    92   4206    0    0    0    0
060D 3380-K VMPG1O  2655 13.4  No    52   99    70   4245    0    0    0    0
060E 3380-K VMPRAE  2655 21.5  Yes   20   41   206   6888   17    5    5    8
Select a device for I/O device details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 56. Layout of DASD Seeks Locations Screen (FCX156)

The sample shows a screen with disks sorted in ascending device number sequence (indicated by the underscore characters '___' above the 'Addr' header), the initial default sequence. Other possible sort sequences are indicated by dots above the corresponding columns, they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER. Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

The information shown is based on MONITOR and I/O domain SAMPLE data and on SEEKS domain EVENT data. The display can be built only when data collection for all these domains is active.

For more detailed seeks data for one specific disk either:

- Place the cursor on the Addr field of the disk you are interested in and press ENTER, or
- Enter the subcommand 'SEEKDET *devno*' on the command line

The 'Seeks Analysis Details' screen will then be shown with detailed data for the selected device (see "SEEKDET" on page 276 for more information on that performance display).

Field Descriptions:

The following field descriptions apply to both the SEEKLOC and SEEKLLOG *devno* displays, with the exception of the `Addr` field which will be replaced by the field `Interval End Time` on the SEEKLLOG display.

Device:

Addr Real device number. The first line contains the prefix `>>` `Mean` `<<` instead of a device number. It provides averages for all disks for which seeks data were collected.

Device Type
Device type and model of the disk

Volume Serial
The volume serial of the disk. Dots can be shown initially if no I/O sample data have been collected yet for the disk.

Size in Cyls
The number of cylinders available on the disk.

Disc Time msec
The average disconnect time during the interval. Dots will be shown for disks where the disconnect time cannot be calculated, either because we have not yet received two samples which allow calculating a valid delta value, or because there has been no I/O activity during the sample period.

Cached
Indicates whether the disk has profited from the cache during the last sample interval, i.e. whether any read or write hits were recorded. The string `Yes` will be inserted if hits were found, and `No` will be inserted otherwise.

Seeks:

Pct Read
Percent of seeks to the disk which were for channel programs containing only READ operations.

Pct Non0
Percent of seeks which caused a displacement of the access arm of at least 1 cylinder.

Mean Non-0 Dist
Average displacement of the access arm, taking into account only the seeks which caused a nonzero displacement.

Total Seeks
The total number of seeks activity samples recorded for the disk.

Percent of Seek Targets within Percent Range of Cylinders:

The seek targets are grouped into ten pools with a size of about 1/10 of the total number of cylinders each. The frequency with which seeks were made to each area is expressed as the percentage of seeks which were targeted to the area, where the seek target headings are

0<= <=10
For seeks targeted to the lowest 10 percent range of the disk's cylinders

10< <=20
For seeks targeted to the 2nd 10 percent range of the disk's cylinders

...

90< For seeks targeted to the topmost 10 percent range of the disk's cylinders.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown. Note that overall period averages will also be shown for the 'current' setting.

FCX157, DASD Seeks Distances Screen – SEEKDIST

Performance Toolkit Subcommand: "SEEKDIST" on page 277.

The DASD Seeks Distances Screen (FCX157) shows DASD seeks statistics on the distribution of seeks distances for each monitored disk:

```
FCX157      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

____ .                 .    .        .    .     .      .
<--------- Device ---------->     <------ Seeks -------> <---------- Percent
                    Size Disc               Mean                       with
     Device Volume    in Time Cach  Pct  Pct Non-0  Total    =   <=   <=   <=
Addr Type   Serial  Cyls msec   ed Read Non0  Dist  Seeks    0    5   10   20
>> Mean <<                         32   61   146 172678   39   14    6    7
0600 3380-K PROFSA  2655 21.2  Yes   13   31   198   4222   69   11    2    6
0601 3380-K VMPRA1  2655 19.3  Yes   25   38   171    471   62   29    0    0
0602 3380-K PROFSB  2655 21.6  Yes   13   50   150   5539   50   16   17    6
0603 3380-K VMPRA3  2655 21.6  Yes   24   48   279  10898   52   18   10    2
0604 3380-K VMPRA4  2655 13.9  Yes   57   48   178   1605   52   22   16    2
0605 3380-K VMPRA5  2655 21.4  Yes   19   50   217   5017   50   24    7    6
0606 3380-K VMPRA6  2655 22.8  Yes   18   49   257   5816   51   19   11    6
0607 3380-K VMPRA7  2655 20.5  Yes   17   44   217   8056   56   20    6    5
0608 3380-K ESA111  2655 10.8  No     5    4   814     80   96    0    0    0
060A 3380-K VMPRAA  2655 21.6  Yes   17   43   213   3072   57   26    4    2
060B 3380-K VMPRAB  2655 10.7  Yes   54   53   117   6228   47   41    3    1
060C 3380-K VMPG1N  2655 13.3  No    56   98    94   4136    2   11    5    8
060D 3380-K VMPG1O  2655 13.4  No    52   99    70   4187    1    6    7   14
060E 3380-K VMPRAE  2655 21.5  Yes   19   41   206   6809   59   14    8    6
Select a device for I/O device details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 57. Layout of DASD Seeks Distances Screen (FCX157)

The sample shows a screen with disks sorted in ascending device number sequence (indicated by the underscore characters '___' above the 'Addr' header), the initial default sequence. Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287), or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Note that the information extends beyond the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

The information shown is based on MONITOR and I/O domain SAMPLE data and on SEEKS domain EVENT data. The display can be built only when data collection for all these domains is active.

For more detailed seeks data for one specific disk either:

- Place the cursor on the Addr field of the disk you are interested in and press ENTER, or
- Enter the subcommand 'SEEKDET *devno*' on the command line

The 'DASD Seeks Details' screen will then be shown with detailed data for the selected device (see "SEEKDET" on page 276 for more information on that performance display).

Field Descriptions:

The following field descriptions apply to both the SEEKDIST and SEEKDLOG *devno* displays, with the exception of the `Addr` field which will be replaced by the field `Interval End Time` on the SEEKDLOG display.

Device:

Addr Real device number.

The first line contains the prefix `>>` `Mean` `<<` instead of a device number. It provides averages for all disks for which seeks data were collected.

Device Type
Device type and model of the disk

Volume Serial
The volume serial of the disk. Dots can be shown initially if no I/O sample data have been collected yet for the disk.

Size in Cyls
The number of cylinders available on the disk.

Disc Time msec
The average disconnect time during the interval. Dots will be shown for disks where the disconnect time cannot be calculated, either because we have not yet received two samples which allow calculating a valid delta value, or because there has been no I/O activity during the sample period.

Cached
Indicates whether the disk has profited from the cache during the last sample interval, i.e. whether any read or write hits were recorded. The string `Yes` will be inserted if hits were found, and `No` will be inserted otherwise.

Seeks:

Pct Read
Percent of seeks to the disk which were for channel programs containing only READ operations.

Pct Non0
Percent of seeks which caused a displacement of the access arm of at least 1 cylinder.

Mean Non-0 Dist
Average displacement of the access arm, taking into account only the seeks which caused a nonzero displacement.

Total Seeks
The total number of seeks activity samples recorded for the disk.

Percent of Seek Distances within the Ranges:

The seek distances are grouped into pools of geometrically increasing seek distances. The seek distance distribution is shown by displaying the percentage of seeks which falls into each seek distance pool, where the pool ranges are

= 0 For seeks with a seek distance of zero

<= 5 For seeks with a seek distance in the range of 1 up to 5 cylinders

<= 10 For seeks with a seek distance in the range of 6 up to 10 cylinders

...

>800 For seeks with a seek distance exceeding 800 cylinders.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown. Note that overall period averages will also be shown for the 'current' setting.

FCX158, DASD Seeks Details Screen – SEEKDET

Performance Toolkit Subcommand: "SEEKDET" on page 276.

The DASD Seeks Details Screen (FCX158) provides detailed information on seeks activity for one specific disk:

```
FCX158      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Seeks Analysis Details

Device number:   0615        Total nr. of SEEKs :   2497
Device type  : 3380-K        Percent Read-only  :      6
Volume serial: VMPRA8        Percent non-0 seeks:     44
Cylinders    :   2655        Ave. seeks distance:    278
Cached       :    Yes        Disc. time (msec)  :   20.4

  Seek Range  Owner    Vadr  Seeks %Rd %Nz Dist     0   % of Total Seeks   100
+-----------------------------------------------+   +-----+-----+-----+-----+
|    28-   37 RVO      0191     71  21  86 1140 |   | >                     .
|    82-   85 MSMU     0191     80   0  63   44 |   | >                     .
|   133-  265                                   |   .                       .
|   266-  398                                   |   .                       .
|   399-  530                                   |   .                       .
|   531-  663                                   |   .                       .
|   664-  796                                   |   .                       .
|   872-  872 GHA      0191      1 100 100  787 |   .                       .
|   932-  937 MWR      0191    248   0  51  332 |   >>>                     .
|   947-  953 EGG      0191      3   0  67   39 |   .                       .
|  1022- 1026 PSTE     0191     68  65  44  257 |   R                       .
|  1116- 1120 RCL      0191    149  15  64  553 |   >>                      .
|  1195- 1327                                   |   .                       .
|  1328- 1459                                   |   .                       .
|  1460- 1592                                   |   .                       .
|  1654- 1679 EKO      0191    141   9  62  377 |   >>                      .
|  1769- 1780 JA       0191   1335   2  33  112 |   >>>>>>>>>>>>>           .
|  1866- 1885 EGRO     0191     89  20  46   79 |   >                       .
|  1991- 2123                                   |   .                       .
|  2139- 2186 MBIR     0191    312   3  56  268 |   >>>                     .
|  2256- 2388                                   |   .                       .
|  2389- 2521                                   |   .                       .
|  2522- 2654                                   |   .                       .
+-----------------------------------------------+   +-----+-----+-----+-----+

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 58. Layout of DASD Seeks Details Screen (FCX158)

The information shown is based on MONITOR and I/O domain SAMPLE data and on SEEKS domain EVENT data. The display can be built only when data collection for all these domains is active.

Two blocks of data will be shown:

- A first fixed block with overall information for the disk, and
- A second block with variable layout, showing detailed information on the seeks activity to specific cylinder ranges and minidisks.

Seeks activity to different areas of the disk pack will also be displayed graphically as a bar chart, as part of the second block.

Field Descriptions:

Seeks Analysis Details:

Device number
Real device number

Device type
Device type and model of the disk

Volume serial
The volume serial of the disk. Dots can be shown initially if no I/O sample data have been collected yet for the disk.

Cylinders
The number of cylinders available on the disk

Cached
Indicates whether the disk has profited from the cache during the last sample interval, i.e. whether any read or write hits were recorded. The string `Yes` will be inserted if hits were found, and `No` will be inserted otherwise.

Total nr. of seeks
The total number of seeks activity samples recorded for the disk

Percent Read-only
Percent of seeks to the disk which were for channel programs containing only READ operations

Percent non-0 seeks
Percent of seeks which caused a displacement of the access arm of at least 1 cylinder

Ave. seeks distance
Average displacement of the access arm, taking into account only the seeks which caused a nonzero displacement

Disc. time (msec)
The average disconnect time during the interval. Dots will be shown for disks where the disconnect time cannot be calculated, either because we have not yet received two samples which allow calculating a valid delta value, or because there has been no I/O activity during the sample period.

Detailed Data for Cylinder Ranges and Minidisks:

Seek Range
The cylinder range to which the remaining information on the line applies.

The disk is split into 20 ranges of equal size. Where seeks are targeted to a minidisk, the lowest and highest target cylinder numbers are used to describe the minidisk extent. The ranges used for the display are either the original ranges of 1/20 of the total disk size, or (parts of) a minidisk, whichever is smaller, i.e. you may see

- More than one small minidisk shown as a separate entity although they would all have fitted into one of the 1/20 slots
- More than one line for a single minidisk if it extends beyond the boundary of one of the original 1/20 slots.

The net result should be a display which shows sufficient detail for locating very busy minidisks, or very busy areas on a single minidisk or full-pack disk.

Owner
The owner of the minidisk. The string `System` will be inserted if the cylinder range is not part of a user minidisk but of a CP area (e.g. PAGE or SPOOL area).

Vadr The virtual device number of the minidisk. The field is left empty if the line does not describe a minidisk.

Seeks The number of seeks samples collected which were targeted to this cylinder range

%Rd The percentage of seeks to the cylinder range which were for read-only operations

%Nz The percentage of seeks to the cylinder range which entailed a movement of the access arm of at least 1 cylinder

Dist The average displacement of the access arm for all nonzero seeks which were targeted to this area

% of Total Seeks
The percentage of seeks which were targeted to the cylinder range, shown in the form of a bar chart. The characters used to form the bars are

R For seeks with read-only operations

> For seeks containing also write operations

Effect of 'AVERAGE' and 'INTERIM' subcommands: None. Average data are always displayed.

FCX160, History Data Selection Menu – HISTDATA

Performance Toolkit Subcommand: "HISTDATA" on page 196.

The History Data Selection Menu (FCX160):

```
FCX160      File Selection: All Files with Default Filetypes     History Data

         Move cursor to the history data file you are interested in and
         - enter 'G' to select the file for creating graphics
         - just press ENTER for viewing the data in REDISP format

    .        .        .   _______          .        .        .   _______
  S Filename Filetype FM  Created        S Filename Filetype FM  Created
  . CHVM4    RMONLOG  V   2003/07/13     . CHVM5    RMONLOG  V   2003/07/13
  . ACUM     HISTSUM  V   2003/07/12     . ACUM     PERFHIST V   2003/07/12
  . CHVM4    RMONLOG1 V   2003/07/12     . CHVM5    RMONLOG1 V   2003/07/12
  . CHVM4    RMONLOG2 V   2003/07/11     . CHVM5    RMONLOG2 V   2003/07/11
  . 071103   PERFLOG1 V   2003/07/11     . 19970711 HISTLOG1 V   2003/07/11
  . 071003   PERFLOG2 V   2003/07/10     . 19970710 HISTLOG2 V   2003/07/10
  . 070903   PERFLOG3 V   2003/07/09     . 19970709 HISTLOG3 V   2003/07/09
  . 070803   PERFLOG3 V   2003/07/08     . 19970708 HISTLOG3 V   2003/07/08
  . 070703   PERFLOG3 V   2003/07/07     . 19970707 HISTLOG3 V   2003/07/07
  . 070403   PERFLOG3 V   2003/07/04     . 19970704 HISTLOG3 V   2003/07/04




Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 59. Layout of History Data Selection Menu (FCX160)

See the "Viewing Performance History Data" section in the *z/VM: Performance Toolkit Guide* for more information on this screen.

FCX161, LPAR Channel Load Screen – LCHANNEL

Performance Toolkit Subcommand: "LCHANNEL" on page 210.

In the LPAR Channel Load Screen (FCX161), fields which indicate that the channel has been busy are highlighted.

```
FCX161      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

CHPID Chan-Group       <%Busy>  <----- Channel %Busy Distribution 03:37:21-10:21:21 ------>
(Hex) Descr Qual Shrd  Cur Ave  0-10 11-20 21-30 31-40 41-50 51-60 61-70 71-80 81-90 91-100
 B4   HPF     00 Yes    27   6   80     0    14     6     0     0     0     0     0     0
 B5   HPF     00 Yes    27   6   80     0    14     6     0     0     0     0     0     0
 F6   HPF     00 Yes    14   3   80    20     0     0     0     0     0     0     0     0
 F7   HPF     00 Yes    14   3   80    20     0     0     0     0     0     0     0     0
 02   ESCON   00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 03   ESCON   00 No      0   0  100     0     0     0     0     0     0     0     0     0
 04   ESCON   00 No      0   0  100     0     0     0     0     0     0     0     0     0
 05   ESCON   00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 06   HPF     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 0F   HPF     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 12   OSC     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 17   OSD     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 18   HPF     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 19   HPF     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 1A   OSD     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 1B   OSD     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 1C   HPF     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 1E   OSD     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 1F   OSD     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 20   FCP     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 20   FCP     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 21   FCP     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 22   FCP     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 23   FCP     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 24   HPF     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 25   HPF     00 Yes     0   0  100     0     0     0     0     0     0     0     0     0
 ...


See also CHANNEL and FCHANNEL displays
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 60. Layout of LPAR Channel Load Screen (FCX161)

LPAR channel load analysis is based on CP monitor SYSTEM domain data from the Channel-Path Measurement Facility where available, otherwise data from the Extended Channel-Path Measurement Facility is used. For systems running in a logical partition, the values shown pertain to the channel activity generated by *this* partition only, not the overall channel activity. The screen shows a list of all channels for which valid information was found.

Channels will be ordered in %Busy sequence, either for the *current*, i.e. the last interval's %Busy values if 'current' data are being displayed, or for *average* %Busy values when 'average' performance data have been selected. Channels with equal %Busy figures will be sorted in ascending CHPID sequence.

Field Descriptions for Channel Load:

CHPID (Hex)
The hexadecimal 'channel path identifier'.

Chan-Group Descr
Description of the channel model group, as found in the Store-Channel-Path description.

Chan-Group Qual
The hexadecimal channel model group qualifier. Note that a valid qualifier is available only on systems with the extended channel measurement facility.

Shrd 'Shared' indicator for the channel. It can be either:

YES For channels which are shared with other logical partitions

NO For channels which are dedicated to this logical partition

%Busy
The percentage of 'busy' conditions found, where

Cur Shows the 'current' figures, calculated for the last interval

Ave Shows the 'average' load, calculated for the whole period since the last RESET, or since Performance Toolkit was last invoked.

For FICON channels the 'busy' value is calculated as the percentage of actual work unit utilization compared to the maximum possible value. Channel 'busy' percentages cannot be calculated for Hipersocket channels; the string `n/a` is inserted instead.

Under the heading:

```
Channel %Busy Distribution hh:mm:ss-hh:mm:ss
```

You will find the channel load distribution for each of the active channels. It shows the relative frequency with which the channel busy percentage of separate measurement intervals was found in either of the 10% ranges 0-10, 11-20, ..., 91-100.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Interim averages are displayed for the INTERIM setting, and overall averages are shown for both the AVERAGE and CURRENT settings since average data is shown together with the current load. Sorting of the channels is based on the average %Busy percentage instead of the last interval's %Busy values.

FCX162, User Resource Usage Log Screen – USERLOG

Performance Toolkit Subcommand: “USERLOG” on page 338.

The User Resource Usage Log Screen (FCX162) shows a 'by time' log of the selected user's resource consumption. Note that the specified user must have been previously selected for benchmarking.

```
FCX162      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Resource Usage Log for User TCPIP

          <----- CPU Load -----> <----- Virtual IO/s ----->                  <UsrTime> <--Spool-->    MDC        VConf
Interval       <-Seconds->   T/V                  Diag                       <Minutes> Total  Rate Insert       Rebal
End Time  %CPU  TCPU  VCPU Ratio Total DASD Avoid   98   UR Pg/s  User Status  Logd Act. Pages SPg/s  MDC/s Share  Scat.
>>Mean>>   .14  .083  .026  3.27    .2   .1    .0   .0   .0   .0  ---,---,----   46   45    .0    .0     .0 3.0%A   .000
11:33:11   .19  .114  .076  1.50   1.6  1.4    .0   .0   .0   .0  ESA,CL0,DISP    1    1    .0    .0     .0 3.0%A   .000
11:34:11   .10  .057  .020  2.85    .4   .1    .0   .0   .0   .0  ESA,---,DORM    1    1    .0    .0     .0 3.0%A   .000
11:35:11   .09  .054  .019  2.84    .1   .1    .0   .0   .0   .0  ESA,---,DORM    1    1    .0    .0     .0 3.0%A   .000


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 61. Layout of User Resource Usage Log Screen (FCX162)

The information shown is based on USER domain SAMPLE data.

The first entry is reserved for averages or totals (for CPU seconds) since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Descriptions:

Interval End Time
The end time of the monitor interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Userid' field, all data columns are identical to the ones of the 'User Resource Usage' (USER) display. Please see “USER” on page 337 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX163, User Page Data Log Screen – UPAGELOG

Performance Toolkit Subcommand: "UPAGELOG" on page 327.

The User Page Data Log (FCX163) shows a 'by time' log of the paging activity and storage utilization for the selected user (which must have been previously selected for benchmarking):

```
FCX163      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Page Data Log for User CHCAL

Data             <--------- Paging Activity/s ---------->   <----------------- Number of Pages ----------------->
Interval Spaces  <Page Rate>   Page  <--Page Migration-->                <-Resident-> <--Locked-->                 Stor
End Time  Owned  Reads Write Steals  >2GB> X>MS MS>X X>DS     WSS Resrvd  R<2GB  R>2GB L<2GB  L>2GB  XSTOR   DASD   Size
>>Mean>>     .0     .0    .0     .0     .0   .0   .0   .0  786432 524288      5 786423     0      0      0 451167  3072M
06:09:19      0     .0    .0     .0     .0   .0   .0   .0  786432 524288      5 786423     0      0      0 451167  3072M
06:14:19      0     .0    .0     .0     .0   .0   .0   .0  786432 524288      5 786423     0      0      0 451167  3072M
06:19:19      0     .0    .0     .0     .0   .0   .0   .0  786432 524288      5 786423     0      0      0 451167  3072M
06:24:19      0     .0    .0     .0     .0   .0   .0   .0  786432 524288      5 786423     0      0      0 451167  3072M

Command ===> _
F1=Help  F4=Top  F5=Bot  F12=Return
```

Figure 62. Layout of User Page Data Log Screen (FCX163)

The information shown is based on USER domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
The end time of the monitor interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Userid' field, all data columns are identical to the ones of the 'User Page Data' (UPAGE) display. Please see "UPAGE" on page 326 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX164, User Wait States Log Screen – USTATLOG

Performance Toolkit Subcommand: “USTATLOG” on page 341.

The User Wait States Log Screen (FCX164) shows a 'by time' log of the user's wait state statistics. Note that the specified user must have been previously selected for benchmarking.

```
FCX164      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Wait State Data Log for User CHCAL

Interval                                                  <-SVM and->
End Time   %ACT  %RUN %CPU %LDG %PGW %IOW %SIM %TIW %CFW %TI %EL %DM %IOA %OTH
>>Mean>>    29     0   11    0    0    0   18   56    1   0   0   0   14    0
12:36:49    25     0    0    0    0    0   13   60    7   0   0   0   20    0
12:37:49    25     0    7    0    0    0   13   67    7   0   0   0    7    0
12:38:49    25     0   13    0    0    0   33   47    0   0   0   0    7    0
12:39:49    32     0    5    0    0    0    5   58    0   0   0   0   32    0
12:40:49    15     0   11    0    0    0   22   67    0   0   0   0    0    0
12:41:49    40     0    4    0    0    0   17   63    0   0   0   0   17    0
12:42:49    30     0   17    0    0    0    0   61    0   0   0   0   22    0
12:43:49    25     0   20    0    0    0   13   53    0   0   0   0   13    0
12:44:49    20     0   17    0    0    0   17   67    0   0   0   0    0    0
12:45:49    23     0   14    0    0    0   14   57    0   0   0   0   14    0
12:46:49    33     0   25    0    0    0   20   50    0   0   0   0    5    0
12:47:49    18     0    9    0    0    0   18   64    0   0   0   0    9    0
12:48:49    25     0    7    0    0    0   27   60    0   0   0   0    7    0
12:49:49    42     0   12    0    0    0   32   56    0   0   0   0    0    0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 63. Layout of User Wait States Log Screen (FCX164)

The information shown is based on USER domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Interval End Time
: The end time of the monitor interval for which the values were calculated.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Userid' field, all data columns are identical to the ones of the 'User Wait States' (USTAT) display. Please see “USTAT / USTATG” on page 339 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX165, User Response Time Log Screen – URESPLOG

Performance Toolkit Subcommand: "URESPLOG" on page 336.

The User Response Time Log Screen (FCX165) shows a 'by time' log of the user's response time per measured transaction. Note that the specified user must have been previously selected for benchmarking.

```
FCX165      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Response Time Data Log for User CHCAL

Interval  Think  <- Response Time ->  <- Transact/Hour ->  <-- Total Trans -->
End Time   Time  Triv. N-Triv   Mean  Trv/h Ntrv/h Totl/h  Trv-T Ntrv-T Totl-T
>>Mean>>    2.5    ...   .405   .405      0   1501   1501      0    422    422
12:36:47    2.7    ...   .459   .459      0   1264   1264      0     21     21
12:37:48    2.3    ...   .309   .309      0   1745   1745      0     30     30
12:38:48    2.8    ...   .435   .435      0   1264   1264      0     21     21
12:39:49    2.5    ...   .540   .540      0   1479   1479      0     25     25
12:40:35    4.2    ...   .187   .187      0    936    936      0     12     12
12:41:47    2.5    ...   .500   .500      0   1442   1442      0     29     29
12:42:47    2.1    ...   .338   .338      0   1867   1867      0     31     31
12:43:48    3.0    ...   .299   .299      0   1302   1302      0     22     22
12:44:39    3.0    ...   .178   .178      0   1331   1331      0     19     19
12:45:45    3.1    ...   .390   .390      0   1089   1089      0     20     20
12:46:47    2.3    ...   .322   .322      0   1803   1803      0     31     31
12:47:49    2.8    ...   .196   .196      0   1396   1396      0     24     24
12:48:48    2.8    ...   .315   .315      0   1348   1348      0     22     22
12:49:49    2.1    ...   .457   .457      0   1894   1894      0     32     32

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 64. Layout of User Response Time Log Screen (FCX165)

The information shown is based on USER domain EVENT data.

The first entry is reserved for averages and totals (for total transaction counts) since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
: The time of the last transaction within the monitor interval for which the values were calculated.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Userid' field, all data columns are identical to the ones of the 'User Response Time' display. Please see "URESP" on page 335 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX166, User Resources per Transaction Log Screen – UTRANLOG

Performance Toolkit Subcommand: "UTRANLOG" on page 344.

The User Resources per Transaction Log Screen (FCX166) shows a 'by time' log of the user's average resource consumption per measured transaction. Note that the specified user must have been previously selected for benchmarking.

```
FCX166      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Transaction Data Log for User CHCAL

          <-Transact->   <------ Resource Utilization per Transaction ------->
Interval  Total   Rate    CPU  Disk   Page  Xpage  <-Spooling->  <-IUCV/VMCF->
End Time  Count  /hour   msec   I/O   Flts  Reads  SP_RD  SP_WR  IU_BY   IU_TO
>>Mean>>    443   1271   26.2   7.7     .0     .0     .0     .4    2.9     2.9
12:37:48     30   1745   23.9   6.9     .0     .0     .0     .4    2.7     2.7
12:38:48     21   1264   27.8   9.7     .0     .0     .0     .5    3.0     3.0
12:39:49     25   1479   29.8   6.5     .0     .0     .0     .5    3.6     3.6
12:40:35     12    936   21.9   5.2     .0     .0     .0     .3    2.5     2.5
12:41:47     29   1442   29.2   8.2     .0     .0     .0     .5    3.3     3.3
12:42:47     31   1867   23.6   6.4     .0     .0     .0     .4    2.7     2.7
12:43:48     22   1302   23.5   6.0     .0     .0     .0     .3    2.8     2.8
12:44:39     19   1331   22.5   4.6     .0     .0     .0     .4    2.6     2.6
12:45:45     20   1089   31.3   5.7     .0     .0     .0     .7    3.9     3.9
12:46:47     31   1803   24.3   7.3     .0     .0     .0     .4    2.7     2.7
12:47:49     24   1396   22.7   4.9     .0     .0     .0     .4    2.7     2.7
12:48:48     22   1348   20.9   7.7     .0     .0     .0     .3    2.1     2.1
12:49:49     32   1894   27.2  11.0     .0     .0     .1     .5    2.6     2.6

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 65. Layout of User Resources per Transaction Log Screen (FCX166)

The information shown is based on USER domain EVENT data.

The first entry is reserved for averages and totals (for total transaction count) since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
: The time of the last transaction within the monitor interval for which the values were calculated.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Userid' field, all data columns are identical to the ones of the 'User Resources per Transaction' display. Please see "UTRANS" on page 345 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX167, User Communication Log Screen – UCOMMLOG *userid*

Performance Toolkit Subcommand: "UCOMMLOG" on page 323.

The User Communication Log Screen (FCX167), which shows a 'by time' log of the selected user's IUCV and VMCF activity, will be shown if you specify a *userid* on the UCOMMLOG subcommand, where *userid* must be the user identification of a virtual machine which has previously been selected for benchmarking:

```
FCX167      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Communications Data Log for User VTAM

                    S
Interval  Msg       V Total <- IUCV Msg/s -->  <- VMCF Msg/s -->  <-- IUCV in Q
End Time  Target    M Msg/s ISend IRecv IFail  VSend VRecv VFail  SendQ RecvQ R
>>Mean>>  *SIGNAL   Y  .985  .476  .509  .000   .000  .000  .000      0     0
09:45:58  *SIGNAL   Y 5.517 3.667 1.850  .000   .000  .000  .000      0     0
09:46:58  *CCS      Y 1.083  .483  .600  .000   .000  .000  .000      0     0
09:47:59  *CCS      Y  .987  .444  .543  .000   .000  .000  .000      0     0
09:48:58  *SIGNAL   Y  .203  .084  .118  .000   .000  .000  .000      0     0
09:49:58  *SIGNAL   Y  .167  .067  .100  .000   .000  .000  .000      0     0
09:50:58  *SIGNAL   Y  .167  .083  .083  .000   .000  .000  .000      0     0
09:51:58  *CCS      Y  .317  .150  .167  .000   .000  .000  .000      0     0
09:52:58  *CCS      Y  .883  .383  .500  .000   .000  .000  .000      0     0
09:53:58  *CCS      Y 1.067  .600  .467  .000   .000  .000  .000      0     0
09:54:58  *CCS      Y 1.667  .950  .717  .000   .000  .000  .000      0     0
09:55:58  *SIGNAL   Y 1.783 1.050  .733  .000   .000  .000  .000      0     0
09:56:58  *SIGNAL   Y  .150  .067  .083  .000   .000  .000  .000      0     0
09:57:58  *CCS      Y  .650  .350  .300  .000   .000  .000  .000      0     0
09:58:58  *CCS      Y  .833  .400  .433  .000   .000  .000  .000      0     0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 66. Layout of User Communication Log Screen (FCX167)

The information shown is based on USER domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Userid' field, all data columns are identical to the ones of the 'User Communication' (UCOMM) display. Please see "UCOMM" on page 322 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX168, General I/O Device Data Log Screen – DEVLOG

Performance Toolkit Subcommand: "DEVLOG" on page 170.

The General I/O Device Data Log Screen (FCX168) shows a 'by time' log of general I/O performance data for the selected disk (which must have been previously selected for benchmarking).

```
FCX168      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

General I/O Data Log for Device 5CB0

Interval <- Dev. Descr.->  Mdisk Pa- <-Rate/s-> <------- Time (msec) -------> Req. <Percent>  SEEK Recov <-Throttle->
End Time Type   Label/ID   Links ths  I/O Avoid Pend Disc Conn Serv Resp CUWt Qued Busy READ  Cyls  SSCH Set/s  Dly/s
>>Mean>> 3390-9 FC5CB0 CP      0   2 73.0    .0 .126 .022 .687 .836 .836 .000  .00    6    0     2     0   ...    ...
15:59:14 3390-9 FC5CB0 CP      0   2  112    .0 .126 .017 .503 .646 .646 .000  .00    7    0     0     0   ...    ...
16:00:14 3390-9 FC5CB0 CP      0   2  114    .0 .126 .017 .501 .644 .644 .000  .00    7    0     0     0   ...    ...
16:01:15 3390-9 FC5CB0 CP      0   2  111    .0 .126 .017 .508 .650 .650 .000  .00    7    0     0     0   ...    ...

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 67. Layout of General I/O Device Data Log Screen (FCX168)

The information shown is based on MONITOR domain and I/O domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string `>>Mean>>` in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval for which the values were calculated.

In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Addr' field, all data columns are identical to the ones of the 'I/O Device Screen'. Please see "DEVICE" on page 169 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX169, Control Unit Cache Log Screen – CACHDLOG

Performance Toolkit Subcommand: "CACHDLOG" on page 148.

The Control Unit Cache Log Screen (FCX169) shows 'by time' information on the cache activity and effectiveness for the selected disk. Note that the disk must be connected to a cached control unit which has previously been selected for benchmarking.

```
FCX169      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Control Unit Cache Log for Device 0EC2

Interval          Overall CU-Cache Performance           Split
End Time VOLSER   IO/S %READ %RDHIT %WRHIT ICL/S BYP/S   IO/S %READ %RDHIT
>>Mean>> ESAPK2    3.9    49     92      0    .0    .0    3.9    49     92 (N)
>>Mean>>                                                  .0     0      0 (S)
>>Mean>>                                                  .0     0      0 (F)
10:35:00 ESAPK2    2.4    49     94      0    .0    .0   'NORMAL' I/O only
10:36:00 ESAPK2    1.4    50     97      0    .0    .0   'NORMAL' I/O only
10:37:00 ESAPK2     .4    42     88      0    .0    .0   'NORMAL' I/O only
10:38:00 ESAPK2    1.5    49     93      0    .0    .0   'NORMAL' I/O only
10:39:00 ESAPK2    1.2    43     87      0    .0    .0   'NORMAL' I/O only
10:40:00 ESAPK2    3.2    35     94      0    .0    .0   'NORMAL' I/O only
10:41:00 ESAPK2    4.4    30     92      0    .0    .0   'NORMAL' I/O only
10:42:00 ESAPK2    5.8    43     94      0    .0    .0   'NORMAL' I/O only
10:43:00 ESAPK2    5.3    32     95      0    .0    .0   'NORMAL' I/O only
10:44:00 ESAPK2    5.3    40     94      0    .0    .0   'NORMAL' I/O only
10:45:00 ESAPK2    3.2    50     78      0    .0    .0   'NORMAL' I/O only
10:46:00 ESAPK2    6.1    49     92      0    .0    .0   'NORMAL' I/O only

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 68. Layout of Control Unit Cache Log Screen (FCX169)

The information shown is based on MONITOR and I/O domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Dir' and 'Addr' fields, all data columns are identical to the ones of the 'CU-cached Disks Screen'. Please see "CACHDBSE" on page 147 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX170, CPOWNED Device Log Screen – CPOWNLOG

Performance Toolkit Subcommand: “CPOWNLOG” on page 157.

The CPOWNED Device Log Screen (FCX170) shows the availability and utilization of CP system areas on the selected disk disk (which must have been previously selected for benchmarking), and it is available only for CP owned disks which contain some such area(s).

```
FCX170      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

CPOWNED Device Log for Device 0EC2

         <- Device -->                        <------------- Rate/s ----------
Interval        Volume Area   Area      Used  <--Page---> <--Spool-->
End Time Devtyp Serial Type   Extent       %  P-Rds P-Wrt S-Rds S-Wrt Total  +
>>Mean>> 3380-E ESAPK2 SPOOL   300- 499   57     .0    .0   1.8   1.4   3.2
>>Mean>>               T-DISK 1400-1599    0    ...   ...   ...   ...   ...
10:41:00 3380-E ESAPK2 SPOOL   300- 499   60     .0    .0   1.1   2.3   3.5
                       T-DISK 1400-1599    0    ...   ...   ...   ...   ...
10:42:00 3380-E ESAPK2 SPOOL   300- 499   61     .0    .0   2.5   3.2   5.7
                       T-DISK 1400-1599    0    ...   ...   ...   ...   ...
10:43:00 3380-E ESAPK2 SPOOL   300- 499   61     .0    .0   1.6   2.6   4.2
                       T-DISK 1400-1599    0    ...   ...   ...   ...   ...
10:44:00 3380-E ESAPK2 SPOOL   300- 499   61     .0    .0   2.0   2.2   4.1
                       T-DISK 1400-1599    0    ...   ...   ...   ...   ...
10:45:00 3380-E ESAPK2 SPOOL   300- 499   61     .0    .0   1.3   1.5   2.8
                       T-DISK 1400-1599    0    ...   ...   ...   ...   ...
10:46:00 3380-E ESAPK2 SPOOL   300- 499   62     .0    .0   3.0   3.0   6.0
                       T-DISK 1400-1599    0    ...   ...   ...   ...   ...

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 69. Layout of CPOWNED Device Log Screen (FCX170)

The information shown is based on MONITOR and STORAGE domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Interval End Time
The end time of the monitor interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Addr' field, all data columns are identical to the ones of the 'CP Owned Device Screen'. Please see “DEVICE” on page 169 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX171, DASD Seeks Locations Log Screen – SEEKLLOG

Performance Toolkit Subcommand: "SEEKLLOG" on page 279.

The DASD Seeks Locations Log Screen (FCX171) shows a 'by time' log of seeks locations for all I/O activity to the selected disk (which must have been previously selected for benchmarking).

```
FCX171      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

SEEKS Locations Log for Device 0EC2

         <------- Device ------->      <------ Seeks -------> <----------- Per
                          Size Disc                  Mean                Within P
Interval Device Volume      in Time Cach  Pct  Pct Non-0  Total  0<=  10<  20<
End Time Type   Serial    Cyls msec   ed Read Non0  Dist  Seeks <=10 <=20 <=30 <
>>Mean>> 3380-E ESAPK2    1770  6.2  Yes   54   15    64  30079    7    2   85
10:35:00 3380-E ESAPK2    1770  6.4  Yes   50   10    88    146    3    0   97
10:36:00 3380-E ESAPK2    1770  5.3  Yes   53   10    80     80    3    1   94
10:37:00 3380-E ESAPK2    1770  9.1  Yes   48   29   164     21    3    2   93
10:38:00 3380-E ESAPK2    1770  6.7  Yes   51   18    90     89    2    0   98
10:39:00 3380-E ESAPK2    1770  6.3  Yes   44   13   135     72    2    0   98
10:40:00 3380-E ESAPK2    1770  8.7  Yes   46   22    79    169   19   14   26
10:41:00 3380-E ESAPK2    1770  8.1  Yes   33   14    64    237   63   14   22
10:42:00 3380-E ESAPK2    1770  6.2  Yes   44   10    44    346    6   11   83
10:43:00 3380-E ESAPK2    1770  8.0  Yes   37   15    80    290   51    0   42
10:44:00 3380-E ESAPK2    1770  6.9  Yes   46   18    65    290   64   16   15
10:45:00 3380-E ESAPK2    1770  7.9  Yes   51   20   213    189   29    0   71
10:46:00 3380-E ESAPK2    1770  5.5  Yes   50    9    28    367   19    0   42

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 70. Layout of DASD Seeks Locations Log Screen (FCX171)

The information shown is based on MONITOR and I/O domain SAMPLE data and on SEEKS domain EVENT data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Note that the information extends beyond the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Interval End Time
: The time when the last seek operation was monitored in the interval, or the end time of the sample interval when no seeks activity was recorded in an interval.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Addr' field, all data columns are identical to the ones of the 'DASD Seeks Locations Screen'. Please see "SEEKLOC" on page 280 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX172, DASD Seeks Distances Log Screen – SEEKDLOG

Performance Toolkit Subcommand: “SEEKDLOG” on page 278.

The DASD Seeks Distances Log Screen (FCX172) shows a 'by time' log of the average seeks distances measured for all I/O activity to the selected disk (which must have been previously selected for benchmarking).

```
FCX172      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

SEEKS Distances Log for Device 0EC2

         <------- Device ------->      <------ Seeks -------> <---------- Perc
                          Size Disc                  Mean
Interval Device Volume      in Time Cach  Pct  Pct Non-0  Total    =   <=   <=
End Time Type   Serial    Cyls msec   ed Read Non0  Dist  Seeks    0    5   10
>>Mean>> 3380-E ESAPK2  1770  6.2  Yes   54   15    64  30079   85    6    1
10:35:00 3380-E ESAPK2  1770  6.4  Yes   50   10    88    146   90    3    3
10:36:00 3380-E ESAPK2  1770  5.3  Yes   53   10    80     80   90    3    4
10:37:00 3380-E ESAPK2  1770  9.1  Yes   48   29   164     21   71    0   10
10:38:00 3380-E ESAPK2  1770  6.7  Yes   51   18    90     89   82    4    1
10:39:00 3380-E ESAPK2  1770  6.3  Yes   44   13   135     72   88    0    0
10:40:00 3380-E ESAPK2  1770  8.7  Yes   46   22    79    169   78   11    0
10:41:00 3380-E ESAPK2  1770  8.1  Yes   33   14    64    237   86    9    0
10:42:00 3380-E ESAPK2  1770  6.2  Yes   44   10    44    346   90    7    0
10:43:00 3380-E ESAPK2  1770  8.0  Yes   37   15    80    290   85    7    0
10:44:00 3380-E ESAPK2  1770  6.9  Yes   46   18    65    290   82   10    0
10:45:00 3380-E ESAPK2  1770  7.9  Yes   51   20   213    189   80    4    2
10:46:00 3380-E ESAPK2  1770  5.5  Yes   50    9    28    367   91    5    3

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 71. Layout of DASD Seeks Distances Log Screen (FCX172)

The information shown is based on MONITOR and I/O domain SAMPLE data and on SEEKS domain EVENT data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Interval End Time

The time when the last seek operation was monitored in the interval, or the end time of the sample interval when no seeks activity was recorded in an interval.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Addr' field, all data columns are identical to the ones of the 'DASD Seeks Distances Screen'. Please see “SEEKDIST” on page 277 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX173, Benchmark Log Selection Menu – BENCHMRK

Performance Toolkit Subcommand: "BENCHMRK" on page 142.

Once benchmarking has been activated you can select the Benchmark Log Selection Menu (FCX173):

```
FCX173      CPU nnnn  SER nnnnn        Benchmark Log Data         Perf. Monitor

  ______    .
  Object    Log File
S ID        Name       Description
. 1582      CACHDLOG   I/O device CU cache data log
. 1582      CACHELOG   Extended function cache data log
. 1582      DEVLOG     General I/O device performance log
. 1582      HPFLOG     HPF I/O device activity log
. 5CCD      CACHDLOG   I/O device CU cache data log
. 5CCD      CACHELOG   Extended function cache data log
. 5CCD      DEVLOG     General I/O device performance log
. 5CCD      HPFLOG     HPF I/O device activity log


Select an object log with cursor and hit ENTER
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 72. Layout of Benchmark Log Selection Menu (FCX173)

See the "Benchmarking Objects" section in the *z/VM: Performance Toolkit Guide* for more information on this screen.

FCX174, User Transaction Details Screen – UTRANDET

Performance Toolkit Subcommand: "UTRANDET" on page 343.

The User Transaction Details Screen (FCX174):

```
FCX174      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

User Transaction Details for USER1

Absolute share per processor:   3%       Max. abs. share per processor:  10%

             C   Resp   <------ Resource Utilization per Transaction ------->
             P   Time    CPU  Disk   Page  Xpage  <-Spooling->  <-IUCV/VMCF->
Time Stamp   U  (sec)   msec   I/O   Flts  Reads  SP_RD  SP_WR  IU_BY   IU_TO
09:59:50.161 0  Add to elig. list: Class 1, E1= 1 E2= 0 E3= 0, Prior.:  .134
09:59:50.161 0  Add to disp. list: Class 1, Q0= 5 Q1=11 Q2=12 Q3= 2
                D-List Priority:   .000 (  .008), IABIAS
                Tot. rel. share=39400, Tot. abs. share=  3%, ETS=0.545
                PGS: Total available=03663, Total WSS=10100, Our WSS=01100
                     RES=01122, LIM=50683, XSTORE=00140, Reads=0000/s
                Last SEND to *MONITOR
09:59:50.173 -     5 SEEKs to MDISK 0191:   0% Reads, Av. Displ.    3 Cyl.
09:59:50.173 0  Drop from disp. list:
                Scheduler State: Idle, MTS:    1
                Last SEND to *MONITOR
>>Trans. End 0   .01      3     0      0      0      0      0      0       0

10:00:16.225 0  Add to elig. list: Class 1, E1= 1 E2= 0 E3= 0, Prior.:  .182
10:00:16.225 0  Add to disp. list: Class 1, Q0= 6 Q1=14 Q2= 6 Q3= 4
                D-List Priority:   .008 (  .012), IABIAS
                Tot. rel. share=43920, Tot. abs. share=  3%, ETS=0.571
                PGS: Total available=03169, Total WSS=10778, Our WSS=01101
                     RES=01122, LIM=50682, XSTORE=00140, Reads=0000/s
                IUCV/VMCF int. pending, Last SEND to *MONITOR
10:00:16.797 0  Drop from disp. list: SIM-Wait
                Scheduler State: Susp. short-time event, MTS:    3
                Last SEND to *MONITOR
10:00:16.826 0  Add to elig. list: Class 0, E1= 0 E2= 0 E3= 0, Prior.: 99999
10:00:16.826 0  Add to disp. list: Class 0, Q0= 7 Q1=12 Q2= 7 Q3= 4
                D-List Priority:   .000 (  .008), Lock Shot, IABIAS
                Tot. rel. share=51700, Tot. abs. share=  3%, ETS=3.446
                PGS: Total available=03050, Total WSS=10045, Our WSS=01122
                     RES=01125, LIM=00001, XSTORE=00140, Reads=0000/s
                Last SEND to *MONITOR
10:00:16.826 0  Drop from disp. list:
                Scheduler State: Selected for processing, MTS:    0
                Last SEND to *MONITOR

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 73. Layout of User Transaction Details Screen (FCX174)

The information shown is based on CP monitor USER domain EVENT data and on SCHEDULER domain EVENT data.

Note that EVENT data collection for all users can cause considerable overhead on a large system. Activate this part of data collection only for periods where you really need the information for analysis, or only for a subset of users.

The sample shows a screen where both USER and SCHEDULER domain event data were enabled for the user. The display can also be selected when only USER domain event data are available, but the queue add/drop entries will then be missing.

Field Description:

xxxxxxx **share per processor**
Indicates the virtual machine's share, as specified in its directory or by command. *xxxxxxx* will be either `Relative` or `Absolute`.

Max. *xxx***. share per processor**
Indicates the virtual machine's maximum share, as specified in its directory or by command. *xxx.* will be either `rel.` or `abs.` to indicate whether a relative or absolute share maximum has been set.

The maximum share string will be omitted where no maximum share has been set for a virtual machine.

Time Stamp
The exact time, in hours, minutes, seconds and milliseconds when a particular event was recorded.

The string `>>Trans. End` will be inserted instead for the line containing the resource consumption data for the preceding transaction when scheduler domain data were also processed for the user.

CPU The number of the virtual CPU on which the logged activity took place.

Resp Time (sec)
The response time for the transaction. This field, and also all of the remaining field descriptors in the header lines, applies only to the transaction end data lines.

Resource Utilization per Transaction: Utilization figures for a variety of resources are shown under this heading.

CPU msec
The CPU time used per transaction, in msec

Disk I/O
The number of disk I/O requests per transaction

Page Flts
The number of page faults per transaction

Xpage reads
The number of pages moved from expanded storage to central storage per transaction

Spooling SP_RD
The number of UR read operations from spool per transaction

Spooling SP_WR
The number of UR write operations to spool per transaction

IU_BY
The number of IUCV and VMCF data transfers from this user to another virtual machine, or to CP, per transaction

IU_TO
The number of IUCV and VMCF data transfers to this user, per transaction

The scheduler activity entries are largely self-explanatory. The three possible entries are

- `Add to elig. list`
- `Add to disp. list`
- `Drop from disp. list`

A short description of each entry follows:

Add to eligible list entries: They have the following general layout:

```
Add to elig. list: Class n, E1= m E2= m E3= m, Prior.: p.ppp
```

where:

Class Indicates the class (0-3) which was assigned to the transaction

E1= Indicates the total number of class 1 users in the eligible list

E2= Indicates the total number of class 2 users in the eligible list

E3= Indicates the total number of class 3 users in the eligible list

Prior. Indicates the eligible list priority assigned to the user

Add to dispatch list entries: They have the following general layout:

```
Add to disp. list: Class n, Q0= m Q1= m Q2= m Q3= m
D-List Priority:   .nnn (  .nnn), aaaaaaaa
Tot. rel. share=nnnnn, Tot. abs. share=nnn%, ETS=n.nnn
PGS: Total available=nnnnn, Total WSS=nnnnn, Our WSS=nnnnn
     RES=nnnnn, LIM=nnnnn, XSTORE=nnnnn, Reads=nnnn/s
bbbbbbbb
```

where:

Class Indicates the class (0-3) which was assigned to the transaction

Q0= Indicates the total number of class 0 users in the dispatch list (quick dispatch)

Q1= Indicates the total number of class 1 users in the dispatch list

Q2= Indicates the total number of class 2 users in the dispatch list

Q3= Indicates the total number of class 3 users in the dispatch list

D-List Priority
Indicates the user's:

- *Actual* dispatch list priority, and
- In parentheses the dispatch list priority *before* adjustments for factors such as interactive bias and paging bias.

aaaaaaaa
Can indicate one or several of the following conditions:

- Hot Shot
- Lock Shot
- Hot Shot Req.
- IABIAS
- Loading

Tot. rel. share
Is the sum of the relative shares of all users in the dispatch list

Tot. abs. share
Is the sum of the absolute shares of all users in the dispatch list

ETS Is the current length of the elapsed time slice for the user's class

PGS: Indicates that the following fields contain information on storage utilization and paging

Total available
Is the total number of pages available to the dispatcher

Total WSS
Is the total working set size, in pages, of all users in the dispatch list

Our WSS
Is the size of the monitored user's working set, in pages

RES Is the number of the monitored user's resident pages

LIM Is the page growth limit

XSTORE
Is the number of allocated XSTORE blocks

Reads
Is the page read rate

bbbbbbbb
Can provide some more special status information. A combination of the following strings can be shown:

SVM Wait
If the user was in SVM wait for IUCV/VMCF

IUCV/VMCF int. pending
If an IUCV or VMCF external interrupt was pending

Last SEND to
Provides the target of the last IUCV or VMCF SEND operation

Drop from dispatch list entries: They have the following general layout:

```
Drop from disp. list: cccccccc
Scheduler State: dddddddd, MTS:   nn
eeeeeeee
```

where:

cccccccc
Can be a combination of the following:

- Pre-empted (due to large storage requirements)
- CF-Wait
- SIM-Wait
- I/O-Wait

Scheduler State
One of the following states will be inserted for *dddddddd*:

- Review suspended
- Review idle
- Selected for processing
- Ready for dispatcher
- Test-idle
- Susp. short time event
- Idle

MTS Shows the number of minor time slices which have expired since the beginning of the transaction.

eeeeeeee
Can be a combination of the following:

SVM Wait
If the user was in service machine wait for IUCV/VMCF

IUCV/VMCF int. pending
If an IUCV or VMCF external interrupt was still pending

Last SEND to
Provides the target of the last IUCV or VMCF SEND operation

Seeks information: Where seeks data collection has been enabled for disks with some I/O activity from the monitored user, additional entries with seeks information may be included in the log, as follows:

```
nnnn SEEKs to MDISK xxxx:  rr% Reads, Av. Displ. ccccc Cyl.
```

where:

nnnn Is the number of seek operations to the minidisk since the last queue drop

xxxx Is the virtual device number of the minidisk

rr Is the percentage of read operations

ccccc Is the average access arm displacement in cylinders

Note that:

- Minidisk seeks statistics show the I/O activity to a minidisk for the whole period since the last queue drop
- They are inserted when a queue drop monitor record is processed and show the same time stamp as that queue drop, i.e. this is *not* the time of the actual I/O activity.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX175, Scheduler Data Log Screen – SCHDATA

Performance Toolkit Subcommand: "SCHDATA" on page 272.

The Scheduler Data Log Screen (FCX175) shows a 'by time' log of some of the smoothed scheduler data fields which are used by scheduler algorithms:

```
FCX175      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Scheduler <Page Read>  Page <-Resource->  <-- Aver. User Load -->  <Expansion>
Interval   Rate  msec Steal <-Weights-->  <-Class 1-> All Classes  <-Factors->
End Time  Pgs/s   /Pg Value Stor. Paging  Pgs/s   WSS Pgs/s   WSS  Cl1 Cl2 Cl3
>>Mean>>    203    18     0    16       1      0   317     1   316  2.0 2.0 2.0
09:34:01    209    17     0    14       0      0   318     1   312  2.0 2.0 2.0
09:35:01    199    17     0    14       1      0   330     1   326  2.0 2.0 2.0
09:36:01    200    17     0    17       2      0   334     1   317  2.0 2.0 2.0
09:37:01    182    17     0    14       0      0   320     1   307  2.0 2.0 2.0
09:38:01    198    17     0    15       0      0   316     1   333  2.0 2.0 2.0
09:39:01    202    17     0    18       0      0   328     1   324  2.0 2.0 2.0
09:40:01    203    17     0    17       2      0   324     1   313  2.0 2.0 2.0
09:41:01    194    18     0    18       0      0   316     1   306  2.0 2.0 2.0
09:42:01    195    19     0    16       0      0   306     1   317  2.0 2.0 2.0
09:43:01    192    19     0    15       0      0   325     1   343  2.0 2.0 2.0
09:44:01    200    19     0    14       1      0   320     1   315  2.0 2.0 2.0
09:45:01    205    19     0    13       0      0   317     1   289  2.0 2.0 2.0
09:46:01    194    19     0    15       2      0   319     1   306  2.0 2.0 2.0
09:47:01    202    19     0    18       1      0   320     1   302  2.0 2.0 2.0
09:48:01    214    19     0    19       2      0   333     1   330  2.0 2.0 2.0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 74. Layout of Scheduler Data Log Screen (FCX175)

The information shown is based on SCHEDULER domain EVENT data.

The leftmost column contains the time stamp of the last data record (format *hh:mm:ss*)

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Scheduler Interval End Time' column.

Field Description:

Scheduler Interval End Time
: The end time of the last scheduler interval or the BYTIME interval which fell into the last monitor sample interval.

  Note that scheduler data records are generated in an interval which is independent of the monitor sample interval. Since the length of the interval is currently 30 seconds, more than one such data record will usually be generated in one monitor sample interval. Average values are then calculated for all records which were obtained during the last monitor sample interval.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Page Read shows the following information on page reads:

Rate Pgs/s
: The page read rate, per second

msec/Pg
The elapsed time per page read

Page Steal Value
Corresponds to the STEAL parameter in the INDICATE LOAD subcommand

Resource Weights:

Stor. The resource weight for storage. Used by the scheduler to decide how much of a bottleneck the storage resources are.

Paging
The resource weight for paging. Used by the scheduler to decide how much of a bottleneck the paging resources are.

Average User Load shows paging and storage consumption for the average user:

Class 1 Pgs/s
The average page rate of class 1 users at the end of their Q1 dispatch list stay

Class 1 WSS
The average working set size of class 1 users at the end of their Q1 dispatch list stay

All Classes Pgs/s
The average page rate of all users at the end of their dispatch list stay

All Classes WSS
The average working set size of all users at the end of their dispatch list stay

Expansion Factors:

Cl1 The ratio of time it is taking for a short transaction to complete, compared with the amount of time it would take if it were running alone on the system.

Cl2 The ratio of time it is taking for a medium transaction to complete, compared with the amount of time it would take if it were running alone on the system.

Cl3 The ratio of time it is taking for a long transaction to complete, compared with the amount of time it would take if it were running alone on the system.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX176, Cached Control Units Screen – CTLUNIT

Performance Toolkit Subcommand: "CTLUNIT" on page 164.

The Cached Control Units Screen (FCX176) shows overall load information on cached control units, the use made, and the effectiveness of the cache. Control units which have been active during the last measuring interval will be highlighted on the screen.

```
FCX176      CPU nnnn  SER nnnnn  Interval HH:MM:SS    Perf. Monitor

____ .          .     .     .     .     .     .     .     .     .     .     .     .     .     .     .     .     .     .     .     .
Sub-          <-----Cache Size------> <----------- DASD Load Data ------------> <----------- Cache Utilization Data ------------>
sys-          <Volatile-> <Non-Volat> <--Total-->                               <-Total Rates/s-> <-------- Percentages -------->
tem  Control <--(MB)---> <--(kB)---> <I/O rates>  Pct <----- Time (ms) ------>  Read  Read Write      </TotWrt> <-----Hits----->
ID   Unit     Conf Avail NV-Cf NV-Av Cache SCMBK Busy Pend Disc Conn Serv Resp N-Seq   Seq    FW Read %DFW %CFW RdHt Wrt DFW CFW
0003 1750-E8  1315   963  131k  131k    .0   2.1    0 .114 .000 .083 .197 .197    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0004 1750-E8  1315   963  131k  131k    .0   2.1    0 .394 .000 .083 .477 .477    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0006 1750-E8  1315   963  131k  131k    .0   1.1    0 .350 .000 .174 .524 .524    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0101 2107-E8 13920 11128  524k  524k    .0   2.4    0 .122 .000 .075 .197 .197    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0102 2107-E8 13920 11128  524k  524k    .0   2.4    0 .122 .000 .085 .206 .206    .0    .0    .0    0  100    0   ..  100 100  ..
0103 2107-E8 13920 11128  524k  524k    .0   2.4    0 .124 .000 .082 .206 .206    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0104 2107-E8 13920 11128  524k  524k    .0   2.4    0 .124 .000 .075 .199 .199    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0105 2107-E8 13920 11128  524k  524k    .0   2.4    0 .121 .000 .088 .209 .209    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0108 2107-E8 13920 11128  524k  524k    .0    .3    0 .115 .000 .064 .179 .179    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0109 2107-E8 13920 11128  524k  524k    .0    .1    0 .112 .000 .080 .192 .192    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
010A 2107-E8 13920 11128  524k  524k    .0    .1    0 .128 .000 .064 .192 .192    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
010B 2107-E8 13920 11128  524k  524k    .0    .1    0 .128 .000 .064 .192 .192    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
010C 2107-E8 13920 11128  524k  524k    .0    .1    0 .128 .000 .064 .192 .192    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
010D 2107-E8 13920 11128  524k  524k    .0    .1    0 .096 .000 .064 .160 .160    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
010E 2107-E8 13920 11128  524k  524k    .0    .1    0 .112 .000 .064 .176 .176    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0200 2107-E8 13920 11128  524k  524k    .0   2.0    0 .193 .000 .147 .340 .340    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0201 2107-E8 13920 11128  524k  524k    .0    .2    0 .128 .000 .082 .210 .210    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0202 2107-E8 13920 11128  524k  524k    .0    .1    0 .128 .000 .080 .208 .208    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0208 2107-E8 13920 11128  524k  524k    .0   7.3    0 .202 .000 .167 .368 .368    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0227 2107-E8 13920 11128  524k  524k    .0    .2    0 .160 .000 .107 .267 .267    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0229 2107-E8 13920 11128  524k  524k    .0    .4    0 .305 .000 .256 .561 .561    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
022D 2107-E8 13920 11128  524k  524k    .0    .2    0 .192 .000 .128 .320 .320    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0304 2107-E8  192k  172k 6291k 6291k    .0    .3    0 .128 .000 .100 .228 .228    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
0309 2107-E8  192k  172k 6291k 6291k 702.5 454.8    0 .126 .020 .504 .650 .650    .1    .0 702.4    0  100    0   17  100 100  ..
0325 2107-E8  192k  172k 6291k 6291k    .0   1.2    0 .105 .000 .066 .171 .171    .0    .0    .0   ..   ..   ..   ..  ..  ..  ..
...

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 75. Layout of Cached Control Units Screen (FCX176)

The information shown is based on MONITOR and I/O domain data.

The sample shows a screen with performance information for a number of 3990-3 control units, sorted to their subsystem ID (as indicated by the underscore characters '____' above the 'Subsystem ID' header). Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the column heading (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Field Descriptions for Overall Performance:

Subsystem ID
Is the control unit's subsystem identifier

Control Unit
Is the control unit type and model.

Different models of IBM DASD subsystems will be recognized and displayed as such only if they are operating in enhanced mode; otherwise they will be shown as 3990-3 control units.

Cache Size gives information on the amount of storage which is available for caching:

Conf Shows the size of configured cache storage, in Megabytes

Avail Shows the amount of cache storage which is available, in Megabytes

NV-Cf
Shows the size of configured non-volatile storage, in kilobytes

NV-Av
Shows the amount of non-volatile storage which is available, in kilobytes

DASD Load Data gives overall load information on the performance of all disks which are connected to the cached control unit:

I/O rates Cache
Shows the total I/O activity as it is perceived by the cached control unit, i.e. where multiple systems are connected to one control unit the total I/O activity from *all* systems is shown.

I/O rates SCMBK
Shows the total I/O activity as determined from count fields in the subchannel measurement blocks of the system which does the monitoring, i.e. only the I/O requests from that system.

Since the busy percentage and all of the service time components are calculated from subchannel measurement data, the same restrictions apply also to the next six fields.

Pct Busy
Average busy percentage for all connected disks.

Pend Average 'function pending' time (msec). This is the average time an I/O request remained pending in the I/O subsystem due to path busy conditions.

Disc Average 'disconnected' time This is the average time that the device remained disconnected from the channel while executing I/O requests. For DASD it includes the time spent for executing the SEEK and SET SECTOR orders and also any re-connect misses. High values may indicate overloaded paths, or many long SEEKs to data at opposite ends of the device.

The value also includes the 'device-active-only' time where that information is available.

Conn Average 'connected' time (msec). This is the average time that the device was connected to the channel while executing I/O requests, i.e. receiving commands or actually transferring data. It includes also the SEARCH time.

Serv Average service time, i.e. the sum of function pending, disconnected and connected time

Resp Device response time. This is the device service time plus the time during which an I/O request was waiting to be started. It is calculated based on the average I/O request queue length and the I/O rate.

Note that averages for the control unit queuing time are not included on this display due to space restrictions. See the `CUWt` field of "DEVICE" on page 169 for queuing times of individual DASD.

Cache Utilization Data shows overall information on the activity and efficiency of the cached control unit.

Total Rates/s:

Read N-Seq
Total non-sequential read rate, per second

Read Seq
Total sequential read rate, per second

Write FW
Total fast-write write rate, per second

Percentages:

Read Average percentage of read operations, based on the sum of read and write operations

/TotWrt %DFW
Average percentage of DASD fast-write write operations, based on the sum of all write operations

/TotWrt %CFW
Average percentage of cache fast-write write operations, based on the sum of all write operations

Hits RdHt
Average read percentage

Hits Wrt
Average write percentage, for DASD *and* cache fast write operations

Hits DFW
Average DASD fast-write hit percentage

Hits CFW
Average cache fast-write hit percentage

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields.

FCX177, Cache Extended Functions Screen – CACHEXT

Performance Toolkit Subcommand: "CACHEXT" on page 150.

The Cache Extended Functions Screen (FCX177) shows performance data for disks connected to a cached control unit capable of handling extended functions, and it gives information on the use made and the effectiveness of the cache. Devices which have been active during the last measuring interval will be highlighted on the screen.

```
FCX177      CPU nnnn  SER nnnnn  Interval hh:mm:ss    Perf. Monitor
____ .      .      .    . . . .       .     .     .     .     .    .    .    .
<--Device Descr.-> Stg  C D D     <--------- Rate/s ----------> <-------------
                   Ctlr A F U     Total Total  Read  Read Write      <--------
Addr Type   VOLSER ID   C W L ST  Cache SCMBK N-Seq   Seq    FW Read  Tot RdHt
1760 3390-2 USE742 0008 A A - 00     .4    .3    .0    .0    .3    8   82   11
1761 3390-2 USE746 0008 A A - 00     .6    .5    .1    .0    .5   22   53   25
1762 3390-2 USE798 0008 A A - 00    1.7   1.0    .3    .0   1.5   16   66   26
1763 3390-2 USE799 0008 A A - 00    1.0    .5    .2    .0    .8   17   64   18
1764 3390-2 USE71A 0008 A A - 00     .1    .0    .0    .0    .1    0   89   ..
1765 3390-2 USE71C 0008 A A - 00    1.6    .9    .2    .0   1.4   15   70   33
1766 3390-2 FR1766 0008 D A - C0     .0    .0    .0    .0    .0   ..   ..   ..
1767 3390-2 FR1767 0008 D A - C0     .0    .0    .0    .0    .0   ..   ..   ..
1780 3390-2 USE803 0006 A A - 00   66.6  63.6  65.9    .0    .7   99   98   98
1781 3390-2 USE804 0006 A A - 00     .4    .0    .1    .0    .3   17   95   68
1782 3390-2 USE725 0006 A A - 00     .2    .1    .0    .0    .2    5   97   33
1783 3390-2 USE805 0006 A A - 00     .1    .0    .1    .0    .0   86   67   67
1784 3390-2 FR1784 0006 A A - 00     .0    .0    .0    .0    .0   ..   ..   ..
1785 3390-2 FR1785 0006 A A - 00     .0    .0    .0    .0    .0   ..   ..   ..
1786 3390-2 USE806 0006 A A - 00     .1    .0    .0    .0    .1   35   90   73
1787 3390-2 USE727 0006 A A - 00    2.2   1.1    .0    .0   2.1    1   96   11
1788 3390-2 SYE003 0006 A A - 00    6.8   4.0   6.1    .0    .7   89   91   90
Select a device for I/O device details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 76. Layout of Cache Extended Functions Screen (FCX177)

The information shown is based on MONITOR and I/O domain data.

The sample shows a screen with performance information for 3390 disks which have been sorted for ascending DASD device number (indicated by the underscore characters '____' above the 'Addr' header). Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the column heading (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

For more detailed information on the load of one specific disk either:

- Place the cursor on the `Addr` field of the device you are interested in and press ENTER, or
- Enter the subcommand 'DEVICE *devno*' on the command line

Field Description:

The following field descriptions apply to both the CACHEXT and CACHELOG *devno* displays, with the exception of the `Addr` field which will be replaced by the field `Interval End Time` on the CACHELOG display and the `Time Outs` field which will be abbreviated to a simple `T`.

Device Descr. provides some general information about the disks:

Addr Disk device number

Type Device type and model. For alias parallel access volumes of an IBM DASD Subsystem, the device type is replaced by the string:

```
-> xxxx
```

where xxxx is the device number of the base parallel access volume.

VOLSER
Disk label

Stg Ctlr ID
Storage controller subsystem identifier

CAC Caching status, as follows

A Caching is activated

D Caching is deactivated

P Deactivate is pending

DFW Status of DASD fast write, as follows

A DASD fast write is activated

D DASD fast write is deactivated

P DASD fast write deactivate is pending

DUL Status of dual copy, as follows

- Dual copy not active for the disk

1 Disk is primary device of a dual copy pair, dual copy active

2 Disk is secondary device of a dual pair, dual copy active

D Dual copy has been suspended

P Dual copy deactivate is pending

ST Caching status flag in hexadecimal representation, where

```
Bits 0-1
 '00'  Caching activated
 '01'  Reserved
 '10'  Deactivate pending
 '11'  Caching deactivated

Bits 2-3
 '00'  DASD fast write allowed
 '01'  Reserved
 '10'  DASD fast write deactivate is pending
 '11'  DASD fast write deactivated

Bit 4: Primary device of duplex pair, if set

Bit 5: Secondary device of duplex pair, if set

Bits 6-7
 '00'  Duplex pair available
 '01'  Duplex pair pending
       (copy to establish duplex pair in progress)
 '10'  Failed duplex, original on primary
 '11'  Suspended duplex, original not on primary
```

Rate/s shows cache activity, as the number of I/Os per second:

Total Cache
Total I/O rate for the disk as it is perceived by the cached control unit, i.e. where multiple systems are connected to one control unit the total I/O activity from *all* systems is shown.

Total SCMBK
I/O rate as indicated by subchannel measurement block data for the system which does the monitoring, i.e. only the I/O activity for that system is included.

Where V=R guest systems can set up their own subchannel measurement blocks for dedicated disks, SIE assisted I/O activity to such disks will not be included either.

Read N-Seq
Non-sequential read rate (read normal + read CFW)

Read Seq
Sequential read rate (read sequential)

Write FW
Total write fast write rate (CFW + DFW)

Percent Hits shows cache efficiency percentages:

Read Percentage of cachable read operations, based on total I/O activity

Tot Percentage of total hits (read + CFW + DFW), based on the sum of all cachable read and write operations

RdHt Percentage of read hits, based on the sum of all cachable read operations

Wrt Percentage of write hits (DASD FW + cache FW), based on the sum of all DASD and cache fast write write operations

DFW Percentage of DASD fast write hits, based on the sum of all DASD fast write write operations

CFW Percentage of cache fast write hits, based on the sum of all cache fast write write operations

Percent /TotWrt shows DASD and cache fast write utilization percentages:

/TotWrt %DFW
Percentage of DASD fast write operations, based on total write activity

/TotWrt %CFW
Percentage of cache fast write operations, based on total write activity

Percent Staging shows staging/destaging percentages, based on total cache I/O activity:

Norm Percent of non-sequential DASD to cache transfer operations

%Seq Percent of sequential DASD to cache transfer operations

DeSt Percent of cache to DASD transfer operations

Percent of cache bypass operations, based on total cache I/O activity:

DFW Byps
Percent of DASD fast write operations which were forced to bypass the cache and access DASD directly due to non-volatile storage constraints

BYP+ICL
Percentage of I/O operations which bypassed caching voluntarily

Time Outs
Number of timeouts that occurred while waiting for data from the control unit (status = -2). The field is left empty when no timeouts were found.

On the CACHELOG display the field name will be abbreviated to 'T' and an asterisk will be inserted if timeouts have occurred.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields.

FCX178, Minidisk Cache Storage Log Screen – MDCSTOR

Performance Toolkit Subcommand: "MDCSTOR" on page 232.

The Minidisk Cache Storage Log Screen (FCX178) shows minidisk cache storage utilization data by time:

```
FCX178      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <---------------- Main Storage Frames -----------------> <----------
Interval         <--Actual--->    Min    Max  Page    Steal
End Time   Ideal   <2GB   >2GB    Set    Set Del/s Invokd/s   Bias  Ideal Actu
>>Mean>>   94948  42088 519166      0 655360   299     .240   1.00  16384  162
11:23:58  102479  41600 380397      0 655360   244     .200   1.00  16384  162
11:24:58  102522  41655 387876      0 655360   245     .200   1.00  16384  163
11:25:58  102216  41689 394707      0 655360   271     .250   1.00  16384  161
11:26:58  101257  41730 402826      0 655360   279     .217   1.00  16384  163
11:27:58  101179  41743 413336      0 655360   322     .250   1.00  16384  162
11:28:58  103179  41761 423091      0 655360   222     .183   1.00  16384  161
11:29:58  100248  41769 429965      0 655360   340     .250   1.00  16384  163
11:30:58   99880  41790 438826      0 655360   273     .233   1.00  16384  162
11:31:58   99335  41874 447344      0 655360   300     .233   1.00  16384  162
11:32:58   98832  41938 456691      0 655360   257     .200   1.00  16384  161
11:33:58   98168  41974 464636      0 655360   300     .233   1.00  16384  163
11:34:58   98062  41992 473121      0 655360   251     .217   1.00  16384  163
11:35:58   97119  41998 482695      0 655360   308     .250   1.00  16384  162
11:36:58   96477  41986 491686      0 655360   307     .250   1.00  16384  161
11:37:58   95730  41963 500476      0 655360   300     .233   1.00  16384  162
See MDCACHE display for minidisk cache activity log
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 77. Layout of Minidisk Cache Storage Log Screen (FCX178)

The information shown is based on CP monitor SYSTEM domain SAMPLE data.

The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Main Storage Frames:

Ideal The ideal number of main storage page frames in the minidisk cache (based on average age of a page in DPA, determined by arbiter)

Actual <2GB
The actual number of main storage page frames used for the minidisk cache below the 2GB line

Actual >2GB
The actual number of main storage page frames used for the minidisk cache above the 2GB line. The field is available only for z/VM systems running in 64-bit mode.

Min Set
The minimum number of main storage pages to be used for the minidisk cache

Max Set
The maximum number of main storage pages to be used for the minidisk cache

Page Del/s
The number of main storage pages deleted from cache per second

Steal Invokd/s
The number of times the steal function was invoked to steal main storage pages from cache per second

Bias The bias for minidisk cache usage of real storage. A number less than 1 is a bias against minidisk cache; a number greater than 1 is a bias for minidisk cache.

Expanded Storage Blocks:

Ideal The ideal number of expanded storage blocks in the minidisk cache (based on average age of an XSTORE block, as determined by arbiter)

Actual
The actual number of expanded storage blocks used for the minidisk cache

Min Set
The minimum number of expanded storage blocks to be used for the minidisk cache

Max Set
The maximum number of expanded storage blocks to be used for the minidisk cache

Page Del/s
The number of XSTORE pages deleted from cache per second

Steal Invokd/s
The number of times the steal function was invoked to steal expanded storage pages from cache per second

Bias The bias for minidisk cache use of expanded storage. A number less than 1 is a bias against minidisk cache; a number greater than 1 is a bias for minidisk cache.

Age The average age of paging XSTORE blocks

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX179, System Facilities Log Screen – SYSLOG

Performance Toolkit Subcommand: "SYSLOG" on page 303.

The System Facilities Log Screen (FCX179) shows a 'by time' log of system facilities utilization.

```
FCX179      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <---------------------- Fast CCW Translations/s --------------------->
          <---------- for DASD Devices ----------> <-- for Network Devices -->    User
Interval  <------- Command ---------> <-Transport>                               Exit
End Time   Done  Abort Notelig  Total Write   Done  Done  Abort Notelig  Total  (usec)
>>Mean>>      2      0       0      2     4      9     1      0       0      1       0
08:00:21      0      0       0      0     0      0     0      0       0      0       0
08:05:21      0      0       0      0     0      0     0      0       0      0       0
08:10:21      0      0       0      0     0      0     0      0       0      0       0
08:15:21      0      0       0      0     0      0     0      0       0      0       0
08:20:21      0      0       0      0     0      0     0      0       0      0       0
08:25:21      0      0       0      0     0      0     0      0       0      0       0
08:30:21      0      0       0      0     0      0     0      0       0      0       0
08:35:21      0      0       0      0     0      0     0      0       0      0       0
08:40:21      0      0       0      0     0      0     0      0       0      0       0
08:45:21      0      0       0      0     0      0     0      0       0      0       0
08:50:21      0      0       0      0     0      0     3      0       0      3       0
08:55:21      0      0       0      0     0      0     0      0       0      0       0
09:00:21      0      0       0      0     0      0     0      0       0      0       0
09:05:21      0      0       0      0     0      0     0      0       0      0       0
09:10:21      0      0       0      0     0      0     0      0       0      0       0
09:15:21      0      0       0      0     0      0     0      0       0      0       0
09:20:21      0      0       0      0     0      0     0      0       0      0       0
09:25:21      0      0       0      0     0      0     0      0       0      0       0
09:30:21      0      0       0      0     0      0     0      0       0      0       0
09:35:21      1      0       0      1     0      0     0      0       0      0       0
09:40:21     13      0       0     13     0      0     0      0       0      0       0
09:45:21      0      0       0      0     0      0     0      0       0      0       0
09:50:21      0      0       0      0     0      0     0      0       0      0       0
09:55:21     11      0       0     11     0      0     1      0       0      1       0
10:00:21     21      0       0     21     0      0     0      0       0      0       0
10:05:21     18      0       0     18     0      0     0      0       0      0       0
10:10:21     20      0       0     20     0      0     0      0       0      0       0
10:15:21     20      0       0     20     0      0     0      0       0      0       0
10:20:21     21      0       0     21    17     44     0      0       0      0       0
10:22:21     19      0       0     19   667   1668     0      0       0      0       0

Command ===>
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 78. Layout of System Facilities Log Screen (FCX179)

The information shown is based on SYSTEM domain SAMPLE data.

The leftmost column contains the end time (format *hh:mm:ss*) of the interval for which the values were calculated.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
The end time of the sample interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Fast CCW Translations/s: These fields show information on the activity of the fast CCW translation code. For z/VM V.4.1 and later, two different sets of CCW translation rates are provided:

- *For DASD Devices* and
- *For Network Devices*,

showing the CCW translation activity for CCW chains directed at disks and network devices respectively. Only CCW translations for DASD devices are reported on prior VM releases.

Done Successfully translated CCWs per second

Abort Aborted translation attempts per second

Notelig
Number of CCWs which were found to be not eligible for translation, per second

Total Total number of CCWs handled per second

Transport Write
Number of times a write channel program for a DASD device was presented for HPF DCW translation.

Transport Done
Number of times HPF DCW translation processing completed successfully for a DASD device.

User Exit
Time spent processing user exit code, in microseconds

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX180, System Configuration Screen – SYSCONF

Performance Toolkit Subcommand: "SYSCONF" on page 301.

The System Configuration Screen (FCX180):

```
FCX180      CPU 2097  SER 0312E        System Config.            Perf. Monitor

System History for GDLFCFCT  (running in LPAR)
CP Level                z/VM Version 6.2.0, Service Level 0000 (64-bit)
CP Load Module          CPLOAD    Generated  2010/06/30 at 09:06:39
Last Termination Time   2010/07/05 at 20:03:00
Last Termination Code   ........
Last IPL Time           2010/07/05 at 20:04:29
Time Zone Offset        -04:00:00 From Greenwich Mean Time
Checkpoint Volume       FC2A60
Warmstart Volume        FC2A60
PDR       Volume        ......
Capacity Indic./Reason  000/000 (Facility not installed)
Unified Resource Mgr    Not Available
Ensemble ID             ..............................
Channel subsystem ID    02
Enhanced CMF            Not Available
Polarization mode       Vertical
Topology check/changes  834/4
Plant and Sequence Code 02 AEE75

Server Time Protocol (STP) facility configuration
XRC_TEST enabled            No        XRC_OPTIONAL enabled        No
STP H/W feature installed   No        STP H/W feature enabled     No
STP Timestamping enabled    No        STP Timezone usage enabled  No
STP is active               No        STP is suspended            No
STP susp. message issued    No
STP TOD clock offset        +00:00:00.0000000000

Initial Status on 2010/07/06 at 11:32, Processor 2097-742
Real Proc: Cap   904, Total 64, Conf 42, Stby  0, Resvd 22
Sec. Proc: Cap   904, Total 22, Conf 22, Stby  0, Resvd  0
Log. CP  : CAF    71, Total 16, Conf  3, Stby 13, Resvd  0, Ded  0, Shrd  3
Log. ZIIP: CAF   333, Total  1, Conf  1, Stby  0, Resvd  0, Ded  0, Shrd  0


<------ Processor ------>    Crypto Facility
Num Serial-Nr Type Topology    ID      Status
 1   00312E   CP   00.01.H    ..      Offline
 2   00312E   CP   00.01.HD   ..      Offline
11   00312E   ZIIP 01.01.Vl   ..      Offline
20   00312E   CP   01.01.Vm   ..      Offline
Processor Configuration Mode: VM

Changed System Status
Date  Time        Changed
08/25 00:29:38  *** Status refreshed ***
08/25 00:50:40  System Topology changed. Check/Change count is 3421/7
08/25 00:55:40  System polarization mode changed to Vertical (by Administrator)
08/25 00:55:40  System polarization mode changed to Horzontal (Detected)


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 79. Layout of System Configuration Screen (FCX180)

The information shown is based on MONITOR domain SAMPLE data.

Field Descriptions:

System History for SYSTEMID:

The string '`for` *systemid*' will be omitted in MONSCAN mode for z/VM systems where the system identification is not available. One of the following strings may be appended in realtime monitoring mode if the system is not running first level, or is running in a logical partition:

```
(running 2nd level)
(running in LPAR)
(running 2nd level in LPAR)
```

The correct level will be inserted if it is higher than second level.

CP Level
CP level with version, release, modification level, and service level. The string '`(64-bit)`' will be appended when operating in 64-bit mode.

CP Load Module
Name of CP load module used to IPL the z/VM system.

When running on z/VM systems earlier than V6.2, you will see dashes ("---") in this field.

Generated
Date and time of system generation of the CP Load Module.

When running on z/VM systems earlier than V6.2, you will see dashes ("---") in this field.

Last Termination Time
Date and time of last termination, if available. Dots are shown otherwise.

Last Termination Code
Abend code of last termination, if available. Dots are shown otherwise.

Last IPL Time
Date and time of last IPL.

Time Zone Offset
Time zone difference to Greenwich Mean Time.

Checkpoint Volume
Disk label of the volume that contains the checkpoint cylinders.

Warmstart Volume
Disk label of the volume that contains the warmstart cylinders.

PDR Volume
Disk label of the volume that contains the Persistent Data Record of the VMSSI configuration. When running on z/VM systems earlier than V6.2, you will see dashes ("---") in this field.

Capacity Ind./Reason
Capacity-Change Reason and Capacity-Adjustment Indication values. When CAI is zero, the indication is not reported. When it is in the range 1-99, some amount of reduction is indicated. When 100, the machine is operating at its normal capacity. The CAI displays the aggregate position of model-dependent controls and should not be assumed to be a direct correlation to the difference between primary and nominal values. The CCR indicates the last CAI change reason.

When running on z/VM systems earlier than V6.2, you will see dashes ("---/---") in this field.

Unified Resource Mgr
Indicates whether system is managed by the Unified Resource Manager. Possible values are:

- Not Available
- Disabled by CP
- Waiting for SMAPI
- Server Disabled by SMAPI Server
- Available
- Unknown

When running on z/VM systems earlier than V6.2, you will see dashes ("---/---") in this field.

Ensemble ID
The Unified Resource Manager ensemble identifier.

When running on z/VM systems earlier than V6.2, you will see dashes ("---") in this field.

Channel subsystem ID
The Channel subsystem (CSS) identifier (in hexadecimal).

When running on z/VM systems earlier than V6.2, you will see dashes ("---") in this field.

Enhanced CMF
Indicates whether the Enhanced Channel Measurement Facility is installed and available.

Polarization mode
The polarization mode: Vertical or Horizontal.

When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

Topology check/changes
Cumulative count of checks and detected changes of topology configuration.

When running on z/VM systems earlier than V6.3, you will see dashes ("---/---") in this field.

Plant and Sequence Code
The plant ID of manufacture and Sequence Code for this CEC hardware.

Server Time Protocol (STP) facility configuration:

Shows the Server Time Protocol facility configuration settings. When running on z/VM systems earlier than V6.2, you will see dashes ("---") in these fields. Further STP configuration details are shown below:

XRC_TEST enabled
XRC_TEST enabled in the configuration file.

XRC_OPTIONAL enabled
XRC_OPTIONAL enabled in the configuration file.

STP H/W feature installed
STP hardware feature is installed.

STP H/W feature enabled
STP hardware feature is enabled .

STP Timestamping enabled
STP Timestamping enabled in the configuration file.

STP Timezone usage enabled
STP Timezone usage enabled in the configuration file.

STP is active
STP is active.

STP is suspended
STP is suspended.

STP susp. message issued
STP suspension message has been issued.

STP TOD clock offset
STP TOD clock offset in the format *+HH:MM:SS.sssssssss*. The fractional part *sssssssss* provides the precision of 0.1 nanoseconds sufficient to display any TOD clock value.

Initial/Refresh Status:

Shows date (in *yyyy/mm/dd* format) and time (in *hh:mm* format) when the status was obtained – that is, when monitoring was last activated (or reactivated). The processor type and model, as well as the real, logical, and virtual CPU configurations, are also displayed (when available), as follows:

Real Proc
The counts of the real processors on the machine and the capability of these.

Sec. Proc
The counts of secondary processors on the machine and the capability of these.

Virt Proc
The counts of the virtual processors as defined for a second level guest z/VM system and the capability of these.

Log. CP
The counts of logical processor type CP in the partition and the capability adjustment factor (CAF) for this type.

Log. ZAAP
The counts of logical processor type ZAAP in the partition and the capability adjustment factor (CAF) for this type.

Log. ZIIP
The counts of logical processor type ZIIP in the partition and the capability adjustment factor (CAF) for this type.

Log. IFL
The counts of logical processor type IFL in the partition and the capability adjustment factor (CAF) for this type.

Log. ICF
The counts of logical processor type ICF in the partition and the capability adjustment factor (CAF) for this type.

Cap Real CPU capability of one of the CPUs in the configuration. This value is used as an indication of the capability of the CPU relative to the capability of other CPU models.

CAF The processor capability adjustment factor for logical or virtual CPUs. It specifies the amount of underlying level-1, level-2, or level-3 configuration

capability allowed to be used for this configuration. The maximum level is 1000; lower values indicate a correspondingly lower available CPU capability.

Total The total number of CPUs in the configuration. It includes all CPUs in the configured, standby, and reserved state.

Conf The number of CPUs in the 'configured' state.

Stby The number of CPUs in the 'standby' state.

Resvd The number of CPUs in the 'reserved' state.

Ded The number of CPUs in the logical configuration that are dedicated CPUs.

Shrd The number of CPUs in the logical configuration that are shared CPUs.

Processor Num
Processor number.

Processor Serial-Nr
Processor serial number.

Processor Type
The processor type. The values are:

CP Central Processor

ICF Internal Coupling Facility Processor

IFL Integrated Facility for Linux Processor

ZIIP IBM System z Integrated Information Processor (zIIP)

ZAAP IBM System z Application Assist Processor (zAAP)

This value is available on systems running z/VM V5.3 and above. For earlier releases, this field will always be `CP`.

Processor Status
Processor status (Online or Offline).

Crypto Facility ID
Crypto unit ID.

Crypto Facility Status
Status of crypto facility (Online or Offline).

For z/VM V.4.1.0 or later, S/370 mode guests are not supported on the system.

Processor Configuration Mode:

Displays the current LPAR (or virtual, for 2nd level) configuration mode:

- VM
- LINUX
- ESA390

When running on z/VM systems earlier than V5.4, you will see dashes ("---") in this field.

Changed System Status:

Shows time and nature of any system status changes.

Date Date (format *mm/dd*) of the status change

Time Time (format *hh:mm*) of the status change

Changed
Shows time and nature of any system status changes.

- `Processor nn varied online/offline`
- `Crypto facility for processor nn varied online/offline`
- `Memory changed: StandBy=xxM, Reserved=yyM`
- `Memory added: Real=xxM, SXS=yyM`
- `The capacity has been changed: CAI=xxx, CCR=yyy.`

The information shown is initially provided by a MONITOR domain record when Performance Toolkit connects to the *MONITOR service. If the program has been set up to collect the monitor data from another machine's disk file, the program will attempt to obtain the monitor domain data from the first monitor sample in the disk file; the data cannot be shown if the required information is not found in that first sample.

For an explanation of the messages that can appear in this area, see "FCX149, Monitor Settings Screen – MONSET" on page 513

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX182, General User Communication Log Screen – UCOMMLOG

Performance Toolkit Subcommand: "UCOMMLOG" on page 323.

The General User Communication Log Screen (FCX182), which shows 'by time' information on the overall use made of IUCV and VMCF communication facilities, will be shown if you enter the UCOMMLOG subcommand with no *userid*:

```
FCX182      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Interval  Total <- IUCV Msg/s -->  <- VMCF Msg/s -->  <-- IUCV in Q -->   VMCF
End Time  Msg/s ISend IRecv IFail  VSend VRecv VFail  SendQ RecvQ ReplQ  Queue
>>Mean>>  253.7 110.5 122.8  .259  10.00 10.06  .000   .002  .102  .000   .001
07:20:15  81.78 30.18 37.27  .203  6.973 7.157  .000   .003  .111  .000   .000
07:25:15  97.35 37.16 45.33  .230  7.273 7.357  .000   .003  .117  .000   .000
07:30:15  103.1 37.09 47.67  .210  9.070 9.080  .000   .003  .108  .000   .000
07:35:15  118.9 46.44 55.31  .247  8.443 8.470  .000   .003  .103  .000   .000
07:40:15  161.9 61.42 74.97  .263  12.63 12.66  .000   .002  .108  .000   .000
07:45:15  156.5 56.28 72.43  .253  13.78 13.80  .000   .002  .102  .000   .000
07:50:15  200.1 80.62 94.29  .280  12.43 12.46  .000   .002  .091  .000   .000
07:55:15  197.0 78.07 92.78  .267  12.93 12.96  .000   .002  .097  .000   .000
08:00:15  269.1 105.2 127.2  .303  18.22 18.26  .000   .002  .104  .000   .000
08:05:15  319.5 128.6 152.6  .377  18.88 19.08  .000   .001  .099  .000   .001
08:10:15  287.9 108.6 137.2  .330  20.84 20.86  .000   .001  .089  .000   .001
08:15:15  401.1 157.2 192.3  .417  25.54 25.57  .000   .002  .080  .000   .001
08:20:15  766.9 340.5 373.7  .380  26.12 26.21  .000   .001  .078  .000   .005
08:25:15  565.4 244.3 272.7  .420  23.99 24.08  .000   .001  .079  .000   .007
08:30:15  379.3 154.9 180.2  .400  21.90 21.91  .000   .001  .074  .000   .000
08:35:15  613.2 264.6 297.2  .423  25.53 25.57  .000   .001  .086  .000   .000

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 80. Layout of General User Communication Log Screen (FCX182)

The information shown is based on USER domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Userid' field, for the message target and SVM fields, and for the total and maximum IUCV connections fields which do not make much sense for the system communications log, all data columns are identical to the ones of the 'User Communication' (UCOMM) display. Please see "UCOMM" on page 322 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX183, DASD Performance Log Screen – DASDLOG

Performance Toolkit Subcommand: "DASDLOG" on page 166.

The DASD Performance Log Screen (FCX183) shows overall performance data for all disks connected to the system, by time, with one entry per sample interval.

```
FCX183      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Interval  Mdisk Pa-  <-Rate/s->  <------- Time (msec) -------> Req. <Percent>
End Time  Links ths   I/O Avoid  Pend Disc Conn Serv Resp CUWt Qued Busy READ
>>Mean>>   37.6 3.0  97.6   188    .2 14.9  5.2 20.3 18.8   .0  .00    0   25
07:10:15   24.3 3.0   100  80.9    .2 10.6  3.0 13.8 13.8   .0  .00    1   24
07:15:15   25.7 3.0  46.7  83.2    .2 14.0  4.1 18.3 18.3   .0  .00    1   23
07:20:15   26.8 3.0  51.4  78.1    .2 14.2  4.6 19.0 19.0   .0  .00    1   26
07:25:15   29.6 3.0  64.0   112    .2 15.1  4.0 19.3 19.3   .0  .00    1   21
07:30:15   32.8 3.0  57.4   134    .2 15.0  3.9 19.1 19.1   .0  .00    1   25
07:35:15   36.7 3.0  72.6   148    .2 14.5  4.1 18.8 18.8   .0  .00    1   29
07:40:15   40.4 3.0  96.0   201    .2 15.7  4.3 20.2 20.2   .0  .00    1   26
07:45:15   45.9 3.0   128   218    .2 15.7  4.2 20.1 20.1   .0  .00    2   46
07:50:15   49.6 3.0   126   230    .2 15.5  4.9 20.6 20.6   .0  .00    2   22
07:55:15   54.9 3.0   165   287    .2 15.8  6.7 22.7 22.7   .0  .00    3   16
08:00:15   61.5 3.0   170   331    .3 15.4  6.3 22.0 22.0   .0  .00    3   22
08:05:15   68.5 3.0   175   445    .3 15.8  6.8 22.9 22.9   .0  .00    3   27
08:10:15   76.2 3.0   187   348    .3 16.2  5.9 22.4 22.4   .0  .00    3   22
08:15:16   86.3 3.0   239   461    .3 17.5  6.2 24.0 24.0   .0  .00    4   25
08:20:16   93.7 3.0   256   560    .3 17.1  6.3 23.7 23.7   .0  .00    5   21
08:25:16  101.5 3.0   257   574    .3 16.8  6.6 23.7 23.7   .0  .00    5   22

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 81. Layout of DASD Performance Log Screen (FCX183)

The information shown is based on MONITOR and I/O domain SAMPLE data.

The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Addr', 'Type' and 'Label/ID' fields, all data columns are identical to the ones of the 'I/O Device' (DEVICE) display. Please see "DEVICE" on page 169 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX184, Cache Extended Functions Log – CACHELOG

Performance Toolkit Subcommand: “CACHELOG” on page 149.

The Cache Extended Functions Log (FCX184) shows 'by time' information on the cache activity and effectiveness for the selected disk. Note that the disk must be connected to a cached control unit which has previously been selected for benchmarking.

```
FCX184      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Cache Ext. Function Log for Device 1790

         <Dev. Descr.> Stg  C D D     <--------- Rate/s ----------> <---------
Interval               Ctlr A F U     Total Total  Read  Read Write      <----
End Time Type   VOLSER ID   C W L ST  Cache SCMBK N-Seq   Seq    FW Read  Tot
>>Mean>> 3390-2 SPE704 0006 A A - 00   23.4  23.4  14.9    .0   8.5   64   85
09:06:35 3390-2 SPE704 0006 A A - 00   32.9  32.9  22.1    .0  10.8   67   87
09:11:35 3390-2 SPE704 0006 A A - 00   33.6  33.6  20.1    .0  13.5   60   87
09:16:35 3390-2 SPE704 0006 A A - 00   40.7  40.7  23.0    .0  17.7   57   87
09:21:35 3390-2 SPE704 0006 A A - 00   24.6  24.7  15.4    .0   9.3   62   84
09:26:35 3390-2 SPE704 0006 A A - 00   29.2  29.2  16.0    .0  13.1   55   85
09:31:35 3390-2 SPE704 0006 A A - 00   32.9  32.9  22.0    .0  10.9   67   90
09:36:35 3390-2 SPE704 0006 A A - 00   11.6  11.6   8.9    .0   2.7   77   85
09:41:35 3390-2 SPE704 0006 A A - 00   16.0  16.0   9.4    .0   6.6   59   80
09:46:35 3390-2 SPE704 0006 A A - 00   13.5  13.5   9.2    .0   4.3   68   86
09:51:35 3390-2 SPE704 0006 A A - 00   23.2  23.4  13.5    .0   9.7   58   82
09:56:35 33902  SPE704 0006 A A - 00   26.1  25.9  12.8    .0  13.4   49   80
10:01:37 33902  SPE704 0006 A A - 00   27.9  28.0  17.5    .0  10.4   63   82
10:06:35 33902  SPE704 0006 A A - 00   23.2  23.3  14.1    .0   9.1   61   92
10:11:35 33902  SPE704 0006 A A - 00   12.7  12.6  10.0    .0   2.7   79   80

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 82. Layout of Cache Extended Functions Log Screen (FCX184)

The information shown is based on MONITOR and I/O domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Note that the information extends beyond the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Interval End Time
: The end time of the monitor interval for which the values were calculated.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Addr' field, all data columns are identical to the ones of the 'Cache Extended Functions' screen. Please see “CACHEXT” on page 150 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX185, I/O Configuration Changes Screen – IOCHANGE

Performance Toolkit Subcommand: "IOCHANGE" on page 200.

The I/O Configuration Changes Screen (FCX185) shows changes made to the initial I/O configuration after activating monitor data collection:

```
FCX185      CPU nnnn  SER nnnnn        Status   HH:MM:SS        Perf. Monitor

I/O Configuration Change Log
Log started at 07:00:18 on 2012/01/18
I/O event data initially enabled   for ALL devices.
See MONSET display for later changes.

Date  Time      Changed
01/18 07:03:09  Device 4113 attached to DTCVSW2
01/18 07:03:09  Device 4114 attached to DTCVSW2
01/18 07:03:09  Device 4115 attached to DTCVSW2
01/18 07:03:09  Device F020 attached to DTCVSW2
01/18 07:03:09  Device F021 attached to DTCVSW2
01/18 07:03:09  Device F022 attached to DTCVSW2
01/18 07:03:09  HIPER-BRDG device F020 activated for DTCVSW2 as F020
01/18 07:03:09  QDIO device 4113 activated for DTCVSW2 as 4113
01/18 07:03:20  Device F620 attached to DTCVSW2
01/18 07:03:20  Device F621 attached to DTCVSW2
01/18 07:03:20  Device F622 attached to DTCVSW2
01/18 07:03:20  HIPER-BRDG device F620 activated for DTCVSW2 as F620
01/18 07:03:30  Device F623 attached to DTCVSW2
01/18 07:03:30  Device F624 attached to DTCVSW2
01/18 07:03:30  Device F625 attached to DTCVSW2
01/18 07:03:30  HIPER-BRDG device F623 activated for DTCVSW2 as F623
01/18 07:03:30  HPF features have been changed for 010D 'EM'->'E'



Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 83. Layout of I/O Configuration Changes Screen (FCX185)

The information shown is based on I/O domain EVENT data.

Field Descriptions:

I/O Configuration Change Log:

Log started
Time and date when data collection was started.

I/O event data ...
The initial data collect setting for the I/O event domain.

I/O configuration changes can be logged only for periods where I/O event data were collected for the affected device(s).

Configuration Changes: Shows date, time and nature of any I/O configuration changes.

Date Month and day (format *mm/dd*) of the status change

Time Time (format *hh:mm:ss*) of the status change

Changed
Describes how the status changed, as follows:

- `Device` *xxxx* `varied offline`

- Device *xxxx* varied online
- Device *xxxx* attached to *userid*
- Device *xxxx* detached from *userid*
- Shared device *xxxx* attached to system
- Subchannel to device *xxxx* varied online
- Subchannel to device *xxxx* varied offline
- Measurement facility set on for device *xxxx*
- Measurement facility set off for device *xxxx*
- Device *xxxx* deleted
- Device *xxxx* modified
- Channel path *yy* deleted
- Throttling rate for device *xxxx* set to *n.nn*/s
- Throttling rate for device *xxxx* set off
- NIC *userid vxxx* for Virtual Network *userid lanname* is Up
- NIC *userid vxxx* for Virtual Network *userid lanname* is Down
- *qdio* device *xxxx* activated for *userid* as *vxxx*
- *qdio* device *xxxx* deactivated
- *HPF features have been* changed for *aaaa bb->cc*

where

xxxx Is the device number of affected I/O devices

yy Is the channel path ID

userid Is the user identification of virtual machines: to or from which an I/O device has been attached or detached; the owner of the specified NIC virtual card or attached QDIO device; the Virtual network owner.

qdio Is the type of network device: HiperSocket, QDIO, OSN, INMN, IEDN, HIPER-BRDG, HIPER-IEDN, or Unknown. Note: after deactivation of QDIO device the IOCHANGE log contains three records about detached devices: *xxxx*, *xxxx+1*, and *xxxx+2*.

vxxx Is a virtual device number in the current configuration of the specified *userid*.

lanname
Is a Virtual network name.

aaaa SSID for which HPF installed features have been changed.

bb cc HPF installed feature bit codes. See "FCX282, HPF I/O Device Screen – DEVICE HPF" on page 789 for the list of HPF installed feature bit codes.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX186, Remote Basic Mode Screen – BASMODE

Performance Toolkit Subcommand: "BASMODE" on page 141.

The Remote Basic Mode Screen (FCX186) allows entering CP and CMS commands and can, therefore, be selected only by users which have received 'command' authorization on the remote system (CMD specification in the requestor's entry of file FCONRMT AUTHORIZ on the remote system).

```
FCX186           BASIC Mode Screen Copy of User OPERATNS         CHVM4

+63 08:48:13 FCXUSL317A User HEIS %CPU 63.6 exceeded threshold 30.0 for 5 min.
+64 08:58:13 FCXUSL317A User HEIS %CPU 82.5 exceeded threshold 30.0 for 5 min.
 FCXAPP527I User FCONMNT connected on path 0003
 FCONMNT : MENU
 FCONMNT : BASM
 FCONMNT : CMS ID
 cms id
 OPERATNS AT CHVM4    VIA RSCS1    04/03/96 09:01:16 CES      WEDNESDAY
 R;
 FCONMNT : CP Q STOR
 cp q stor
 STORAGE = 0015424K
 FCONMNT : CP Q XSTOR
 cp q xstor
 XSTORE= 64M online= 64M
 XSTORE= 64M userid= SYSTEM usage= 70% retained= 0M pending= 0M
 XSTORE MDC min=0M, max=64M, usage=50%
 XSTORE= 64M userid=  (none)  max. attach= 64M



Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 84. Layout of Remote Basic Mode Screen (FCX186)

Description:

The information shown on this screen is a simple copy of the data on the server machine's basic mode screen. You can:

- Enter CP commands, with the CP prefix
- Enter CMS commands, with the CMS prefix, and you can
- Directly view the result of these commands.

Several people may select the remote basic mode screen and enter commands concurrently.

Restrictions:

As mentioned above, what you see is a copy of the contents of the server machine's basic mode screen, and only line mode output can be intercepted and displayed.

- *Do not attempt to activate any full screen application.* Doing so will place the server machine in a full screen mode whose output cannot be intercepted and transmitted to you, nor can you pass back commands for controlling that full screen application.

  You will have to logon to the server machine in order to exit from the full screen application if you have inadvertently started one.

- The server machine's screen size may be different from your own. If it is larger, you may have to use the forward/backward scroll keys for viewing all the data on the screen.
- Changes on the server machine's screen will not automatically be reflected on your copy, except immediately after entering a command.

  Press the ENTER key without entering a command in order to force a screen refresh.

FCX187, User Defined Performance Data Logs Screen – FC DEFLOG

Performance Toolkit Subcommand: "FCONTROL DEFLOG" on page 20.

This screen can contain selected performance data fields from other 'standard' displays. The specified fields will be copied at the end of each monitor sample interval.

Since the layout of the resulting screen is, by definition, determined by the user, any example will merely illustrate some of the possibilities. The following figure shows such an example:

```
FCX187      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Sample log with some fields copied from SYSTEM screen
Interval
End Time  SieEx SieIn  <-No-XSTORE-> <-XST-Alloc-> <XST-Release> <AV_List_Req>
08:25:55    6.8   6.0       0     .0    776   12.9    766   12.8    814   13.6
08:26:55    6.8   6.0       0     .0    617   10.3    615   10.3    747   12.5
08:27:55    7.6   6.6       0     .0   1026   17.1    972   16.2    937   15.6
08:28:55    6.3   5.6       0     .0    713   11.9    671   11.2    645   10.8
08:29:55    9.5   8.8       0     .0    554    9.2    551    9.2    588    9.8
08:30:55   12.1  11.1       0     .0   1170   19.5   1112   18.5   1153   19.2
08:31:55   12.7  11.2       0     .0   1434   23.9   1316   21.9   1406   23.4
08:32:55    8.1   7.1       0     .0   1059   17.7   1053   17.6   1078   18.0
08:33:55    7.1   6.3       0     .0    697   11.6    724   12.1    746   12.4
08:34:55    7.4   6.7       0     .0    664   11.1    609   10.2    639   10.7
08:35:55    6.3   5.6       0     .0    778   13.0    767   12.8    781   13.0
08:36:55   11.0   9.9       0     .0   1009   16.8   1012   16.9   1037   17.3
08:37:55    7.0   6.4       0     .0    632   10.5    630   10.5    619   10.3
08:38:55   11.0  10.0       0     .0   1030   17.2    949   15.8   1039   17.3
08:39:55   11.9  10.2       0     .0   1598   26.6   1552   25.9   1594   26.6
08:40:55    7.5   6.5       0     .0   1252   20.9   1338   22.3   1355   22.6
User-defined screen - no HELP text available
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 85. Example of a User Defined Performance Data Logs Screen (FCX187)

Use the FC DEFLOG subcommand to define:

- The name you want to give to the log
- Any of the header lines 1 to 3
- The fields to be inserted into the log, where each requires:
  - Start column and length for the field in your new log
  - Source screen name and source field location (line number and start column)
  - Optionally, a short description to be inserted into the corresponding columns of the last header line (header line 3).

The subcommands used for defining the above log have been included in the sample FCONX $PROFILE initialization file delivered with the program, as follows:

```
FC DEFLOG MYLOG H1 Sample log with some fields copied from SYSTEM screen
FC DEFLOG MYLOG COL 12 LEN 5 COPY SYSTEM LINE 12 COL 34 NAME SieEx
FC DEFLOG MYLOG COL 18 LEN 5 COPY SYSTEM LINE 12 COL 75 NAME SieInter
FC DEFLOG MYLOG COL 25 LEN 13 COPY SYSTEM LINE 25 COL 67 NAME <-No-XSTORE->
FC DEFLOG MYLOG COL 39 LEN 13 COPY SYSTEM LINE 26 COL 26 NAME <-XST-Alloc->
FC DEFLOG MYLOG COL 53 LEN 13 COPY SYSTEM LINE 26 COL 67 NAME <XST-Release>
FC DEFLOG MYLOG COL 67 LEN 13 COPY SYSTEM LINE 18 COL 26 NAME <AV_List_Req>
```

i.e. you would select this sample log by entering the command `MYLOG` on the command line. See "FCONTROL DEFLOG" on page 20 for a detailed description of the command.

The leftmost column contains the end time:
`(format hh:mm:ss)`

of the monitor interval for which the values were calculated. Note that, depending on the number and size of the fields defined, only part of the performance variables may be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT commands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

Field Description:

Interval End Time
The end time of the monitor interval for which the values were calculated. This is the only field which will *always* be inserted; you cannot overwrite it with other data.

FCX188, Multitasking Users Screen – MTUSERS

Performance Toolkit Subcommand: "MTUSERS" on page 236.

The Multitasking Users Screen (FCX188) shows information on CMS multitasking activity in virtual machines by user.

Information for users with some multitasking activity in the interval is shown highlighted on the screen.

```
FCX188      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
.         ____      .     .      .     .     .        .     .      .     .
          <------------ Threads ------------>          <---Max.--->   POSIX
          <-Creates--> <-Deletes--> <-Switch/s>  Threads  <Concurrent>  Create
Userid    Cre/s ms/Cre Del/s ms/Del  Slow  Fast  Blocked  Proc.  Thrds   Fails
>System<   .002   .000  .001   .005  .001  .008      9.7    2.8   12.7      .0
WRH        .030   .000  .010   .013  .010  .113      6.0      2      8       0
BITMAN     .023   .000  .013   .001  .013  .130      9.0      2     11       0
SQLMACHF   .007   .000  .003   .000  .003  .023     13.0      3     17       0
CALSERV    .000    ...  .000    ...  .000  .000     10.0      3     13       0
EDLSFS     .000    ...  .000    ...  .000  .000     10.0      3     13       0
EDLSFS1    .000    ...  .000    ...  .000  .000     10.0      3     13       0
EDLSFS2    .000    ...  .000    ...  .000  .000     10.0      3     13       0
EDLSFS3    .000    ...  .000    ...  .000  .000     10.0      3     13       0
EDLSFS4    .000    ...  .000    ...  .000  .000     10.0      3     13       0
EPLREF     .000    ...  .000    ...  .000  .000     10.0      3     13       0
FLDTEST    .000    ...  .000    ...  .000  .000     10.0      3     13       0
IPSU       .000    ...  .000    ...  .000  .000     11.0      3     15       0
KAHLON     .000    ...  .000    ...  .000  .000      6.0      2      8       0
MKC        .000    ...  .000    ...  .000  .000      6.0      2      8       0
SCHANCK     ...    ...   ...    ...   ...   ...      ...    ...    ...    ....
Select a user for user details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 86. Layout of Multitasking Users Screen (FCX188)

The information shown is based on APPLICATION domain SAMPLE data.

The sample shows a screen with the users sorted in descending sequence of the threads creation rate (indicated by the underscore characters '____' above the `Cre/s` header). Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the appropriate column heading as sort argument (see "SORT" on page 287), or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

The first entry is reserved for the overall system average of all multitasking users for which data could be collected, regardless of the current sorting sequence. It is identified by the `>System<`-'userid'.

Some additional lines with user class averages will be shown at the top when user classes have been defined (see "FCONTROL UCLASS" on page 91). The 'userid' shown will then be the user class name.

Note that the information extends beyond the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

For more detailed information on one specific user either:

- Place the cursor on the `Userid` field of the virtual machine you are interested in and press ENTER, or
- Enter the subcommand 'USER *userid*' on the command line

Field Description:

The following field descriptions apply to both the MTUSERS and MTUSRLOG *userid* displays, with the exception of the `Userid` field which will be replaced by the field `Interval End Time` on the MTUSRLOG display.

Userid
User identification of the virtual machine for which the line contains performance data

Threads: Shows thread activity data.

Creates Cre/s
The thread creation rate

Creates ms/Cre
The average elapsed time, in milliseconds, per thread creation

Deletes Del/s
The thread deletion rate

Deletes ms/Del
The average elapsed time, in milliseconds, per thread deletion

Switch/s slow
The regular path switch rate

Switch/s fast
The fast path switch rate

Threads Blocked
The number of threads which are currently blocked

Max. Concurrent: Shows some maximum values.

Proc. The highest number of processes that were concurrently defined

Thrds
The highest number of threads that were concurrently defined

POSIX Create Fails
The number of times that a POSIX thread creation failed due to an attempt to exceed the maximum allowable POSIX processes.

Nr of Users
The number of users which contributed to the average shown on this line. Values are inserted only for lines with averages; the field remains empty for normal user data lines.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages or totals will be shown. All of a user's sessions during the selected period contribute to the averages shown. Note also that all of the activity fields (rates) are based on each user's connect time within the overall period, *not* the total elapsed time for the whole period.

FCX189, Multitasking User Log Screen – MTUSRLOG

Performance Toolkit Subcommand: “MTUSRLOG” on page 237.

When requesting a Multitasking User Log Screen (FCX189) for a user, the *userid* must be that of a virtual machine which has previously been selected for benchmarking. It provides a 'by time' log of the user's multitasking activity.

```
FCX189      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Multitasking Data Log for User BITMAN

          <------------- Threads ------------->          <---Max.--->   POSIX
Interval  <-Creates--> <-Deletes--> <-Switch/s>  Threads  <Concurrent>  Create
End Time  Cre/s ms/Cre Del/s ms/Del  Slow  Fast  Blocked  Proc.  Thrds   Fails
>>Mean>>  5.879   .000 5.876   .000 5.876 44.96     14.6     12     40       0
09:27:12   .023   .000  .013   .001  .013  .130      9.0      2     11       0
09:32:15   .007   .000  .007   .001  .007  .033      9.0      2     11       0
09:37:15   .007   .000  .007   .001  .007  .033      9.0      2     11       0
09:42:16   .163   .000  .143   .001  .143 1.485     14.0      3     19       0
09:47:16   .290   .000  .290   .001  .290 2.969     14.0      3     20       0
09:52:15   .113   .000  .113   .001  .113 1.268     14.0      3     20       0
09:57:16   .063   .000  .063   .001  .063  .693     14.0      3     20       0
10:02:16   .010   .000  .010   .002  .010  .193     14.0      3     20       0
10:07:10   .003   .000  .003   .002  .003  .071     14.0      3     20       0
10:12:10  1.229   .000 1.213   .000 1.213 12.56     20.0      6     29       0
10:17:10 84.49    .000 84.49   .000 84.49 622.6     20.0     12     40       0
10:22:11  5.347   .000 5.357   .000 5.357 45.32     16.0     12     40       0
10:27:10  2.171   .000 2.165   .006 2.165 21.70     19.0     12     40       0
10:32:10  3.464   .000 3.464   .000 3.464 31.97     19.0     12     40       0
10:37:11  2.611   .000 2.611   .010 2.611 23.55     19.0     12     40       0
10:42:10   .084   .000  .090   .001  .090  .735     16.0     12     40       0
10:47:15   .000    ...  .000    ...  .000  .000     16.0     12     40       0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 87. Layout of Multitasking User Log Screen (FCX189)

The information shown is based on APPLICATION domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string `>>Mean>>` in the 'Interval End Time' column.

Field Description:

Interval End Time
: The end time of the monitor interval for which the values were calculated.

  In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Userid' field, all data columns are identical to the ones of the 'Multitasking Users' (MTUSERS) display. Please see “MTUSERS” on page 236 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX190, Byte File System File Activity Log – BFSFILES

Performance Toolkit Subcommand: "BFSFILES" on page 143.

The Byte File System File Activity Log (FCX190) shows information on the file and directory activity of byte file system servers by time (only shared file system servers with some BFS activity are included):

```
FCX190      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

                  <---------------------------- File Activity/sec ------------
Interval                   <--Open--->                        Check Change Change Lo
End Time Server    Create    New    Old  Read Write Close Access   Mode  Owner Ob
>>Mean>> SCHANCK3       0      0      0     0     0     0      0      0      0
>>Mean>> IPSU           0   .000   .001  .007  .001  .003   .000   .000      0
>>Mean>> SERVERV        0   .000      0  .000  .000  .000      0      0      0
>>Mean>> SERVER8        0      0      0     0     0     0      0      0      0
>>Mean>> VMDCEBFS       0   .000   .000  .002  .000  .000   .000   .000   .000
>>Mean>> SQLMACHF       0      0      0     0     0     0      0      0      0
>>Mean>> SCHANCK4       0      0      0     0     0     0      0      0      0

09:06:48 SCHANCK3       0      0      0     0     0     0      0      0      0
09:06:48 IPSU           0   .001   .002  .018  .001  .007   .000   .000      0
09:06:48 SERVERV        0      0      0     0     0     0      0      0      0
09:06:48 SERVER8        0      0      0     0     0     0      0      0      0
09:06:48 VMDCEBFS       0   .000   .001  .001  .000  .001      0      0      0

09:11:49 SCHANCK3       0      0      0     0     0     0      0      0      0
09:11:49 IPSU           0      0      0  .000  .000  .000      0      0      0
09:11:49 SERVERV        0      0      0     0     0     0      0      0      0
09:11:49 SERVER8        0      0      0     0     0     0      0      0      0
09:11:49 VMDCEBFS       0      0      0  .000  .002  .000      0      0      0

09:16:50 SCHANCK3       0      0      0     0     0     0      0      0      0
09:16:50 IPSU           0      0      0     0     0     0      0      0      0
09:16:50 SERVERV        0      0      0     0     0     0      0      0      0
09:16:50 SERVER8        0      0      0     0     0     0      0      0      0
09:16:50 VMDCEBFS       0   .000   .000  .005  .000  .000   .000      0      0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 88. Layout of Byte File System File Activity Log (FCX190)

The information shown is based on CP monitor APPLDATA domain SAMPLE data.

The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column. The relative activity shown is based on each server's actual connect time, not the overall elapsed time in the interval.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Server
The userid of the shared file system or CRR server to which the following figures apply

File Activity/sec:

The following fields show file activity rates by different categories.

Create
The total file create rate (sum of create regular, create character and create block special file requests)

Open New
The total 'open new file' request rate (read and write)

Open Old
The total 'open old file' request rate (read and write)

Read The 'read file' request rate

Write The 'write file' request rate

Close The 'close file' request rate

Check Access
The 'check file accessibility' request rate (to check the accessibility of a byte file object)

Change Mode
The 'change mode' request rate (to change the mode associated with a byte file object)

Change Owner
The 'change owner' request rate (to change the owner of a byte file object (UID/GID))

Lookup Object
The 'lookup' request rate (to lookup a byte file object)

Make Object
The 'makecat' request rate (to make a byte file object)

Rename Object
The 'rename' request rate (to rename a byte file object)

Directory Activity/s:

The following fields show directory activity rates by different categories.

Create
The 'create directory' request rate

Open The 'open directory' request rate

Read The 'read directory' request rate (to read directory entries)

Close The 'close directory' request rate

Remove
The 'remove directory' request rate

The string 'No data for server' will be inserted if no new monitor records were processed for a server (logged off or monitoring disabled).

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX191, Byte File System PIPEs and Linking Activity Log – BFSPIPES

Performance Toolkit Subcommand: "BFSPIPES" on page 145.

The Byte File System PIPEs and Linking Activity Log (FCX191) shows information on the PIPEs and linking activity of byte file system servers by time (only shared file system servers with some BFS activity are included):

```
FCX191      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

                  <--------------- PIPE Activity / s --------------->  <------
Interval                                                      Update    <---- C
End Time Server    Create  Open  Read Write Close Access TimeSt Status   Hard S
>>Mean>> SCHANCK3       0     0     0     0     0      0      0      0      0
>>Mean>> IPSU           0     0     0     0     0      0      0      0      0
>>Mean>> SERVERV        0     0     0     0     0      0      0      0      0
>>Mean>> SERVER8        0     0     0     0     0      0      0      0      0
>>Mean>> VMDCEBFS       0     0     0     0     0      0      0      0      0
>>Mean>> SQLMACHF       0  .000     0  .000     0      0      0      0      0
>>Mean>> SCHANCK4       0  .000     0  .000  .000      0      0      0      0

09:06:48 SCHANCK3       0     0     0     0     0      0      0      0      0
09:06:48 IPSU           0     0     0     0     0      0      0      0      0
09:06:48 SERVERV        0     0     0     0     0      0      0      0      0
09:06:48 SERVER8        0     0     0     0     0      0      0      0      0
09:06:48 VMDCEBFS       0     0     0     0     0      0      0      0      0

09:11:49 SCHANCK3       0     0     0     0     0      0      0      0      0
09:11:49 IPSU           0     0     0     0     0      0      0      0      0
09:11:49 SERVERV        0     0     0     0     0      0      0      0      0
09:11:49 SERVER8        0     0     0     0     0      0      0      0      0
09:11:49 VMDCEBFS       0     0     0     0     0      0      0      0      0

09:16:50 SCHANCK3       0     0     0     0     0      0      0      0      0
09:16:50 IPSU           0     0     0     0     0      0      0      0      0
09:16:50 SERVERV        0     0     0     0     0      0      0      0      0
09:16:50 SERVER8        0     0     0     0     0      0      0      0      0
09:16:50 VMDCEBFS       0     0     0     0     0      0      0      0      0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 89. Layout of Byte File System PIPEs and Linking Activity Log (FCX191)

The information shown is based on CP monitor APPLDATA domain SAMPLE data.

The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column. The relative activity shown is based on each server's actual connect time, not the overall elapsed time in the interval.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Server
The userid of the shared file system or CRR server to which the following figures apply

PIPE Activity / s:

The following fields show BFS PIPE activity in different areas.

Create
The 'create named pipe (FIFO)' request rate

Open The sum of the 'pipe open for read' and 'pipe open for write' request rates (to open a named pipe for reading or writing)

Read The 'pipe read' request rate (byte file FIFO file pool requested to read from a named pipe)

Write The 'pipe write' request rate (byte file FIFO file pool requested to write to a named pipe)

Close The 'pipe close' request rate (byte file FIFO file pool requested to close a named pipe)

Access
The 'pipe access' request rate (byte file file pool requested to verify the access authorization to a named pipe)

Update TimeSt
The 'pipe Utime' request rate (byte file file pool requested to update the timestamps associated with a named pipe)

Status
The 'pipe stat' request rate (byte file FIFO file pool requested to obtain current status information about a named pipe)

Linking Activity / s:

Create:

Hard The 'create link' request rate (byte file file pool requested to create a hard link)

Symbol
The 'create symbolic link' request rate (byte file file pool requested to create a symbolic link)

Extern
The 'create external link' request rate (byte file file pool requested to create an external link)

Read The 'read link contents' request rate (byte file file pool requested to read the contents of a link)

Unlink
The 'unlink' request rate (byte file file pool requested to remove a byte file object)

Unlinkd Cleanup
The 'unlinked file cleanup' request rate (unlinked files removed during FILESERV START)

The string '`No data for server`' will be inserted if no new monitor records were processed for a server (logged off or monitoring disabled).

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX192, Byte File System Locking Activity Log – BFSLOCKS

Performance Toolkit Subcommand: "BFSLOCKS" on page 144.

The Byte File System Locking Activity Log (FCX192) shows information on the locking activity of byte file system servers by time (only shared file system servers with some BFS activity are included). The information shown is based on CP monitor APPLDATA domain SAMPLE data.

```
FCX192      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

                  <----------------------- Locking Activity / sec ------------
Interval          <----- Byte Lock ------>        Retry <------- Lock Conflict
End Time Server    Lock  Test Unlock Waits Retry Exceed  File Direct TokMgr NA
>>Mean>> SCHANCK3     0     0      0     0     0      0     0      0      0
>>Mean>> IPSU      .003     0      0     0     0      0     0      0      0
>>Mean>> SERVERV   .000     0      0     0     0      0     0      0      0
>>Mean>> SERVER8      0     0      0     0     0      0     0      0      0
>>Mean>> VMDCEBFS  .000  .000   .000     0     0      0     0      0      0
>>Mean>> SQLMACHF     0     0      0     0     0      0     0      0      0
>>Mean>> SCHANCK4     0     0      0     0     0      0     0      0      0

09:06:48 SCHANCK3     0     0      0     0     0      0     0      0      0
09:06:48 IPSU      .009     0      0     0     0      0     0      0      0
09:06:48 SERVERV      0     0      0     0     0      0     0      0      0
09:06:48 SERVER8      0     0      0     0     0      0     0      0      0
09:06:48 VMDCEBFS     0     0      0     0     0      0     0      0      0

09:11:49 SCHANCK3     0     0      0     0     0      0     0      0      0
09:11:49 IPSU         0     0      0     0     0      0     0      0      0
09:11:49 SERVERV      0     0      0     0     0      0     0      0      0
09:11:49 SERVER8      0     0      0     0     0      0     0      0      0
09:11:49 VMDCEBFS     0     0      0     0     0      0     0      0      0

09:16:50 SCHANCK3     0     0      0     0     0      0     0      0      0
09:16:50 IPSU         0     0      0     0     0      0     0      0      0
09:16:50 SERVERV      0     0      0     0     0      0     0      0      0
09:16:50 SERVER8      0     0      0     0     0      0     0      0      0
09:16:50 VMDCEBFS  .000     0      0     0     0      0     0      0      0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 90. Layout of Byte File System Locking Activity Log (FCX192)

The leftmost column contains the end time (format *hh:mm:ss*) of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string `>>Mean>>` in the 'Interval End Time' column. The relative activity shown is based on each server's actual connect time, not the overall elapsed time in the interval.

Field Description:

Interval End Time

The end time of the monitor interval for which the values were calculated. In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

Server
The userid of the shared file system or CRR server to which the following figures apply

Locking Activity / sec: The following fields show locking activity and lock conflict rates.

Byte Lock:

Lock The 'lock byte' request rate (to lock a byte range)

Test The 'test locked bytes' request rate (to test for byte range locks held on a specific byte range)

Unlock
The 'unlock bytes' request rate (to unlock a byte range)

Waits The 'byte range lock wait' rate (lock request waiting before being awarded the requested lock)

Retry The 'logical lock retries' rate (retry attempted to obtain the BFS requests logical lock)

Retry Exceed
The 'logical lock retries exceeded' rate (logical lock denied due to the lock retry count being exceeded)

Lock Conflicts/s:

File The 'file logical lock conflicts' rate (request for a lock, unlock, or close on a file for serializing byte lock/unlock and file closes was denied or waited for because an implicit lock had already been created on that file, where the request for the lock was also from an implicit request)

Direct
The 'directory creation/deletion logical lock conflicts' rate (request for a lock on an object - file, directory, link or symbolic link - to be created or deleted was denied or waited for because an implicit lock was already held on the object in a byte file system)

TokMgr
The 'token manager logical lock conflicts' rate (token manager requested a WRITE VNODE lock but had to wait for the lock because the implicit lock was already held)

NAMECAT
The 'NAMECAT unallocated lock conflicts' rate (request for a lock on an unallocated NAMECAT row was denied because the implicit lock was already held on the row)

Global
The 'global storage logical lock conflicts' rate (request for a lock on the object was denied or waited for because an implicit lock was already held on the object)

Token Callback: Tokens control shared resources and data caching for byte file system clients/users, much like locks. When a byte file request requires a token that is held by another user, the requestor must wait until the client machine that holds the token returns it (responds to a callback of that token).

Rate/sec
The rate of callbacks due to token conflicts

ms/Callbk
The average callback wait time: The time spent waiting for callbacks of tokens

T-Out Ret/s
The 'token callback timeout retry' rate (for retries of callbacks because of a delay of the holding client machine to respond to the token callback request)

Request Retry/s
The 'token callback requestor retry' rate (Requestor retries because of extended delays in call back response. This occurs when it is necessary to give up waiting for a normal callback completion because of exceeding the retry limit for callback retries.

The string '`No data for server`' will be inserted if no new monitor records were processed for a server (logged off or monitoring disabled).

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX193, System Selection Menu – SYSMENU

Performance Toolkit Subcommand: "SYSMENU" on page 304.

The System Selection Menu (FCX193):

```
FCX193      CPU nnnn  SER nnnnn    (Intermediate Server)         VMSYSA

                        Systems Accessible using APPC/VM

    System    Resource        System    Resource        System    Resource
    VMSYSA    FCXRES0A        VMSYSB    VMSYSB          TESTVM1   RESRC1
    TESTVM2   RESRC2          TESTVM3   RESRC3          TESTVM4   RESRC4
    TESTVM5   RESRC5          TESTVM6   RESRC6          TESTVM7   RESRC7
    TESTVM8   RESRC8          TESTVM9   RESRC9          TESTVM10  RESRC10

Select the system to be monitored
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 91. Layout of System Selection Menu (FCX193)

See the "Connecting to an S&F Server for Remote Connections" section in the *z/VM: Performance Toolkit Guide* for more information on this screen.

FCX194, Variable Correlation Screen – CORREL

Performance Toolkit Subcommand: "CORREL" on page 153.

The Variable Correlation Screen (FCX194) provides a quick overview showing how well any of the many performance variables saved in the HISTLOG and HISTSUM history files correlates with a selected base variable.

```
FIX194              Input File: '20030204 HISTLOG  *'            Perf. Monitor

Correl. Coefficients for Base Variable CPU      (% total CPU     ,   165 Samp)

Selection: From (not set)    Days : All days
           To   (not set)    Hours: All hours

Corre-  Variable  Variable                Corre-  Variable  Variable
lation  Name      Description             lation  Name      Description
 1.000  %LogLd    % logical CPU            1.000  %US       % user CPU
  .997  %EM       % emulation CPU            .957  VMStl     VMDBK steal rate
  .953  %CP       % supervisor CPU           .950  XAl/s     XSTORE alloc/s
  .948  XSStl/s   XSTORE steals/s            .946  XSDel/s   XSTORE delete/s
  .940  %SY       % system CPU               .938  XDeal/s   XSTORE dealloc/s
  .928  DIAG      DIAG instr./s              .926  Alo/s     Page alloc. rate
  .920  SIE       SIE instr. rate            .920  PRIV      Inst. simul./s
  .911  SIEIC     SIE intercept/s            .907  Dsptch    Users dispatched
  .899  VMCF>C    VMCF rate to CP            .899  VMCF>V    VMCF rate to VM
  .899  VMCF_T    Total VMCF rate            .898  VRecv     User VMCF recv/s
  .898  VSend     User VMCF send/s           .896  NT-Q      Non-triv. queue
  .896  PGOUT/s   PAGOUT rate/s              .895  Scan1     Scan 1 rate
  .895  MDUS      MDC insert users           .892  TR-Q      Trivial queue
  .892  ExtInt    Ext. interrupt/s           .892  XPg/s     XSTORE page rate
Select new base variable to recompute
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 92. Layout of Variable Correlation Screen (FCX194)

A good correlation with the base variable is indicated by highlighting the entry. The correlation coefficient is shown

yellow
For correlation coefficients of 0.9 to 1.0

white For correlation coefficients of 0.8 to 0.9

green For all other values

The sample shows a screen with correlations for base variable CPU (total CPU load), the default. You can select any other base variable

- Either by specifying the variable name with the CORREL subcommand when selecting the screen,
- Or by moving the cursor to any variable on the correlation display and then pressing ENTER.

Field Description:

General Header Lines:

Correl. Coefficients ...
This line shows which variable was used as a 'base' variable against which the correlation coefficients for all other variables were calculated.

Selection
Shows the criteria applied when selecting performance data from the

history file. Record selection can be based on an overall period (`From` and `To` specifications) and can be restricted to a smaller subset by selecting only specific days and/or hours.

From Shows the start date or time of a selected period, or `(not set)` when no start date/time has been specified

To Shows the end date or time of a selected period, or `(not set)` when no end date/time has been specified

Days Shows for which weekdays history log records have been processed

Hours
Shows for which hours history log records have been processed

Correlation
The correlation coefficient for the variable.

The correlation will be shown as a number between -1.0 to +1.0, with the following exceptions: A string of

ZERO
Indicates that all of the values processed were zero

CONS
Indicates that all of the values were the same, i.e. the variable was a constant during the selected period

.... Indicates that an insufficient number of valid measurements was found to allow calculation of a meaningful correlation.

Variable Name
The variable name, as described for the REDHIST display. (See "REDHIST" on page 259.)

A question mark '?' in front of the variable name indicates correlation factors of questionable validity because the number of samples for the variable was less than 1/4 of the number of samples for the base variable, as indicated in the header line.

Variable Description
A short description of the variable. See the corresponding paragraphs for the REDHIST display ("REDHIST" on page 259) for a more detailed description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX195, Extended History Data Log Display – REDHIST

Performance Toolkit Subcommand: "REDHIST" on page 259.

This display will be shown after entering the 'REDHIST' subcommand for one of the extended HISTLOG or HISTSUM history data log files, it allows browsing through these files. The current day's file will be shown by default.

```
FCX195              Input File: '20030218 HISTLOG  *'            Perf. Monitor

Date       Time       <-------------------- CPU Load (%) ---------------->
yyyy/mm/dd hh:mm #CPU  CPU  %US  %CP  %EM  %SY %Spin  %WT %LogLd %VEC %VEM

2003/02/18 09:11  6.0  385  370 74.5  310 14.7    .2  215  384.8   ..   ..
2003/02/18 09:16  6.0  366  348 74.4  292 17.6    .2  234  366.0   ..   ..
2003/02/18 09:21  6.0  365  346 77.7  287 18.2    .3  235  364.8   ..   ..
2003/02/18 09:26  6.0  360  342 77.7  282 17.9    .3  240  359.7   ..   ..
2003/02/18 09:31  6.0  441  424 73.7  368 17.3    .2  159  441.5   ..   ..
2003/02/18 09:36  6.0  314  299 66.6  248 15.2    .2  286  314.2   ..   ..
2003/02/18 09:41  6.0  312  296 68.8  243 16.2    .2  288  312.1   ..   ..
2003/02/18 09:46  6.0  326  309 73.7  252 16.3    .2  274  325.6   ..   ..
2003/02/18 09:51  6.0  345  329 74.1  271 15.9    .2  255  345.4   ..   ..
2003/02/18 09:56  6.0  294  278 64.8  229 15.2    .2  306  293.6   ..   ..
2003/02/18 10:01  6.0  345  328 69.8  275 16.8    .2  255  344.8   ..   ..
2003/02/18 10:06  6.0  412  394 68.4  343 17.5    .2  188  411.8   ..   ..
2003/02/18 10:11  6.0  441  425 72.2  368 15.9    .2  159  440.8   ..   ..
2003/02/18 10:16  6.0  395  377 84.2  311 18.3    .2  205  395.1   ..   ..
2003/02/18 10:21  6.0  414  396 75.4  338 18.3    .2  186  413.9   ..   ..
2003/02/18 10:26  6.0  445  426 81.0  364 18.8    .3  155  444.8   ..   ..
2003/02/18 10:31  6.0  436  417 83.4  353 18.7    .3  164  436.1   ..   ..
2003/02/18 10:36  6.0  349  333 67.4  282 16.2    .2  251  349.4   ..   ..
2003/02/18 10:41  6.0  312  296 64.4  247 15.4    .2  288  311.9   ..   ..
Select new base variable with cursor and press ENTER to recompute
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 93. Layout of extended history data log screen

When viewing detailed HISTLOG files the numbers shown usually represent average values calculated for the monitor sample interval which ended at the time specified in the Time field, but in some cases they just represent values as they were sampled at the end of the interval.

When viewing condensed HISTSUM files all numbers are averages of the original sample interval values shown in the detailed HISTLOGs.

Important Notice: This display is just a simple browser for the extended history log files, it shows the performance variables just in the sequence in which they were stored in these files. While the performance variables were originally grouped so as to keep variables pertaining to the same general area (e.g. expanded storage or DASD performance) together, new fields added by future levels of Performance Toolkit will be appended to the end of the HISTLOG records so as not to disturb existing applications which rely on fixed offsets for locating specific variables.

Field Description:

Date and Time Prefix:

Date The date when a row's performance data were collected. A full date will be shown, in format *yyyy/mm/dd*, when viewing the leftmost part of the history data, while an abbreviated format *mm/dd* will be shown after shifting to the right so as to retain more space for displaying the actual performance data fields.

Time The time when a row's performance data were collected. The time is always shown in *hh:mm:ss* format where the time stamp is

- the end time of a data collect interval in the case of detailed history log files (file type HISTLOG*n*)
- the end time of the first data collect interval within a one hour period in the case of a summary history log file (file type HISTSUM) where one record contains the average values calculated for all data collect intervals within that hour.

Interval Definitions:

El_Time
The elapsed time in the interval for which performance values were calculated in this record.

Samples
The number of monitor sample intervals which contributed to the performance values in this record.

General Processor Load Data:

#CPU The number of processors which contributed to the following overall CPU figures.

CPU The percentage of total elapsed time that processors were busy (sum of busy percentages for all processors shown)

%US The percentage of total elapsed time that processor time was attributed to specific users (includes emulation time and CP time, sum of all processors shown)

%CP The percentage of total elapsed time that processors were busy for CP (sum of all processors shown)

%EM The percentage of total elapsed time that processors were operating in emulation mode, doing work for users (sum of all processors shown)

%SY The percentage of total elapsed time that processor time was charged to the system (CP time not attributed to specific users, sum of all processors shown)

%Spin
The percentage of total elapsed time that processors spent in spin loops (sum of all processors shown)

%WT The percentage of total elapsed time that processors were idle (sum of all processors shown)

%LogLd
The percentage of *non-suspended* elapsed time that processors were busy. This value will be identical to the total CPU load CPU for systems running first level on a single image CPU. When running in an LPAR, or second level under VM, the 'logical' load will be higher because it is based on the sum of processor busy time plus *voluntary* wait time, and this sum will be shorter than the actual elapsed time by the time that the processor was suspended (not allowed to work) by either the PR/SM microcode or the first level CP.

%VEC
The percentage of total elapsed time that the vector facility was busy,

including vector overhead (sum of all vector facilities shown). On z/VM 5.2 and later, dots will be inserted here (or on earlier systems, when Vector Facility support is not available).

%VEM
The percentage of total elapsed time that the vector facility was used while in SIE (sum of all vector facilities shown). On z/VM 5.2 and later, dots will be inserted here (or on earlier systems, when Vector Facility support is not available).

VECLD
The vector load rate per second (sum of all vector facilities shown). On z/VM 5.2 and later, dots will be inserted here (or on earlier systems, when Vector Facility support is not available).

PRIV Number of instructions simulated per second.

DIAG
Number of diagnose instructions executed per second.

SIGP Rate at which this CPU is the target of SIGP External Call instructions.

IO/S Number of start subchannel and resume subchannel executions per second.

%Empt
Percent of elapsed time that the local dispatch vector had no VMDBKs. This is the average of the percentages measured for all processors.

#Usrs Average number of users in a processor local dispatch vector when it was not empty. This is the average for all processors.

#Mast
Average number of users in the 'master only' local dispatch vector when it was not empty.

VMStl
The total rate at which VMDBKs were stolen from any processor's local dispatch vector, for dispatching on another processor.

ToMast
The total rate at which VMDBKs were moved to the master processor for processing of 'master only' work.

AvEmp
The average number of seconds before the available list became empty.

Dsptch
Number of 'long paths' through the dispatcher per second. This corresponds approximately to the rate at which users were dispatched for running.

SIE The total SIE (Start Interpretive Execution) rate. It does not include instructions to run a virtual guest during guest SIE simulation and SIE instructions following a successful fastpath simulation.

SIEIC
The total SIE exits by interception rate (i.e. SIE mode stopped because CP had to simulate an instruction). It does not include virtual guest SIE interceptions and interceptions handled by fastpath simulation.

PgFlt The total host segment and guest page fault rate, not including any CP page faults.

FPSim
The number of fastpath instruction simulations per second.

SpRds
The number of spool reads per second.

SpWrt
The number of spool writes per second.

CSCH
The number of clear subchannel executions per second.

HSCH
The number of halt subchannel executions per second.

ExtInt
The number of external interrupts processed per second.

SolInt
The number of solicited interrupts received per second.

UnSolI
The number of unsolicited interrupts received per second.

Users:

LOGN
The number of users logged on.

ACT The number of users found active during a monitor sample interval.

VIO/s
The total number of virtual I/O instructions executed per second.

Real Storage and Paging:

PPAG
The number of pageable pages in the dynamic page area.

NonPag
The number of non-pageable pages in the DPA.

%ST Percent storage utilization, i.e. percentage of pageable storage occupied by the working sets of users in the dispatch and eligible lists.

SHAR
The number of page frames in use by shared segments.

FPGS Amount of real storage reserved by CP for subpool, save, VMDBK and system free storage. On z/VM 5.2 and later, dots will be inserted here.

%FR Percent of subpool free storage in use.

V=R The size of the V=R area, in pages. On z/VM 5.2 and later, dots will be inserted here.

VRFREE
The number of V=R free area doublewords in use. On z/VM 5.2 and later, dots will be inserted here.

FEx/s The number of frames taken per second to satisfy the free storage extend condition.

FrTakn
The number of requests for a free storage extend page which have not yet been satisfied.

FrSub
The number of pages in use for free storage subpools (number of DWs provided, converted to pages).

FrSav The number of pages in use for save areas.

Resrvd
The number of reserved pages.

Locked
The number of pages locked by CP LOCK command.

Avail The number of pages on the available list.

MS-Life
The estimated life of a real storage page, calculated from Little's law (pageable storage / pageout rate).

PRd/s The page read rate per second, including directory, nucleus and warm start I/O, but no spool I/O.

PWr/s The page write rate per second, including directory, nucleus and warm start I/O, but no spool I/O.

PG/s The total page rate per second (sum of reads and writes).

NSS/s
The number of shared segment pages read per second.

Guest/s
The number of single page reads per second for virtual machines.

Syst/s The number of single page reads per second for the system (system pages are always read as single pages).

SPag/s
The total rate of single page reads (sum of guest reads and system reads).

Alo/s The page allocation rate (number of pages obtained from the available list, per second).

#TW The number of tasks waiting for a page, per second.

FrWt The number of tasks waiting for a frame.

Scan1 The number of times the demand scan ended successfully with the first scan per second.

Scan2 The number of times the demand scan ended successfully with the second scan per second.

E-Scan
The number of times the demand scan ended successfully with the emergency scan per second.

ScFail
The number of times the demand scan failed per second.

ESCN
The percentage of demand scans which did not complete after the first pass.

BKRD
The average blocking factor when reading pages from DASD.

BKMG
The average blocking factor when migrating pages out of XSTORE.

BKST
The average blocking factor for page steals, i.e. when writing pages from main storage to DASD.

Expanded Storage Data:

XSTPgBk
The number of expanded storage blocks available for paging (CP partition size minus the space used for the minidisk cache).

%XS The percentage of expanded storage CP partition blocks in use.

XAl/s The expanded storage page block allocation rate per second.

XPg/s The total expanded storage paging rate (sum of PGIN and PGOUT operations per second).

XDeal/s
The expanded storage page block deallocation rate per second.

MigVis
The number of times a shared system was visited by migration per second.

PGIN/s
The total number of PGIN operations per second (to copy the contents of expanded storage blocks to main storage).

%FP_PGIN
The percentage of PGIN operations handled by fastpath logic.

PGOUT/s
The number of PGOUT operations per second, to copy pages from main storage to expanded storage blocks.

Migr/s
The number of pages migrated from expanded storage to DASD, per second.

XAGE
The average age of expanded storage paging blocks, in seconds.

MAGE
The average age of the expanded storage paging blocks which were migrated to DASD, in seconds.

XSTLife
The average age of expanded storage paging blocks, calculated from Little's law (number of XSTORE paging blocks divided by PGOUT rate).

Minidisk Cache Data:

MnIdeal
The ideal number of main storage page frames in the minidisk cache (based on average age of a page in the DPA, determined by arbiter).

MnAct
The actual number of main storage page frames used for the minidisk cache.

MnMin
The minimum number of main storage page frames to be used for the minidisk cache.

MnMax
The maximum number of main storage page frames to be used for the minidisk cache.

MnDel/s
The rate at which main storage pages were deleted from the minidisk cache, per second.

MnStl/s
The rate at which the steal function was invoked to steal main storage pages, per second.

MnBias
The bias for minidisk cache usage of real storage. A number less than 1 is a bias against minidisk cache; a number greater than 1 is a bias for minidisk cache.

XSTAV
The total number of expanded storage blocks available to CP, including the blocks used for the minidisk cache.

XSIdeal
The ideal number of expanded storage blocks in the minidisk cache (based on average age of an XSTORE block, as determined by arbiter).

XSAct
The actual number of expanded storage blocks used for the minidisk cache.

MDNE
The total number of pages used for the minidisk cache in both expanded *and* main storage.

XSMin
The minimum number of expanded storage blocks to be used for the minidisk cache.

XSMax
The maximum number of expanded storage blocks to be used for the minidisk cache.

FairShr
The fair share limit for the minidisk cache, i.e. the maximum number of blocks any single user is allowed to insert into the minidisk cache per fair share interval.

XSDel/s
The rate at which expanded storage pages were deleted from the minidisk cache, per second.

XSStl/s
The rate at which the steal function was invoked to steal expanded storage pages from the minidisk cache, per second.

XSBias
The bias for minidisk cache use of expanded storage. A number less than 1 is a bias against minidisk cache; a number greater than 1 is a bias for minidisk cache.

MDR/S
The number of read requests to the minidisk cache per second.

MDH/s
The number of read requests to the minidisk cache, per second, where all the requested blocks were found in the cache, therby avoiding an I/O operation.

%MDH
The percentage of read requests where all requested blocks were found in the cache.

%MDRPH
The percentage of read requests where only part of the requested blocks were found in the cache (not available for VM/ESA V.1.2.2 and later).

%MDRMS
The percentage of requests which were 'misses', i.e. where none of the requested blocks were found in the cache (not available for VM/ESA V.1.2.2 and later).

BkRd/s
The number of blocks read from the cache per second (not available for VM/ESA V.1.2.2 and later).

%MDR
The percentage of read block operations, out of the total minidisk cache activity (not available for VM/ESA V.1.2.2 and later).

%Bk The percentage of addressed blocks which were found in the minidisk cache (not available for VM/ESA V.1.2.2 and later).

MDPIN/s
The rate at which minidisk cache pages were moved from expanded storage to main storage.

MDPOUT/s
The rate at which minidisk cache pages were moved from main storage to expanded storage.

MDAvAge
The estimated average age, in seconds, of a minidisk cache block, based on Little's law (cache size divided by PGOUT rate).

FSEx/s
Fair share exceeded rate, i.e. the rate that blocks could not be moved into the minidisk cache because their user's fair share limit was exceeded.

BkIns/s
Insertions per second into the 'in transit' waiting queue which keeps track of users requesting blocks which are already on the way to the minidisk cache.

InvR/s
The invalidation request rate, i.e. the number of requests per second to invalidate minidisk cache blocks due to an I/O to a virtual device via a non-cachable I/O interface.

InvB/s
The number of blocks per second which were invalidated following an invalidation request.

MDUS
The number of users which had blocks inserted into the minidisk cache in the last fair share interval.

Auxiliary Storage Data:

PgSlots
The total number of slots allocated to the page area.

%PGSL
The percentage of allocated page slots which are in use.

SpSlots
The total number of slots allocated to the spool area.

%SPSL
The percentage of allocated spool slots which are in use.

DuSlots
The total number of slots allocated to the dump area.

%DUSL
The percentage of allocated dump slots which are in use.

SpCrea
The number of spool files created per monitor sample interval.

SpCre/s
The rate, per second, at which spool files were created.

SpPurg
The number of spool files purged per monitor sample inverval.

SpPur/s
The rate, per second, at which spool files were purged.

PgMLOAD
The average 'modified device load' value for paging devices, in milliseconds. This is the I/O device service time, multiplied by the number of queued requests for that same device, a value upon which CP bases its decisions when selecting a paging device for output.

SpMLOAD
The average 'modified device load' value for spooling devices, in milliseconds. This is the I/O device service time, multiplied by the number of queued requests for that same device, a value upon which CP bases its decisions when selecting a spooling device for output.

Scheduler Queue Data:

InQue
The total number of VMDBKs found in the dispatch and eligible lists.

Q0 The number of class 0 (quick dispatch) users' VMDBKs found in the dispatch list.

Q1 The number of class 1 (interactive) users' VMDBKs found in the dispatch list.

Qx The number of non-interactive users' VMDBKs found in the dispatch list (classes 0, 2 and 3).

Q2 The number of class 2 users' VMDBKs found in the dispatch list.

Q3 The number of class 3 users' VMDBKs found in the dispatch list.

Q0L The number of loading class 0 (quick dispatch) users' VMDBKs found in the dispatch list.

Q1L The number of loading class 1 (interactive) users' VMDBKs found in the dispatch list.

QxL The number of loading non-interactive users' VMDBKs found in the dispatch list (classes 0, 2 and 3).

Q2L The number of loading class 2 users' VMDBKs found in the dispatch list.

Q3L The number of loading class 3 users' VMDBKs found in the dispatch list.

LimLst
The number of VMDBKs in the limit list (not allowed to run due to their maximum share settings).

E1 The number of class 1 (interactive) users' VMDBKs found in the eligible list.

Ex The number of non-interactive users' VMDBKs found in the eligible list (classes 2 and 3).

E2 The number of class 2 users' VMDBKs found in the eligible list.

E3 The number of class 3 users' VMDBKs found in the eligible list.

E1L The number of loading class 1 (interactive) users' VMDBKs found in the eligible list.

ExL The number of loading non-interactive users' VMDBKs found in the eligible list (classes 2 and 3).

E2L The number of loading class 2 users' VMDBKs found in the eligible list.

E3L The number of loading class 3 users' VMDBKs found in the eligible list.

C1ES The length of the class 1 elapsed time slice, in seconds. This is the elapsed time which a class 1 user is allowed to spend in the dispatch list, and which should allow 85% of all transactions to complete.

AbsShr
The sum of the absolute shares of all VMDBKs which were in the dispatch list.

RelShr
The sum of the relative shares of all VMDBKs which were in the dispatch list.

Consid
The total number of main storage frames considered when selecting users for dispatching.

Q0WSS
The sum of pages in the working sets of class 0 (quick dispatch) users in the dispatch list.

Q1WSS
The sum of pages in the working sets of class 1 (interactive) users in the dispatch list.

Q2WSS
The sum of pages in the working sets of class 2 users in the dispatch list.

Q3WSS
The sum of pages in the working sets of class 3 users in the dispatch list.

Scheduler Data:

SC_Pg/s
The smoothed page read rate, per second, as used by scheduling algorithms.

SC_ms/P
The average elapsed time per page read, as used by scheduling algorithms.

SC_PSV
The page steal value, corresponds to the STEAL parameter in the 'INDICATE LOAD' output.

SC_SWgt
The resource weight for storage. Used by the scheduler to determine how much of a bottleneck the storage resources are.

SC_PWgt
The resource weight for paging. Used by the scheduler to determine how much of a bottleneck the paging resources are.

SC_C1P/s
The average paging rate of class 1 users at the end of their Q1 dispatch list stay. Used by the scheduler to assign a projected paging rate to E1 users on entry to the eligible list.

SC_C1WSS
The average working set size of class 1 users at the end of their Q1 dispatch list stay. Used by the scheduler to assign a projected WSS to E1 users on entry to the eligible list.

SC_AlP/s
The average pageing rate of all users in the dispatch and eligible lists.

SC_AlWSS
The average working set size of all users in the dispatch and eligible lists.

Cl1Exp
The expansion factor for class 1 users, i.e. the ratio of time it is taking for a class 1 transaction to complete compared with the amount of time it would take if it were running alone on the system.

Cl2Exp
The expansion factor for class 2 users, i.e. the ratio of time it is taking for a class 2 transaction to complete compared with the amount of time it would take if it were running alone on the system.

Cl3Exp
The expansion factor for class 3 users, i.e. the ratio of time it is taking for a class 3 transaction to complete compared with the amount of time it would take if it were running alone on the system.

Transaction Data:

Tr_UP_T
The response time, in seconds, for trivial UP transactions.

Tr_MP_T
The response time, in seconds, for trivial MP transactions.

TR-T The average response time, in seconds, for all trivial transactions (UP and MP).

Nt_UP_T
The response time, in seconds, for non-trivial UP transactions.

Nt_MP_T
The response time, in seconds, for non-trivial MP transactions.

NT-T The average response time, in seconds, for all non-trivial transactions (UP and MP).

UP_Resp
The average response time, in seconds, for all UP transactions (trivial and non-trivial).

QD_UP_T
The response time, in seconds, for all UP transactions of quick dispatch users.

MeanResp
The average response time, in seconds, for all transactions on the system (UP and MP, trivial and non-trivial).

Tr_UP/s
The transaction rate per second for trivial UP transactions.

Tr_MP/s
The transaction rate per second for trivial MP transactions.

TR/S The average transaction rate per second for all trivial transactions (UP and MP).

Nt_UP/s
The transaction rate per second for non-trivial UP transactions.

Nt_MP/s
The transaction rate per second for non-trivial MP transactions.

NT/S The average transaction rate per second for all non-trivial transactions (UP and MP).

UP_Tr/s
The average transaction rate per second for all UP transactions (trivial and non-trivial).

Qd_Tr/s
The transaction rate per second for quick dispatch transactions.

Trans/s
The average transaction rate per second for all transactions on the system (UP and MP, trivial and non-trivial).

TR-Q The average number of concurrently active users with trivial transactions (UP and MP).

NT-Q The average number of concurrently active users with non-trivial transactions (UP and MP).

%Tr_UP
The percentage of all transactions which were trivial UP transactions.

%Tr_MP
The percentage of all transactions which were trivial MP transactions.

%Nt_UP
The percentage of all transactions which were non-trivial UP transactions.

%Nt_MP
The percentage of all transactions which were non-trivial MP transactions.

%Q_Dsp
The percentage of all transactions which were quick dispatch transactions.

#Tr_UP
The number of trivial UP transactions per sample interval.

#Nt_UP
The number of non-trivial UP transactions per sample interval.

#Tr_MP
The number of trivial MP transactions per sample interval.

#Nt_MP
The number of non-trivial MP transactions per sample interval.

#Trans
The total number of transactions per sample interval.

#AllUP
The total number of UP transactions per sample interval.

%TrUP/UP
The percentage of UP transactions which were trivial transactions.

%NtUP/UP
The percentage of UP transactions which were non-trivial transactions.

ITR The 'system internal throughput ratio', i.e. the number of transactions executed on the system per second of total CPU time.

User Wait States: The following average user wait state percentages are based on 'active' sample counts where a user in the dormant list is considered to be still active if he is also in SVM wait, i.e. waiting for the completion of a communication with a service virtual machine.

Users' wait states are tested for in the following sequence:

- I/O wait
- Console function wait
- Instruction simulation wait
- Page wait
- CPU wait
- Running
- SVM wait and in the eligible list
- Loading
- Dormant
- Dormant and in SVM wait
- I/O active
- Test idle wait
- SVM wait and test idle wait
- Page active wait
- Other

Only the first matching wait state found is accounted for.

%Act The percentage of samples during which an average user was found to be active, i.e. either in the dispatch or eligible list, or in dormant state but waiting for some service from a service virtual machine.

%Run
The average percentage of 'active' samples during which users were found to be running on a real processor.

%CPU
The average percentage of 'active' samples during which users were found to be waiting to run on the real CPU.

%LDG
The average percentage of 'active' samples during which users were found to be in loading state, i.e. with a very high page read rate.

%PGW
The average percentage of 'active' samples during which users were found in page wait state.

%IOW
The average percentage of 'active' samples during which users were found in I/O wait state.

%Sim
The average percentage of 'active' samples during which users were found in instruction simulation wait state.

%TIW
The average percentage of 'active' samples during which users were found in 'test idle' wait state, i.e. waiting to be dropped from the dispatch list.

%CFW
The average percentage of 'active' samples during which users were found in console function wait, i.e. waiting for CP to execute one of the console function commands which allow altering the state and configuration of the virtual machine (e.g. LINK, ATTACH, and DETACH command).

%SV+TI
The average percentage of 'active' samples during which users were found in both SVM wait and 'test idle' wait. SVM wait state indicates that users were waiting for the completion of a communication with a service virtual machine.

%SV+EL
The average percentage of 'active' samples during which users were found in both SVM wait and in the eligible list. SVM wait state indicates that users were waiting for the completion of a communication with a service virtual machine.

%SV+DM
The average percentage of 'active' samples during which users were found in both SVM wait and in the dormant list. SVM wait state indicates that users were waiting for the completion of a communication with a service virtual machine, which is also the reason why this state is counted as 'active' even though users were also in the dormant list.

%IOA
The average percentage of 'active' samples during which users were found to be waiting for something other than the above while an I/O operation started by the user had not yet completed.

%LIM
The average percentage of 'active' samples during which users were found to be in the limit list, i.e. prevented from running by a maximum share setting.

%PGA
The average percentage of 'active' samples during which users were found in 'page active' wait, i.e. had loaded a wait PSW while waiting for the completion of a page read operation. This wait state is to be expected for guest systems running with PAGEX ON.

%OTH
The percentage of 'active' samples during which users were found in other states.

%Q0 The average percentage of 'active' samples during which users were found in Q0 (in the dispatch list as class 0 user).

%Q1 The average percentage of 'active' samples during which users were found in Q1 (in the dispatch list as class 1 user).

%Q2 The average percentage of 'active' samples during which users were found in Q2 (in the dispatch list as class 2 user).

%Q3 The average percentage of 'active' samples during which users were found in Q3 (in the dispatch list as class 3 user).

%E0-E3
The average percentage of 'active' samples during which users were found in the eligible list.

System Wait States:

The following wait states are calculated from the same source data as the average user wait states above, but they are different in that they are calculated based only on the normal non-dormant state (without considering dormant plus SVM wait a non-dormant state too), i.e. we only look at wait states of VMDBKs in the dispatch list.

%PQ The average percentage of in-queue samples where users were found in page wait state.

%IQ The average percentage of in-queue samples where users were found in page I/O state.

%LD The average percentage of in-queue samples where users were found in loading state, i.e. with a very high page read rate.

%EL The average percentage of in-queue samples where users were found in the eligible list, waiting for a scarce resource to become available.

Average DASD Load:

Links The average number of minidisk links to disks.

Paths The average number of available channel paths to disks.

DASD/s
The average number of SSCH and RSCH instructions per disk executed per second from this system.

Avoid/s
The average number of real I/O operations per second and per disk which could be avoided because the blocks were found in the minidisk cache.

Pend The average function pending time, in milliseconds. This is the average time an I/O request remained pending in the I/O subsystem due to path busy conditions.

Disc The average device disconnected time, in milliseconds. This is the average time the device remained disconnected from the channel while executing I/O requests, e.g. time spent for executing SEEK and SET SECTOR orders and also any reconnect misses.

Conn The average device connected time, in milliseconds. This is the average time the device was connected to the channel while executing I/O requests (e.g. receiving commands, SEARCH time or actual data transfer).

Serv The average DASD service time, in milliseconds. This is the sum of the function pending, disconnected and connected times.

Resp The average DASD response time, in milliseconds. This is the device service time plus the time an I/O request was waiting to be started. The queue delay time is calculated based on the average I/O request queue length and the I/O rate.

CUWt
The average control unit queuing time, i.e. the additional wait time caused if the target device was already busy with an I/O started from another system (in milliseconds).

Qued The average I/O queue length for all disks. The value is taken from CP monitor high-frequency sampling data, it is an indicator for I/O contention on the device level.

Be aware of the restrictions as to the validity of this field in the case of CP owned disks and disks attached to guest systems, as described under "DEVICE" on page 169 for field `Req. Qued`.

Busy The percentage of elapsed time during which an average disk was busy.

%Read
The average percentage of I/O requests which were for READ operations only.

Cyls The average numberof cylinders skipped per SEEK order.

Recov
The number of SSCHs (*not* the rate) executed for error recovery purposes.

Dly/s The average rate at which I/O requests were delayed due to throttling.

Total System Services Activity:

IUVM_T
The total IUCV and VMCF activity per second.

IUCV_T
The total IUCV activity per second.

VMCF_T
The total VMCF activity per second.

***TOT_T**
The total IUCV activity, per second, by all CP IUCV services.

***MSA_T**
The total activity, per second, for the *MSGALL IUCV service.

***MSG_T**
The total activity, per second, for the *MSG IUCV service.

***RPI_T**
The total activity, per second, for the *RPI IUCV service.

***BLK_T**
The total activity, per second, for the *BLOCKIO IUCV service.

***MON_T**
The total activity, per second, for the *MONITOR IUCV service.

***SIG_T**
The total activity, per second, for the *SIGNAL IUCV service.

***CCS_T**
The total activity, per second, for the *CCS IUCV service.

***SPL_T**
The total activity, per second, for the *SPL IUCV service.

***SYM_T**
The total activity, per second, for the *SYMPTOM IUCV service.

***ACC_T**
The total activity, per second, for the *ACCOUNT IUCV service.

***LOG_T**
The total activity, per second, for the *LOGREC IUCV service.

***CRM_T**
The total activity, per second, for the *CRM IUCV service.

***IDE_T**
The total activity, per second, for the *IDENT IUCV service.

***CNF_T**
The total activity, per second, for the *CONFIG IUCV service.

System Services Activity from CP to Virtual Machines:

IUVM>V
The sum of the IUCV and VMCF communication rates from CP to virtual machines, per second.

IUCV>V
The total IUCV communication rate from CP to virtual machines, per second.

VMCF>V
The total VMCF communication rate from CP to virtual machines, per second.

***TOT>V**
The total IUCV communication rate, per second, by all CP IUCV services from CP to virtual machines.

***MSA>V**
The communication rate from CP to virtual machines, per second, for the *MSGALL IUCV service.

***MSG>V**
The communication rate from CP to virtual machines, per second, for the *MSG IUCV service.

***RPI>V**
The communication rate from CP to virtual machines, per second, for the *RPI IUCV service.

***BLK>V**
The communication rate from CP to virtual machines, per second, for the *BLOCKIO IUCV service.

***MON>V**
The communication rate from CP to virtual machines, per second, for the *MONITOR IUCV service.

***SIG>V**
The communication rate from CP to virtual machines, per second, for the *SIGNAL IUCV service.

***CCS>V**
The communication rate from CP to virtual machines, per second, for the *CCS IUCV service.

***SPL>V**
The communication rate from CP to virtual machines, per second, for the *SPL IUCV service.

***SYM>V**
The communication rate from CP to virtual machines, per second, for the *SYMPTOM IUCV service.

***ACC>V**
The communication rate from CP to virtual machines, per second, for the *ACCOUNT IUCV service.

***LOG>V**
The communication rate from CP to virtual machines, per second, for the *LOCREC IUCV service.

***CRM>V**
The communication rate from CP to virtual machines, per second, for the *CRM IUCV service.

***IDE>V**
The communication rate from CP to virtual machines, per second, for the *IDENT IUCV service.

***CNF>V**
The communication rate from CP to virtual machines, per second, for the *CONFIG IUCV service.

System Services Activity from Virtual Machines to CP:

IUVM>C
The sum of the IUCV and VMCF communication rates from virtual machines to CP, per second.

IUCV>C
The total IUCV communication rate from virtual machines to CP, per second.

VMCF>C
The total VMCF communication rate from virtual machines to CP, per second.

***TOT>C**
The total IUCV communication rate, per second, by all CP IUCV services from virtual machines to CP.

***MSA>C**
The communication rate from virtual machines to CP, per second, for the *MSGALL IUCV service.

***MSG>C**
The communication rate from virtual machines to CP, per second, for the *MSG IUCV service.

***RPI>C**
The communication rate from virtual machines to CP, per second, for the *RPI IUCV service.

***BLK>C**
The communication rate from virtual machines to CP, per second, for the *BLOCKIO IUCV service.

***MON>C**
The communication rate from virtual machines to CP, per second, for the *MONITOR IUCV service.

***SIG>C**
The communication rate from virtual machines to CP, per second, for the *SIGNAL IUCV service.

***CCS>C**
The communication rate from virtual machines to CP, per second, for the *CCS IUCV service.

***SPL>C**
The communication rate from virtual machines to CP, per second, for the *SPL IUCV service.

***SYM>C**
The communication rate from virtual machines to CP, per second, for the *SYMPTOM IUCV service.

***ACC>C**
The communication rate from virtual machines to CP, per second, for the *ACCOUNT IUCV service.

***LOG>C**
The communication rate from virtual machines to CP, per second, for the *LOGREC IUCV service.

***CRM>C**
The communication rate from virtual machines to CP, per second, for the *CRM IUCV service.

***IDE>C**
The communication rate from virtual machines to CP, per second, for the *IDENT IUCV service.

***CNF>C**
The communication rate from virtual machines to CP, per second, for the *CONFIG IUCV service.

System Services Communication Failures:

IUVM_F
The total failure rate, per second, for all IUCV and VMCF communications.

IUCV_F
The total failure rate, per second, for all IUCV communications.

VMCF_F
The total failure rate, per second, for all VMCF communications.

***TOT_F**
The total failure rate, per second, for all CP IUCV services.

***MSA_F**
The failure rate, per second, for the *MSGALL IUCV service.

***MSG_F**
The failure rate, per second, for the *MSG IUCV service.

***RPI_F**
The failure rate, per second, for the *RPI IUCV service.

***BLK_F**
The failure rate, per second, for the *BLOCKIO IUCV service.

***MON_F**
The failure rate, per second, for the *MONITOR IUCV service.

***SIG_F**
The failure rate, per second, for the *SIGNAL IUCV service.

***CCS_F**
The failure rate, per second, for the *CCS IUCV service.

***SPL_F**
The failure rate, per second, for the *SPL IUCV service.

***SYM_F**
The failure rate, per second, for the *SYMPTOM IUCV service.

***ACC_F**
The failure rate, per second, for the *ACCOUNT IUCV service.

***LOG_F**
The failure rate, per second, for the *LOGREC IUCV service.

***CRM_F**
The failure rate, per second, for the *CRM IUCV service.

***IDE_F**
The failure rate, per second, for the *IDENT IUCV service.

***CNF_F**
The failure rate, per second, for the *CONFIG IUCV service.

System Facilities Data:

Done The number of CCWs successfully translated by the 'fast CCW translation' function, per second.

Abort The number of attempted fast CCW translations which were aborted, per second.

Notelig
The number of CCWs which were found to be not eligible for fast CCW translation, per second.

TotCCW
The total number of CCWs handled by the fast CCW translation function, per second.

Exit(us)
The total time spent processing user exit code per sample interval, in microseconds.

User Communication Activity:

Msg/s
The total IUCV and VMCF activity of an average user, per second.

ISend
The average IUCV send activity per second and user.

IRecv The average IUCV receive activity per second and user.

IFail The average number of IUCV data transfer failures per second and user.

VSend
The average number of VMCF data transfers to other users, per second and user.

VRecv
The average number of VMCF data transfers from other users, per second and user.

VFail The average number of VMCF data transfer failures per second and user.

SendQ
The average number of IUCV send requests queued for users.

RecvQ
The average number of IUCV requests in a user's receive queue.

ReplQ
The average number of IUCV requests in a user's reply queue.

VQueue
The average number of VMCF messages queued per users.

User Extremes:

Max. CPU
The percentage of total CPU time consumed by the user with the highest CPU load.

Max. VEC
The percentage of total vector time consumed by the user with the highest vector load. On z/VM 5.2 and later, dots will be inserted here (or on earlier systems, when Vector Facility support is not available).

Max. I/O
The I/O rate per second of the user with the highest I/O activity.

Max. Pag
The page rate per second of the user with the highest paging activity.

Max. Res
The number of resident pages of the user with the highest number of pages resident in main storage.

Max. MDC
The rate of minidisk cache inserts per second of the user with the highest minidisk cache insert rate.

Max. XST
The number of expanded storage blocks occupied by the user with the highest expanded storage usage.

Fields added for Storage:

Mn>2GB
Number of main storage frames above the 2GB line.

Below2G
Pages moved below 2GB for translation, per second.

System Log Data: Fast CCW Translation for Network Devices

N_Done
The number of network CCWs successfully translated by the 'fast CCW translation' function, per second.

N_Abort
The number of attempted fast network CCW translations which were aborted, per second.

N_NotEl
The number of network CCWs which were found to be not eligible for fast CCW translation, per second.

N_TotCC
The total number of network CCWs handled by the fast CCW translation function, per second.

I/O Processor Data:

SSCH/s
The number of times the I/O processor(s) began a start subchannel, per second.

Int/s The number of I/O interrupts generated by the I/O processor(s), per second.

%Busy
The average percentage of high frequency samples during which I/O processors were found to be busy.

Channel
The average percentage of channel busy conditions found per 'begin subchannel'.

Switch
The average percentage of switch busy conditions found per 'begin subchannel'.

CtlUnit
The average percentage of control unit busy conditions found per 'begin subchannel'.

Device
The average percentage of device unit busy conditions found per 'begin subchannel'.

Usage Notes:

1. The REDHIST display shows mainly data which could also be viewed in other 'by time' logs; it is not expected to be used very frequently. Since the HISTLOG

and HISTSUM files also contain a large amount of data, some compromises were made to avoid excessive storage requirements, but which lead also to some restrictions.

- Only one copy of the REDHIST display exists at any point in time, similar to the detailed user and I/O device displays. If multiple users view and manipulate REDHIST displays concurrently, they will interfere with each other's actions.
- The operation of the 'locate' function has been changed for this display:
  a. Only the date and time prefix area and the variable names specified in the second header line can be specified as strings to be located. The actual performance numbers will *not* be scanned.
  b. The program bases its decision as to whether a forward/backward locate operation or a left/right shift is attempted on the contents of the string specified: If it contains only valid decimal digits and/or the signs '/', ':' and blanks, a search for a string in the date/time area is assumed; otherwise a left/right shift is attempted.
  c. When locating a performance variable name in a left/right shift, the directional indicator '-/' for a backward search will be ignored. The search will always be done from left to right, starting with the first field in the record, *not* the current leftmost field.
  d. The following special search arguments have been included as mnemonics for locating specific areas within the data:

     CPU for general CPU and system load data

     USErs
     for the logged on and active user counts

     STOrutil
     for main storage utilization and paging activity

     XSTore
     for expanded storage utilization and activity

     MDCache
     for minidisk cache data

     AUXstor
     for auxiliary storage data

     SCHqueue
     for scheduler queue lengths

     SCHData
     for scheduler timer pop data

     TRANsact
     for user transaction data

     USTlog
     for average user wait state percentages

     SYSStat
     for some wait states of in-queue users only

     DASD
     for average DASD performance information

     CPSall
     for CP services data (all activity)

CPSTovm
for CP services activity from CP to virtual machines

CPSTOCp
for CP services activity from virtual machines to CP

CPSFails
for CP services failures

SYSLog
for fast CCW translations and user exit time

UCOMmlog
for user communication data

MAXusers
for the highest loads imposed by single users

- The PRINT command has not been implemented for REDHIST displays of HISTSUM and HISTLOG files. Although a print command will be accepted, only a small subset of the data will actually be printed.
- Data retrieval of the REDHIST display based on the old FCONRMT logic (data retrieval via RSCS) has not been implemented. Although a retrieval command will be accepted, the initial screen cannot be manipulated with scroll and shift commands to view more output.

FCX198, System Load Overview Screen – FCONRMT, SYSLOAD

Performance Toolkit Subcommand: "FCONRMT" on page 109, "SYSLOAD" on page 302.

The System Load Overview Screen (FCX198):

```
FCX198          Performance Toolkit Remote Monitoring Facility     Remote Data

Sel Node-ID   Time   ------------- Exceptions & CPU Load -------------> AvExcp
 _  EHNIVM0A  15:12  >>>>
```

FCX199, Remote History Data Display

The Remote History Data Display (FCX199):

```
FCX199         Performance Toolkit Remote History Data Display     Node-ID

Sel Date        Interval               Type of Display
 _  2002/08/24  10:14:28 - 10:15:28 :  CPU
 _  2002/08/24  10:14:28 - 10:15:28 :  USER
 _  2002/08/24  10:15:28 - 10:16:29 :  DEV
 _  2002/08/24  10:15:28 - 10:16:29 :  DEV S
 _  2002/08/24  10:16:29 - 10:17:30 :  UPAGE
 _  2002/08/24  14:31:05 - 14:32:06 :  CPU
 _  2002/08/24  14:31:05 - 14:32:06 :  DEV
 _  2002/08/24  14:32:06 - 14:33:08 :  USER
 _  2002/08/24  13:30:15 - 14:33:08 :  UST
 _  2002/08/24  Initial    14:35:23 :  DEV 260
 _  2002/08/24  14:35:23 - 14:37:17 :  DEV 260
 _  2002/08/24  Initial    14:40:52 :  USER PROFCAL
 _  2002/08/24  14:40:52 - 14:42:25 :  USER PROFCAL
 _  2002/08/24  14:44:29 - 14:45:32 :  RED
 _  2002/08/24  14:37:17 - 14:51:45 :  DEV 260
 _  2002/08/24  14:58:28 - 14:59:30 :  USER
 _  2002/08/24  14:42:25 - 15:02:38 :  USER PROFCAL

  17 perf. displays saved; insert 's' to display or 'd' to delete
Command ===>
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 95. Layout of Remote History Data Display (FCX199)

See the "Performance History Data Selection Display" section in the *z/VM: Performance Toolkit Guide* for more information on this screen.

FCX201, FCONXREP Summary History Files Screen

The FCONXREP Summary History Files Screen (FCX201):

```
FCX201          Perf. Toolkit Numerical Performance Analysis        Perf. Report

Period: Date       ==> 2003/01/01  to  2003/02/28   (YYYY/MM/DD)
        Time       ==> 08          to  17           (all hours in period)
        Sel. hours ==> __    __    __    __    __   (only selected hours)
                   ==> __    __    __    __    __
        Sel. days  ==> M-F_ ____ ____ ____ ____ ___ (only selected days)

Desired detail: HOURS  ==>  TOT      (ALL or TOT)
                DAYS   ==>  ALL      (ALL or TOT)
                MONTHS ==>  ALL      (ALL or TOT)

Variable selection ==> CPU           Total CPU load (all processors)
                   ==> PG/S          System page rate (reads & writes)
                   ==> C1ES          85% class 1 elapsed time slice
                   ==> TR/S          Trivial transactions executed per sec.
                   ==> NT/S          Non-triv. transact. executed per sec.
                   ==> ________
                   ==> ________
                   ==> ________

Processing file 'ACUM HISTSUM A1' (new SUM format)

F1=Help  F2=Browse  F3=Quit  F5=XEDIT  F10=Execute  F12=Return
```

Figure 96. Layout of FCONXREP Summary History Files Screen (FCX201)

See Appendix B, "Numerical Analysis of Performance History Data," on page 905 for more information on this screen.

FCX202, LPAR Load Log Screen – LPARLOG

Performance Toolkit Subcommand: "LPARLOG" on page 220.

The LPAR Load Log Screen (FCX202):

```
FCX202      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Interval <Partition->                                      <- Load per Log. Processor -->
End Time Name     Nr.   Upid  #Proc Weight Wait-C Cap %Load  %Busy %Ovhd %Susp %VMld %Logld Type TypeCap
>>Mean>> ECT2       1     02      6     10     NO  NO    .0     .0    .0   ...   ...    ... MIX   6400.0
>>Mean>> EEXT1      6     14      4     10     NO  NO    .0     .0    .0   ...   ...    ... CP    6400.0
>>Mean>> EEXT2     10     24      2     10     NO  NO    .0     .0    .0   ...   ...    ... CP    6400.0
>>Mean>> EPLX1      7     09     12     50     NO  NO   2.0   10.9    .1   ...   ...    ... MIX   6400.0
>>Mean>> EPLX2     11     10      8     45     NO  NO   2.2   17.6    .1   ...   ...    ... IFL   6400.0
>>Mean>> EPLX3     15     11      6     45     NO  NO   2.0   21.0    .1   ...   ...    ... IFL   6400.0
>>Mean>> EPRF1      2     04      4    DED    YES  NO   4.3   69.4    .0   ...   ...    ... CP    6400.0
>>Mean>> EPRF2      3     05      4    DED    YES  NO   3.1   50.0    .0   ...   ...    ... CP    6400.0
>>Mean>> EPS1       4     06      4    DED    YES  NO    .0     .0    .0   ...   ...    ... CP    6400.0
>>Mean>> ESTL1      8     13     15     50     NO  NO   3.2   13.5    .0   ...   ...    ... IFL   6400.0
>>Mean>> EST1       9     03      9     10     NO  NO    .0     .2    .0   ...   ...    ... MIX   6400.0
>>Mean>> EST2      12     23      6     10     NO  NO    .0     .2    .0   ...   ...    ... CP    6400.0
>>Mean>> EST3      16     63     12     25     NO  NO   5.9   31.5    .0   ...   ...    ... MIX   6400.0
>>Mean>> EVIC      17     12      2     10     NO  NO    .0     .3    .2   ...   ...    ... CP    6400.0
>>Mean>> FCFT       5     00     21     40     NO  NO    .2     .6    .0  66.4    .5    ... MIX   6400.0
>>Mean>> K4        13     21      6     10     NO  NO    .0     .3    .1   ...   ...    ... CP    6400.0
>>Mean>> PHOS      14     07      5     10     NO  NO    .0     .2    .0   ...   ...    ... CP    6400.0
>>Mean>> Total     ..     ..     64    335     ..  ..  23.3   11.7    .0   ...   ...    ... ..    6400.0

10:40:06 EPS1      4     06      4    DED    YES  NO   ...     .0    .0   ...   ...    ... CP    6400.0
10:40:06 ESTL1     8     13     15     50     NO  NO   3.2   13.5    .0   ...   ...    ... IFL   6400.0
10:40:06 EST1      9     03      9     10     NO  NO    .0     .2    .0   ...   ...    ... MIX   6400.0
10:40:06 EST2     12     23      6     10     NO  NO    .0     .2    .0   ...   ...    ... CP    6400.0
10:40:06 EST3     16     63     12     25     NO  NO   5.9   31.5    .0   ...   ...    ... MIX   6400.0
10:40:06 EVIC     17     12      2     10     NO  NO    .0     .3    .1   ...   ...    ... CP    6400.0
10:40:06 FCFT      5     00     21     40     NO  NO    .2     .5    .0  66.8    .4    ... MIX   6400.0
10:40:06 K4       13     21      6     10     NO  NO    .0     .3    .0   ...   ...    ... CP    6400.0
10:40:06 PHOS     14     07      5     10     NO  NO    .0     .4    .1   ...   ...    ... CP    6400.0
10:40:06 Total    ..     ..     64    335     ..  ..  24.8   12.4    .0   ...   ...    ... ..    6400.0
...


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 97. Layout of LPAR Load Log Screen (FCX202)

The information shown is based on CP monitor SYSTEM domain SAMPLE data.

The display shows the activity of all logical partitions, by time, and also some totals and averages for the overall load. The leftmost column contains the end time (format *hh:mm:ss*) of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen, use the LEFT/RIGHT commands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entries are reserved for the overall averages since the last RESET command or since data collection was activated. They are designated by the string `>>Mean>>` in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entries, you can find the relevant interval in the header line.

Name The name of the logical partition to which the following figures apply. A "Total" line is also shown which contains totals for the overall load, and averages for logical processor load.

Nr. The number of the logical partition. Note that this is an internal number presented by CP monitor data which does *not* correspond to the externally visible partition number.

Upid The user partition ID number for the logical partition.

#Proc The number of logical processors defined for the partition.

The total number of real processors on the system is inserted for the "Total" line.

Weight
The weight defined for the partition. Weight values range from 1 to 999, with a default of 10. The string "DED" will be inserted when the partition is dedicated.

For a mixed-engine partition, the weight for the partition's CPs will be shown.

The sum of the individual partitions' weights is inserted for the "Total" line.

Wait-C
The 'wait completion' definition for the logical processor. It can be:

YES if the wait completion flag has been set on, indicating the logical processor will keep running on a real processor until its time slice is up even though it is waiting

NO if the wait completion flag is off

Cap The 'capping' definition for the partition. It can be:

YES if 'capping' has been set on for the partition, indicating that CPU cycles are to be allocated only up to the specified maximum

NO if 'capping' is not active

Dots will be inserted for systems where the relevant data are not available.

%Load
The relative load of the partition on the whole processor complex, expressed as the relation of the total time that logical processors were dispatched for this partition, compared to the totally available processor time (number of processors times elapsed time), expressed in percent. If the enhanced LPAR monitor support for secondary processors such as zIIPs, zAAPs, IFLs, and ICFs is not available, then a load value will be inserted for only those partitions having CP processors, while dots will be shown for the relative load of partitions not having any CP processors. The total load shown in the Total line is calculated as the total of all partitions, and it includes also LPAR management time where available (see

description of %Ovhd). If the enhanced LPAR monitor support for secondary processors is not available, then the total load includes only the load of partitions having CP processors.

Note: When the system has enhanced LPAR monitor support, overall physical load figures for CP processors will always be calculated correctly. When the system does not have enhanced LPAR monitor support, CP physical load figures will be incorrect if the CEC contains IFL or ICF processors. This is because IFL and ICF processors are not counted in the 'number of physical processors' but they are treated like CP processors when PR/SM provides z/VM with processor utilization data. Because the overall physical load is calculated based on the assumption that there is no data from IFL or ICF processors, the resulting load figure for CPs will be too high.

Load per Log. Processor:

The following fields show average load figures per logical processor, even for the "Total" line (except for the %Ovhd value). Only the %Busy and %Ovhd fields can be calculated for all partitions. Monitor data for the remaining fields are available only for the logical partition in which the collecting VM system is running.

%Busy
Average percentage of time logical processors were busy, defined as the percentage of elapsed time during which real processors were assigned to logical processors. Note that the value will include also wait time in the system that is running in the partition if 'wait completion' has been enabled for the processor.

%Ovhd
Average percentage of elapsed time the logical processors spent for LPAR management.

Dots will be inserted for systems where the relevant data are not available.

Exception: The "Total" line shows *General LPAR mgmt. overhead*. This is general LPAR management time, expressed as a percentage of the available CPU time (elapsed time times the number of physical processors); it does not include LPAR management overhead for specific logical processors which is already shown in column %Ovhd.

This information is available only on systems with the LPAR management time facility.

%Susp
Average percentage of elapsed time that logical processors were 'suspended', that is, could not give service to the guest system due to LPAR management time and contention for real processors, where the 'suspended' time is calculated as the difference between elapsed time and the sum of processor busy time and voluntary wait time for the same processor as seen by the VM system that is active in the partition.

%VMld
Average processor load *as seen by the guest VM system*, based on processor busy time seen by the guest system and *elapsed time*.

%Logld
Average 'Logical processor load' *as seen by the guest VM system*, based on processor busy time seen by the guest system and *the sum of wait time and processor busy time* perceived by the guest VM system.

Type The CPU type of the logical processors defined for the partition, as follows:

CP Central Processor

ICF Internal Coupling Facility Processor

IFL Integrated Facility for Linux Processor

ZIIP IBM System z Integrated Information Processor (zIIP)

ZAAP IBM System z Application Assist Processor (zAAP)

MIX A mix of different processor types within one partition

Note:

1. For the ZIIP and ZAAP processor types, the monitor data will actually show 'IIP' and 'IFA', respectively. For better consistency, Perfkit translates these values to 'ZIIP' and 'ZAAP'.
2. While you may also see the first five types in the LPAR Load Screen (see "FCX126, LPAR Load Screen – LPAR" on page 463), the MIX type is only valid in this display.

TypeCap
The maximum amount of CPU power of this type the partition is permitted to use, where a value of 100 represents one whole physical CPU's worth of CPU power.

For a mixed-engine partition, the value for the partition's CPs will be shown.

The sum of the individual partitions' type caps is inserted for the "Total" line.

When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX203, TCP/IP Performance Data Menu – TCPMENU

Performance Toolkit Subcommand: "TCPMENU" on page 317.

The TCP/IP Performance Data Menu (FCX203) shows a list of all the available TCP/IP data displays, for all the servers that currently provide TCP/IP monitor records.

```
FCX203      CPU 9672  SER 65993          TCP/IP Displays         Perf. Monitor
  ______    .
  Server    Log File
S Userid    Name       Description
. System    HIPSOCK    Hipersocket channel activity
. System    QDIO       QDIO device activity
. System    VNIC       Virtual Network Device activity
. System    VSWITCH    Virtual Switches activity
. TCPIP     TCPACTLG   General TCP/IP activity log
. TCPIP     TCPBPLOG   TCP/IP buffer pools log
. TCPIP     TCPCONF    TCP/IP server configuration
. TCPIP     TCPDATLG   General TCP/IP data transfer log
. TCPIP     TCPDOSLG   TCP/IP denial of service log
. TCPIP     TCPICMP    TCP/IP ICMP messages log
. TCPIP     TCPIOLOG   TCP/IP I/O activity log
. TCPIP     TCPLINKS   TCP/IP links activity log
. TCPIP     TCPSESS    TCP/IP TCP and UDP sessions log
. TCPIP     TCPUSERS   TCP/IP users activity log
. TCPIPX    TCPACTLG   General TCP/IP activity log
. TCPIPX    TCPBPLOG   TCP/IP buffer pools log
. TCPIPX    TCPCONF    TCP/IP server configuration
. TCPIPX    TCPDATLG   General TCP/IP data transfer log
. TCPIPX    TCPDOSLG   TCP/IP denial of service log
. TCPIPX    TCPICMP    TCP/IP ICMP messages log
. TCPIPX    TCPIOLOG   TCP/IP I/O activity log
. TCPIPX    TCPLINKS   TCP/IP links activity log

Select performance screen with cursor and press ENTER
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 98. Layout of TCP/IP Performance Data Menu (FCX203)

The example is for a system with two TCP/IP servers, TCPIP and TCPIPX.

All TCP/IP logs are based on APPLDATA monitor records created by the server machines: They can be built and displayed only when:

- APPLDATA sample and event data collection has been enabled for the server(s), and when
- The servers themselves have been set up to create APPLDATA monitor records.

Where available, i.e. if hipersockets are defined, the top entry will allow selecting the Hipersocket channel activity display.

Similarly, if QDIO and/or Virtual Switches activity information is available, a `QDIO` and/or a `VSWITCH` entry will allow selecting the QDIO or Virtual Switches activity display. A 'Server Userid' of `System` will be inserted for the Hipersocket, QDIO and Virtual Switches selections.

Both the HIPSOCK and VSWITCH entries will be shown with a 'Server Userid' of `System`.

The logs are initially sorted to Server Userid; you can change the sequence to have them sorted to the log name instead.

Field Description:

S Cursor selection field.

Server Userid
Userid of the TCP/IP server machine whose configuration is shown, or activity logged.

Log File Name
The log file name, equal to the subcommand with which the log data can be selected for display.

Description
Description of the performance display.

FCX204, General TCP/IP Activity Log Screen – TCPACTLG

Performance Toolkit Subcommand: "TCPACTLG" on page 309.

The General TCP/IP Activity Log Screen (FCX204):

```
FCX204      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

TCP/IP Activity Log for Server TCPIP

          <--- Connections/s ---->  <----- TCP Segments/s ------>  <---- ARP/s
Interval  <---- Opens ----->              Trans   Re- Recvd X-mit        Reply
End Time   Init Accept Fails Reset  Recvd   mit X-mit Error Reset  Recvd X-mit
>>Mean>>   .004   .004  .001  .000   .224  .238  .001  .001  .000  4.718  .003
08:34:08   .003   .003  .003  .000   .047  .063  .003  .007  .000  4.477  .003
08:39:08   .000   .000  .000  .000   .007  .013  .003  .000  .000  5.837  .003
08:44:08   .000   .000  .000  .000   .003  .007  .000  .000  .000  5.027  .000
08:49:08   .000   .000  .000  .000   .003  .007  .003  .000  .000  4.540  .003
08:54:08   .000   .000  .000  .000   .007  .013  .000  .000  .000  4.700  .000
08:59:08   .000   .000  .000  .000   .007  .007  .003  .000  .000  3.760  .003
09:04:08   .000   .000  .000  .000   .007  .013  .000  .000  .000  5.867  .000
09:09:08   .000   .000  .000  .000   .000  .000  .000  .000  .000  4.327  .003
09:14:08   .000   .000  .000  .000   .013  .020  .000  .007  .000  3.790  .003
09:19:08   .000   .000  .000  .000   .170  .173  .000  .000  .000  6.310  .003
09:24:08   .000   .000  .000  .000   .447  .467  .000  .000  .000  3.333  .003
09:29:08   .000   .000  .000  .000  1.203 1.243  .000  .000  .000  4.553  .003
09:34:08   .030   .030  .000  .000   .367  .440  .000  .000  .000  6.190  .007

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 99. Layout of General TCP/IP Activity Log Screen (FCX204)

The information shown is based on CP monitor APPLDATA domain SAMPLE data, provided by the TCP/IP server machine.

The display shows general TCP/IP activity by time. The leftmost column contains the end time:

(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Connections:

Opens Init
: The rate per second at which TCP connection open requests were initiated.

Opens Accpt
The rate per second at which TCP connection open requests were accepted.

Opens Fails
The rate per second for TCP connection open failures.

Reset The reset rate per second for TCP connections.

TCP Segments/s:

Recvd
The TCP segments received rate per second.

Transmit
The TCP segments transmit rate per second.

Re-X-mit
The rate at which TCP segments were retransmitted, per second.

Recvd Error
The rate at which TCP segments were received that had errors, per second.

X-mit Reset
The rate at which TCP segments were transmitted that included a reset, per second.

ARP/s: Shows Address Resolution Protocol activity.

Recvd
The ARP requests received rate per second.

Reply X-mit
The rate at which ARP replies were transmitted, per second.

Req. X-mit
The rate at which ARP requests were transmitted, per second.

Denial of Service Packet Discards/s: These fields are available with TCP/IP function level 420 and later only; dots will be inserted otherwise.

Smurf
Smurf denial of service packet discards, per second.

Fraggle
Fraggle denial of service packet discards, per second.

PoDeath
Ping-o-Death denial of service packet discards, per second.

Dots can be shown instead of TCP/IP activity values, and either of the strings:

```
Not updated
Logged off
```

inserted, when no new monitor records have been received for an interval, or when the server was found to have been logged off.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX205, General TCP/IP Data Transfer Log Screen – TCPDATLG

Performance Toolkit Subcommand: "TCPDATLG" on page 312.

The General TCP/IP Data Transfer Log Screen (FCX205):

```
FCX205    CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
TCP/IP Data Transfer Log for Server TCPIP
          <- IP Packets --> <------------------------------ IP Datagrams -----
          <- Received/s --> <----- Incoming/s -----> <- Outgoing/s --> <Fragm.
Interval        <-Errors-->   For- Unknwn Dis- <User Prot>  Dis-    No Recei D
End Time  Total Headr  Addr warded Protcl card DelTo SupBy  card Route   ved g
>>Mean>>  2.384  .000  .602   .000   .000  .00 1.782  .245  .000  .000  .000
08:39:08  2.080  .000  .740   .000   .000  .00 1.340  .020  .000  .000  .000
08:44:08  2.160  .000  .580   .000   .000  .00 1.580  .010  .000  .000  .000
08:49:08  1.870  .000  .550   .000   .000  .00 1.320  .013  .000  .000  .000
08:54:08  2.890  .000  .573   .000   .000  .00 2.317  .017  .000  .000  .000
08:59:08  1.510  .000  .413   .000   .000  .00 1.097  .013  .000  .000  .000
09:04:08  2.343  .000  .707   .000   .000  .00 1.637  .017  .000  .000  .000
09:09:08  1.990  .000  .490   .000   .000  .00 1.500  .003  .000  .000  .000
09:14:08  2.610  .000  .410   .000   .000  .00 2.200  .023  .000  .000  .000
09:19:08  2.690  .000  .820   .000   .000  .00 1.870  .177  .000  .000  .000
09:24:08  2.273  .000  .370   .000   .000  .00 1.903  .470  .000  .000  .000
09:29:08  3.577  .000  .533   .000   .000  .00 3.043 1.247  .000  .000  .000
09:34:08  2.447  .000  .750   .000   .000  .00 1.697  .457  .000  .000  .000

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 100. Layout of General TCP/IP Data Transfer Log Screen (FCX205)

The information shown is based on CP monitor APPLDATA domain SAMPLE data, provided by the TCP/IP server machine.

The display shows general TCP/IP data transfer activity by time. The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The bytes received or bytes transmitted fields could wrap during the monitor interval on systems with a lot of activity so the numbers may not be accurate.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

IP Packets Received/s:

Total Total IP packets received rate per second.

Errors Headr
Received rate per second for IP packets that had header errors.

Errors Addr
Received rate per second for IP packets that had addressing errors.

IP Datagrams

Incoming/s

Forwarded
The number of IP datagrams forwarded per second.

Unknwn Protcl
The number of incoming IP datagrams that specified an unknown protocol, per second.

Discard
The number of incoming IP datagrams discarded per second.

User Prot DelTo
The number of incoming IP datagrams delivered to IP user protocols per second.

Outgoing/s:

User Prot SupBy
The number of outgoing IP datagrams supplied by IP user protocols for delivery, per second.

Discard
The number of outgoing IP datagrams discarded before delivery, per second.

No Route
The number of outgoing IP datagrams that had no route to their destination, per second.

Fragm. Reass/s:

Received
The number of IP fragments received per second that required reassembly.

Datagrams
The number of IP datagrams reassembled per second.

Reass Error
The number of IP datagram reassembly errors per second.

Fragmented/s:

Datagrams
The number of IP datagrams fragmented per second.

Failures
The number of IP datagram fragmentation failures per second.

Created
The number of IP datagram fragments created per second.

UDP Datagrams/s.:

Received
The number of UDP datagrams received per second.

No Listener
The number of UDP datagrams received per second for ports that had no listener.

Receive Error
The number of UDP datagrams received per second that had errors.

Transmit
The number of UDP datagrams transmitted per second.

Dots can be shown instead of data transfer values, and either of the strings:

```
Not updated
Logged off
```

inserted, when no new monitor records have been received for an interval, or when the server was found to have been logged off.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX206, TCP/IP ICMP Messages Log Screen – TCPICMP

Performance Toolkit Subcommand: "TCPICMP" on page 314.

The TCP/IP ICMP Messages Log Screen (FCX206):

```
FCX206      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

TCP/IP ICMP Messages Log for Server TCPIP

          <--------------- ICMP Messages Received/s ----------------> <-------
Interval                  Un-   Time Param Source Redi-       Time Addr
End Time  Total Error reach Exceed Probl Quench  rect Echo Stamp Mask Total Er
>>Mean>>   .004  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
08:34:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
08:39:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
08:44:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
08:49:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
08:54:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
08:59:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
09:04:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
09:09:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
09:14:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
09:19:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
09:24:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
09:29:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .
09:34:08   .003  .000  .000   .000  .000   .000  .000  .00  .000  .00  .003  .

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 101. Layout of TCP/IP ICMP Messages Log Screen (FCX206)

The information shown is based on CP monitor APPLDATA domain SAMPLE data, provided by the TCP/IP server machine.

The display shows TCP/IP ICMP messages activity by time. ICMP reports problems and relays network specific information, such as error status from some network device.

The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

ICMP Messages Received/s:

Total Total ICMP messages received per second.

Error Number of ICMP messages received per second that had errors.

Unreach
Number of ICMP 'Destination Unreachable' messages received per second.

Time Exceed
Number of ICMP 'Time Exceeded' messages received per second.

Param Probl
Number of ICMP 'Parameter Problem' messages received per second.

Source Quench
Number of ICMP 'Source Quench' messages received per second.

Redirect
Number of ICMP 'Redirect' messages received per second.

Echo Number of ICMP 'Echo' and 'Echo Reply' messages received per second.

Time Stamp
Number of ICMP 'Timestamp' and 'Time Stamp Reply' messages received per second.

Addr Mask
Number of ICMP 'Address Mask' and 'Address Mask Reply' messages received per second.

ICMP Messages Sent/s:

Total Total ICMP messages sent per second.

Error Number of ICMP message transmission errors per second.

Unreach
Number of ICMP 'Destination Unreachable' messages sent per second.

Time Exceed
Number of ICMP 'Time Exceeded' messages sent per second.

Param Probl
Number of ICMP 'Parameter Problem' messages sent per second.

Source Quench
Number of ICMP 'Source Quench' messages sent per second.

Redirect
Number of ICMP 'Redirect' messages sent per second.

Echo Number of ICMP 'Echo' and 'Echo Reply' messages sent per second.

Time Stamp
Number of ICMP 'Timestamp' and 'Time Stamp Reply' messages sent per second.

Addr Mask
Number of ICMP 'Address Mask' and 'Address Mask Reply' messages sent per second.

Dots can be shown instead of ICMP message activity, and either of the strings:

```
Not updated
Logged off
```

inserted, when no new monitor records have been received for an interval, or when the server was found to have been logged off.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX207, TCP/IP TCP and UDP Sessions Log Screen – TCPSESS

Performance Toolkit Subcommand: "TCPSESS" on page 318.

The TCP/IP TCP and UDP Sessions Log Screen (FCX207):

```
FCX207      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

TCP/IP TCP & UDP Sessions Log (open/close) for Server TCPIP

                                                                 <Roundtrip>
          Acti- Local Remote IP Address    Client   <-- Bytes ---> <Time (s)->
Time       vity  Port (for TCP only)       Name     Receivd   Sent Smooth Var.
09:31:21  Open     90 9.164.193.181:1080   VMWEBSRV     ---    ---    ---  ---
09:31:21  Close    90 9.164.193.181:1080   VMWEBSRV     250  13539   .010 .010
09:37:51  Open     80 9.164.178.140:2523   WEBSHAR5     ---    ---    ---  ---
09:37:54  Open   3441 9.164.178.140:0113   WEBSHAR5     ---    ---    ---  ---
09:37:54  Close  3441 9.164.178.140:0113   WEBSHAR5       0      1   .000 1.47
09:37:55  Close    80 9.164.178.140:2523   WEBSHAR5     201   3291   .133 .074
09:37:59  Open     80 9.164.178.140:2522   WEBSHAR5     ---    ---    ---  ---
09:37:59  Open     80 9.164.178.140:2521   WEBSHAR4     ---    ---    ---  ---
09:37:59  Open   3442 9.164.178.140:0113   WEBSHAR5     ---    ---    ---  ---
09:37:59  Close  3442 9.164.178.140:0113   WEBSHAR5       0      1   .000 1.47
09:37:59  Open   3443 9.164.178.140:0113   WEBSHAR4     ---    ---    ---  ---
09:37:59  Close  3443 9.164.178.140:0113   WEBSHAR4       0      1   .000 1.47
09:38:01  Close    80 9.164.178.140:2522   WEBSHAR5     243  20752   .187 .095
09:38:02  Close    80 9.164.178.140:2521   WEBSHAR4     251   9101   .062 .043

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 102. Layout of TCP/IP TCP and UDP Sessions Log Screen (FCX207)

The information shown is based on CP monitor APPLDATA domain EVENT data, provided by the TCP/IP server machine.

The display shows TCP and UDP sessions (TCB and UCB open/close activity) by time. See "TCPUSERS" on page 319 for summary data on users' sessions. The leftmost column contains the time:

(format *hh:mm:ss*)

of the open or close activity. For 'close' events only, information on the activity and performance of the session will be included.

Note that only part of the data can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

Field Description:

Time The time of the open or close activity.

Activity
Is either Open if the TCB or UCB for the session was opened, or Close if it was closed.

Local Port
The number of the local port used.

Remote IP Address
The remote IP address (for TCB open/close only), or the string (UDP) (for UCB open/close).

Client Name
The client user identifier.

Bytes Received
The number of bytes received.

Bytes Sent
The number of bytes sent.

Roundtrip Time (s): The 'round trip time' is defined as the time interval between sending a segment and receiving an acknowledgment for it.

Smooth
The smoothed round trip time in seconds.

Var. The smoothed round trip time variance in seconds.

Segments:

Total The total number of segments.

Unacknowledged
The maximum number of unacknowledged segments.

Max. Size:

Segment
The maximum segment size.

Window Recv
The maximum receive window size.

Window Send
The maximum send window size.

Max. Buffer Queue Size:

Input The maximum input buffer queue size.

Output
The maximum output buffer queue size.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX208, TCP/IP Links Activity Log Screen – TCPLINKS

Performance Toolkit Subcommand: "TCPLINKS" on page 316.

The TCP/IP Links Activity Log Screen (FCX208):

```
FCX208      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

TCP/IP Links Activity Log for Server TCPIP

                           <------------ Received/s -------------> <------ Tra
                                 <----------- Packets ----------->       <----
Interval                          Uni-    Non- Dis-        Unknown        Uni-
End Time Link Name         Bytes  cast Unicast card Error Protocol Bytes  cast
>>Mean>> LOSAD00           652.6  .234   6.868  .00  .000     .096 117.9  .248
>>Mean>> IUCVX1             .000  .000    .000  .00  .000     .000  .000  .000

09:14:08 LOSAD00           651.2  .023   6.377  .00  .000     .097 1.840  .027
09:14:08 IUCVX1             .000  .000    .000  .00  .000     .000  .000  .000

09:19:08 LOSAD00           766.6  .180   8.820  .00  .000     .097 31.91  .180
09:19:08 IUCVX1             .000  .000    .000  .00  .000     .000  .000  .000

09:24:08 LOSAD00           562.3  .457   5.150  .00  .000     .093 115.5  .473
09:24:08 IUCVX1             .000  .000    .000  .00  .000     .000  .000  .000

09:29:08 LOSAD00           720.6 1.213   6.917  .00  .000     .100 817.2 1.250
09:29:08 IUCVX1             .000  .000    .000  .00  .000     .000  .000  .000

09:34:08 LOSAD00           743.3  .387   8.250  .00  .000     .093 251.7  .463
09:34:08 IUCVX1             .000  .000    .000  .00  .000     .000  .000  .000

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 103. Layout of TCP/IP Links Activity Log Screen (FCX208)

The information shown is based on CP monitor APPLDATA domain SAMPLE data, provided by the TCP/IP server machine.

The display shows TCP/IP links activity by time. The leftmost column contains the end time:

(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Link Name
: The name of the link whose activity is displayed on the line.

Received/s:

Bytes The number of bytes received per second on this link.

Unicast
The number of unicast packets received per second.

Non-Unicast
The number of non-unicast packets received per second.

Discard
The number of incoming packets discarded per second.

Error The number of incoming packets that had errors, per second.

Unknown Protocol
The number of incoming packets that had unknown protocols, per second.

Transmitted/s:

Bytes The number of bytes transmitted per second on this link.

Unicast
The number of unicast packets transmitted per second.

Non-Unicast
The number of non-unicast packets transmitted per second.

Discard
The number of outgoing packets discarded per second.

Error The number of outgoing packets that had errors, per second.

Dots can be shown instead of link activity values, and either of the strings:

```
Not updated
Logged off
```

inserted, when no new monitor records have been received for an interval, or when the server was found to have been logged off.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX210, TCP/IP Buffer Pools Log Screen – TCPBPLOG

Performance Toolkit Subcommand: "TCPBPLOG" on page 310.

The TCP/IP Buffer Pools Log Screen (FCX210):

```
FCX210      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

TCP/IP Buffer Pool Management Log for Server TCPIP

          <------------------------------- Buffer Pool Level -----------------
          Acti Cli- <- Enve- ->  Raw Sock  BSD  TCP  UDP                  Segm
Interval  vity  ent <- lope -->   IP   et Sock  Ctl  Ctl <-Data Buffer--> Ackn
End Time  CBlk CBlk Reglr Large CBlk CBlk CBlk Blok Blok Reglr Small Tiny CBlk
>>Mean>>   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
>>Min.>>   913   57   727    48   50 1851  212 1910   81   114     0    0  ...
08:39:08   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
08:44:08   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
08:49:08   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
08:54:08   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
08:59:08   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
09:04:08   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
09:09:08   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
09:14:08   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
09:19:08   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
09:24:08   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
09:29:08   977   60   749    48   50 1927  221 1975   82   120     0    0  ...
09:34:08   977   56   749    48   50 1924  221 1968   82   120     0    0  ...

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 104. Layout of TCP/IP Buffer Pools Log Screen (FCX210)

The information shown is based on CP monitor APPLDATA domain SAMPLE data, provided by the TCP/IP server machine.

The display shows TCP/IP buffer pool levels by time. The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were obtained.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

The second entry is reserved for the minimum buffer pool level values encountered. It is designated by the string >>Min.>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or BYTIME interval for which the values were obtained.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Buffer Pool Level: The number of free blocks in the pool at the end of the sample interval.

Activity CBlk
Activity control block pool level.

Client CBlk
Client control block pool level.

Envelope Reglr
Regular envelope pool level.

Envelope Large
Large envelope pool level.

Raw IP CBlk
Raw IP control block pool level.

Socket CBlk
Socket control block pool level.

BSD Sock CBlk
BSD-style socket control block pool level.

TCP Ctl Blok
TCP control block pool level.

UDP Ctl Blok
UDP control block pool level.

Data Buffer Reglr
Regular data buffer pool level.

Data Buffer Small
Small data buffer pool level.

Data Buffer Tiny
Tiny data buffer pool level.

Segm Ackn CBlk
Segment acknowledgement control block pool level.

Fixed Page
Fixed Page Storage Pool fields are:

Stor Level
Fixed page storage pool level (full pages).

Locked Avail
Fixed page storage pool locked pages that are available (not in use).

No minimums are provided by the TCP/IP server, so dots are inserted into the `>>Min.>>` line for both the 'Locked Avail' and the 'Locked Used' columns.

Locked Used
Fixed page storage pool locked pages that are currently allocated by users of the storage pool.

Dots can be shown instead of buffer pool level values, and either of the strings:

```
Not updated
Logged off
```

inserted, when no new monitor records have been received for an interval, or when the server was found to have been logged off.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX212, TCP/IP Server Configuration Screen – TCPCONF

Performance Toolkit Subcommand: "TCPCONF" on page 311.

The TCP/IP Server Configuration Screen (FCX212) shows the buffer pool and TCP/IP links configuration of the selected TCP/IP server machine for the latest interval.

```
FCX212      CPU nnnn  SER nnnnn        Status   hh:mm:ss      Perf. Monitor

TCP/IP Configuration for Server TCPIP
<--Allocation Limit--->   Free  Min. Elem.
Buffer Pools                Blocks Unrestricted Restricted Blocks Depth  Size
Activity Control Block        1024           51        102   1007   995   137
Client Control Block           152            7         15    104   104   296
Data Buffer                   9000          450        900   8972  8966 16384
Small Data Buffer              500           25         50    498   498  2048
Tiny Data Buffer                10            1          1      3     3   256
Envelope                       750           37         75    750   737  2048
Large Envelope                 150            7         15    149   149  9216
Host Pool                        0            0          0      0     0     0
Raw IP Control Block            52            2          5     50    50   232
Socket Control Block          1006           50        100    912   912   228
BSD-Style Socket Ctl. Block   1001           50        100    955   955   913
TCP Control Block             3004          150        300   2975  2975   667
UDP Control Block              105            5         10     79    78   268
Address Translation           1511            0          5   1504  1504   165
IP Route                       301            0          6    282   281   129
Segment Acknowledgement      60080         3004       6008  60080 60078    24
Fixed Page Storage Pool        167       217798     195852     16     0  4096

Overall Storage Utilization: Virtual Machine Storage Size      1024MB
                             Total Available for Allocation    843MB
                             Largest Block Available           824MB

Configuration of link LOSAD00 (number X'00000001')
IBM LCS

Device number    : X'00000D00'           Network number     X'00000000'
Device type      : LCS                   Network type     : TokenRing
Device name      : DOSAD00               Network name     : LOSAD00
Interface number : X'00000001'           Max. transm. unit:   2048 Bytes
Interface type   : iso88025-tokenRing    Interface speed  :  4000k bits/s

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 105. Layout of TCP/IP Server Configuration Screen (FCX212)

The information shown is based on configuration records provided by the TCP/IP server machine, and passed on by CP monitor as APPLDATA EVENT records. Buffer pool information and information for active links is then continuously refreshed from APPLDATA SAMPLE records to reflect the current status.

Field Description:

Buffer Pool Configuration:

Buffer Pools
The description of the control blocks the pool is used for.

Total Blocks
The total number of blocks in the pool.

Unrestricted
The unrestricted allocation limit.

Restricted
The restricted allocation limit.

Free Blocks
The number of available blocks.

Min. Depth
The minimum depth reached.

Elem. Size
The pool element size.

The buffer pool information that is displayed depends on the originating TCP/IP level.

Overall Storage Utilization: Shows the sizes of the machine's total virtual storage, the amount of free storage available for allocation, and the size of the largest block of available storage.

Link Configuration:

The header lines for each link show the link name, the link number, and the link's description. The following additional information is included for all links:

Device number
The device number.

Device type
The device type. Possible device types are

- LCS
- ELANS
- ILANS
- DDN1822
- X25ICA
- PVMIUCV
- SNAIUCV
- X25NPSI
- CTC
- HCH
- HIPPI
- CLAW
- SNALU62
- Virtual (VIPA)
- ATM
- OSA Direct Express
- HiperSockets

Device name
The device name.

Interface number
The interface number.

Interface type
The interface type. Possible interface types are

- other
- regular1822
- hdh1822
- ddn-x25
- rfc877-x25
- ethernet-csmacd
- iso88023-csmacd
- iso88024-tokenBus
- iso88025-tokenRing
- iso88026-man
- starLan
- proteon-10Mbit
- proteon-80Mbit
- hyperchannel
- fddi
- lapb
- sdlc
- ds1
- e1
- basicISDN
- primaryISDN
- propPointToPointSerial
- ppp
- softwareLoopback
- eon
- ethernet-3Mbit
- nsip
- slip
- ultra
- ds3
- sip
- frame-relay

  (Can be abbreviated to fit into the available space.)

Network number
The network number.

Network type
The network type. Possible network types are

- InternalLoopback
- ProNet
- Ethernet
- EtherOr802.3
- Only802.3
- TokenRing
- Util
- IUCV

- CTC
- DDN1822
- X25ICA
- A220
- HIPPI
- FDDI
- CLAWip
- ControlTask
- OffloadLinkl
- OffloadApiBroadcastMedia
- OffloadApiPointToPoint
- OffloadApiOtherKinds
- Virt. Device VIPA
- OSA ATM native mode
- QDIO Ethernet mode
- QDIO ATM mode
- QDIO Token Ring
- HiperSockets

  (Can be abbreviated to fit into the available space.)
- VSwitch-IUCV

Network name
The network name.

Max. transm. unit
The size of the maximum transmission unit.

Interface speed
The speed of the interface, in bits/s.

Be aware that TCP/IP returns a 'speed' that is just a constant based on the device type. The value may differ from the actual interface's capabilities.

The above fields can be shown for each link. For PVMIUCV, SNAIUCV, IPIIUCV and SNALU62 devices the following additional fields can be included:

Local node name
The local node name.

Local user ident.
The local user identifier.

Remote node name
The remote node name.

Rem. user ident.
The remote user identifier.

For CLAW devices the following additional fields can be included:

Host name
The host name.

Adapter name
The claw adapter name.

Control task name
The control task name.

Read buffers
The number and size of read buffers.

Write buffers
The number and size of write buffers.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX213, User Defined Displays Selection Menu – UDEFMENU

Performance Toolkit Subcommand: "UDEFMENU" on page 325.

The User Defined Displays Selection Menu (FCX213):

```
FCX213      CPU nnnn  SER nnnnn        User_Def Displays         Perf. Monitor

  User Defined Screens Selection Menu

  Screen    Data
S Name      Type      Description
. MYSCREEN  Interval  This is a sample screen with CPU and STORAGE data
. MYLOG     By Time   Sample log with fields from SYSTEM screen
. MYLOG2    By Time   Sample log with fields from STORAGE / RESPALL / USER









Select performance screen with cursor and press ENTER
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 106. Layout of User Defined Displays Selection Menu (FCX213)

The menu shows a listing of all of the currently active user defined performance screens with interval data, and of user defined performance data logs with 'by time' data. Displays can be selected by moving the cursor to the desired line and pressing the ENTER key, or by entering the 'screen name' on the command line.

Field Description:

Screen Name
: The name of the user defined screen or performance data log, as defined with the 'FC DEFSCRN ..' or 'FC DEFLOG ..' subcommands. See "FCONTROL DEFLOG" on page 20 and "FCONTROL DEFSCRN" on page 24 for more information on these subcommands.

Data Type
: The kind of performance data contained in the display:

  Interval
  : For displays showing data for a single interval, defined by 'FC DEFSCRN ..' subcommands, or

  By Time
  : For data logs that show data for multiple intervals, with one output line per interval, defined by 'FC DEFLOG ..' subcommands.

Description
: An optional description of the display, set by means of the 'DESC' argument of the 'FC DEFSCRN' or 'FC DEFLOG' subcommands.

FCX214, TCP/IP TCP and UDP Sessions Log Screen – TCPUSERS

Performance Toolkit Subcommand: "TCPUSERS" on page 319.

The TCP/IP Users Activity Log Screen (FCX214):

```
FCX214      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor


TCP/IP Users Activity Log for Server TCPIP

                  Completed   Time  <-Total Bytes X-ferred->  <Roundtrip>  <-
          User    Sessions   /Sess  <-- TCP -->  <-- UDP -->  <Time (s)->
Time      Name     TCP  UDP  (sec)  Recvd  Sent  Recvd  Sent  Smooth Var.  To
>>Mean>> WEBSHAR3   28    0     .9   4794  201k      0     0    .011 .741
>>Mean>> WEBSHAR5    2    0     .5    321  9102      0     0    .003 .734
>>Mean>> WEBSHAR1    2    0     .5    310 26595      0     0    .004 .734
>>Mean>> WEBSHARE    2    0     .5    324  6666      0     0    .003 .735
>>Mean>> Total...   34    0     .8   5749  244k      0     0    .009 .740

07:49:28 WEBSHAR3   22    0    1.0   3921  149k      0     0    .012 .742
07:49:28 WEBSHAR5    0    0    ...    ...   ...    ...   ...     ...   ..
07:49:28 WEBSHAR1    0    0    ...    ...   ...    ...   ...     ...   ..
07:49:28 WEBSHARE    0    0    ...    ...   ...    ...   ...     ...   ..
07:49:28 Total...   22    0    1.0   3921  149k      0     0    .012 .742

07:54:28 WEBSHAR3    0    0    ...    ...   ...    ...   ...     ...   ..
07:54:28 WEBSHAR5    0    0    ...    ...   ...    ...   ...     ...   ..
07:54:28 WEBSHAR1    0    0    ...    ...   ...    ...   ...     ...   ..
07:54:28 WEBSHARE    0    0    ...    ...   ...    ...   ...     ...   ..
07:54:28 Total...    0    0    ...    ...   ...    ...   ...     ...   ..

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 107. Layout of TCP/IP Users Activity Log Screen (FCX214)

The information shown is based on CP monitor APPLDATA domain EVENT data, provided in the form of connection OPEN/CLOSE records by the TCP/IP server machine.

The display shows summary TCP and UDP activity by user and by time; see "TCPSESS" on page 318 for session details. The leftmost column contains the end time:

(format *hh:mm:ss*)

of the sample interval for which the OPEN/CLOSE information was accumulated.

Note that only part of the data can be shown on the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

Field Description:

Time The end time of the interval for which activity data was accumulated.

User Name
The user identification of the virtual machine that handled our side of the sessions.

Completed Sessions: Shows the number of sessions which were completed during the sample interval, i.e. for which a CLOSE event record was processed.

TCP The number of completed TCP sessions.

UDP The number of completed UDP sessions.

Time/Sess (sec)
The average session duration (elapsed time between OPEN and CLOSE).

Total Bytes X-ferred:

TCP Recvd
The number of bytes received during TCP sessions.

TCP Sent
The number of bytes sent during TCP sessions.

UDP Recvd
The number of bytes received during UDP sessions.

UDP Sent
The number of bytes sent during UDP sessions.

Roundtrip Time (s): The 'round trip time' is defined as the time interval between sending a segment and receiving an acknowledgment for it.

Smooth
The smoothed round trip time, in seconds.

Var. The smoothed round trip time variance, in seconds.

Segments:

Total The total number of segments.

Unacknowledged
The maximum number of unacknowledged segments.

Max. Buffer Queue Size:

Input The maximum input buffer queue size.

Output
The maximum output buffer queue size.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX215, FICON Channel Load Screen – FCHANNEL

Performance Toolkit Subcommand: "FCHANNEL" on page 179.

The FICON Channel Load Screen (FCX215):

```
FCX215      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
_______           .     .     .      .     .     .      .        .        .
                <------ FICON Channel Utilization % ------->
                <-- Total for System -->  <-Own Partition-->  <--Total Data-->
Channel           Bus  Work <Data Units>   Work <Data Units>  <Transfer Rate->
Path            Cycle Units Write   Read  Units Write   Read  <- (Bytes/s) -->
ID      Shrd  T_BCy T_WUn T_DUW  T_DUR  L_WUn L_DUW  L_DUR  Write/s   Read/s
F0      Yes       9    24     0      0      0     0      0        0        0
F4      Yes      24     8     1      1      8     1      1   549199   542667
F5      Yes       9     1     0      0      0     0      0        0        0









Enter 'CHannel' or 'LCHannel' for channel busy overviews
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 108. Layout of FICON Channel Load Screen (FCX215)

FICON channel load analysis is based on data from the Extended Channel Path Measurement Facility, available from the CP monitor SYSTEM domain. The screen shows a list of all channels for which valid information was found.

The sample shows a screen with channels sorted in ascending channel path ID sequence (indicated by the underscore characters '___' above the 'ID' header), the initial sequence. Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Field Description for FICON Channel Load:

Channel Path ID
The hexadecimal 'channel path identifier'

Shrd 'Shared' indicator for the channel. It can be either

YES For channels shared with other logical partitions, or

NO For channels dedicated to this logical partition

FICON Channel Utilization %: The following fields show the relative utilization of resources compared to the maximum value, in percent.

Total for System:

Bus Cycle T_BCy
The bus cycles utilization for the whole system.

Work Units T_WUn
The work units utilization for the whole system.

Data Units Write T_DUW
The data units write utilization for the whole system.

Data Units Read T_DUR
The data units read utilization for the whole system.

Own Partition:

Work Units L_WUn
The work units utilization for the own logical partition.

Data Units Write L_DUW
The data units write utilization for the own logical partition.

Data Units Read L_DUR
The data units read utilization for the own logical partition.

Total Data Transfer Rate (Bytes/s):

Write/s
The total number of bytes written per second, for the whole system.

Read/s
The total number of bytes read per second. for the whole system.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields.

FCX216, Reusable Server Kernel Performance Data Menu – RSKMENU

Performance Toolkit Subcommand: "RSKMENU" on page 270.

The Reusable Server Kernel Performance. Data Menu (FCX216) shows a list of all the available RSK data displays, for all the servers that currently provide RSK monitor records:

```
FCX216      CPU nnnn  SER nnnnn            RSK Displays         Perf. Monitor
              _____   .
              Server  Display
S             Userid  Name       Description
.             BPIDX1  RSKDET     Reusable Server Kernel details
.             BPIDX1  RSKDISK    RSK disk performance log
.             BPIDX1  RSKLOG     General RSK performance log
.             BPIDX1  RSKSTOR    RSK storage utilization log
.             BPSERV  RSKDET     Reusable Server Kernel details
.             BPSERV  RSKDISK    RSK disk performance log
.             BPSERV  RSKLOG     General RSK performance log
.             BPSERV  RSKSTOR    RSK storage utilization log
.             BPSRV1  RSKDET     Reusable Server Kernel details
.             BPSRV1  RSKDISK    RSK disk performance log
.             BPSRV1  RSKLOG     General RSK performance log
.             BPSRV1  RSKSTOR    RSK storage utilization log
.             MPTEST  RSKDET     Reusable Server Kernel details
.             MPTEST  RSKDISK    RSK disk performance log
.             MPTEST  RSKLOG     General RSK performance log
.             MPTEST  RSKSTOR    RSK storage utilization log

Select performance screen with cursor and press ENTER
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 109. Layout of Reusable Server Kernel Performance Data Menu (FCX216)

The example is for a system with four servers: BPIDX1, BPSERV, BPSRV1 and MPTEST.

All Reusable Server Kernel performance displays are based on APPLDATA monitor records created by the server machines. They can be built and displayed only when both of the following are true:

- APPLDATA sample data collection has been enabled for the server(s)
- The server(s) have been set up to create APPLDATA monitor records.

The logs are initially sorted to Server Userid. You can change the sequence to have them sorted to the log name instead.

Field Description:

S Cursor selection field.

Server Userid
Userid of the RSK server machine whose performance data are shown.

Display Name
The display name, equal to the subcommand with which the performance screen can be selected for display.

Description
Short description of the performance display.

FCX217, Reusable Server Kernel Performance Details Screen – RSKDET

Performance Toolkit Subcommand: "RSKDET" on page 267.

The Reusable Server Kernel Performance Details Screen (FCX217) shows detailed performance data for the selected RSK server, with activity information for all the monitor rows that provided data.

```
FCX217      CPU nnnn  SER nnnnn        Status   hh:mm:ss         Perf. Monitor

Reusable Server Kernel Details: BPSERV

<---------------------------- Services Activity ----------------------------->
Service  Trans <Bytes/s>   Service  Trans <Bytes/s>   Service  Trans <Bytes/s>
Name       /s Recv Sent   Name       /s Recv Sent   Name       /s Recv Sent
>Total>> 7.178  347 501k   APPC      .000    0    0   AUTH      .000    0    0
CACHE     .003    0    1   CMS       .000    0    0   CONFIG    .000    0    0
CONSOLE   .000    0    0   CP        .000    0    0   ECHO      .000    0    0
ENROLL    .013    0    2   HTTP     7.161  347 501k   IUCV      .000    0    0
...

<--------------------------- Line Driver Activity --------------------------->
Line     Trans <Bytes/s>   Line     Trans <Bytes/s>   Line     Trans <Bytes/s>
Driver     /s Recv Sent   Driver     /s Recv Sent   Driver     /s Recv Sent
>Total>> 7.178  347 501k   CONSOLE   .017    0    3   MSG       .000    0    0
SPOOL     .000    0    0   SUBCOM    .000    0    0   TCP      7.161  347 501k

<---------- Enrollment Set Activity ---------->    <------ Worker API ------->
Name      Records  Bytes  Ins/s Remov/s Retrv/s    ClassName  TotlConn ActConn
>Total>>      212  71232   .003    .000   28.55    BPINDEX           1       1
HTTPCNFG        3   1008   .003    .000   21.49    ........       ....     ...
HTTPMIME      209  70224   .000    .000   7.064    ........       ....     ...

<---------------- Trie Indexing Data ----------------->
Trie      <Data Space>  Records         <-Activity/s-->
Name      MBytes %Used  Indexed  Nodes  Lookups Records
>Total>>    4096    53   731292    27M     .000    .000
D0000002    2048    34   421008  8697k     .000    .000
D0000003    2048    71   310284    18M     .000    .000


<------- File Cache --------> <-Opens--> Discrd    <Authorize/s-> <Row Retrvl>
Name        Bytes %Used Files    /s %Hit     /s    Permit Inquire Rows/s  %Hit
HTTPFILE     128M    63   777 6.911   77   .000      .000    .000   .000    ..

<------------------- Storage Group Activity ------------------->
Storage  I/O        <--- Page Reads ---->  <--- Page Writes --->
Group    Technique   IO/s Pages/s msec/Pg   IO/s Pages/s msec/Pg
>Total>> ------      .996   238.2     ...   .996   238.2     ...
SGDS     DataSpace   .286   68.30     ...   .286   68.30     ...
SG250    Diag 0250   .710   169.9     ...   .710   169.9     ...

<------------------------- Memory Subpool Activity ------------------------->
          <-Storage->  <---- ssMemory Activity ----> <-- CMSSTOR Activity --->
Subpool    Total Used  <- Allocate -> <- Release --> <-Extended-> <-Depleted->
Name       Bytes    %  Rate/s   Bytes Rate/s   Bytes Times  Bytes Times  Bytes
>Total>>    132M   98   114.9    584M  111.5    584M  2609   105M  1302 13584k
BKWSBPAU  102400  100    .000       0   .000       0     0      0     0      0
BKWSBPCA  774208   83   5.540  245808  2.503  122544   938 124384     0      0
...
DMSSBPSO   28776  100    .016   28776   .000   28848     2  28848     0  28848
D0000000       0   ..    .000       0   .000      72     2     72     0     72

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 110. Layout of Reusable Server Kernel Performance Details Screen (FCX217)

The information shown is based on APPLDATA sample domain records created by the RSK server machine.

The display shows all of the usage and activity information provided by the standard data rows contained in reusable server kernel monitor data. It will not show any application specific data, even if the RSK application does provide such additional information.

Names of rows that show any activity for the selected interval will be highlighted. Where no rows were found for a specific component the corresonding lines will be omitted from the display.

Field Description:

Services Activity: Shows activity data obtained from Service data rows. Entries are sorted alphabetically for service names.

Service Name
The name of the service.

A '>Total>>' entry with overall totals for all services is inserted first if data for multiple services can be shown.

Trans/s
The transaction rate per second.

Bytes/s
The number of bytes transferred per second.

Recv Bytes received per second.

Sent Bytes sent per second.

Line Driver Activity: Shows activity data obtained from Line Driver data rows. Entries are sorted alphabetically for line driver names.

Line Driver
The line driver name.

A '>Total>>' entry with overall totals for all line drivers is inserted first if data for multiple line drivers can be shown.

Trans/s
The transaction rate per second.

Bytes/s
The number of bytes transferred per second.

Recv Bytes received per second.

Sent Bytes sent per second.

Enrollment Set Activity: Shows utilization and activity data obtained from Enrollment data rows. Entries are sorted alphabetically for enrollment set names.

Name
The enrollment set name.

A '>Total>>' entry with overall totals for all enrollment sets is inserted first if data for multiple enrollment sets can be shown.

Records
The number of records in the enrollment set.

Bytes The number of bytes in use holding records.

Ins/s The insertion rate per second.

Remov/s
The removal rate per second.

Retr/s The retrieval rate per second.

Worker API: Shows data from the Worker row.

ClassName
The worker class name.

TotConn
The total number of connections to the class since the server started.

ActConn
The current number of connections to the class.

Data for up to three of the most active classes can be shown.

Trie Indexing Data: Shows utilization and activity data obtained from Trie data rows. Entries are sorted alphabetically for trie names.

Trie Name
The name of the trie.

A '>Total>>' entry with overall totals for all tries is inserted first if data for multiple tries can be shown.

Data Space:

MBytes
The data space size in MB.

%Used
The percentage of storage in use.

Records Indexed
The number of records indexed by the trie.

Nodes
The number of nodes in the trie.

Activity/s:

Lookups
The number of lookups per second.

Records
The number of records returned per second.

File Cache: Shows utilization and activity data obtained from Cache data rows. Entries are sorted alphabetically for file cache names.

Name
The cache name.

A '>Total>>' entry with overall totals for all caches is inserted first if data for multiple caches can be shown.

Bytes The cache size in bytes.

%Used
The percentage of cache storage in use.

Cached Files
The number of files in the cache.

Opens /s
The file opens rate per second (ssCacheFileOpen calls).

Opens %Hit
The percentage of cache hits, out of all opens.

Discrd /s
The files discarded rate per second.

Authorization: Shows activity data obtained from the Authorization data row.

Authorize/s
The authorization activity

Permit
The permit rate per second.

Inquire
The inquire rate per second.

Row Retrieval
The row retrieval activity.

Rows/s
The number of rows retrieved per second.

%Hit The percentage of row cache hits, out of all row retrievals.

Storage Group Activity: Shows activity data obtained from Storage Group data rows. Entries are sorted alphabetically for storage group names.

Name
The storage group name.

A '>Total>>' entry with overall totals for all storage groups is inserted first if data for multiple storage groups can be shown.

I/O Technique
The technique used for I/O execution. One of the following strings will be inserted:

Diag 00A4
Indicates use of Diagnose X'A4'.

Diag 0250
Indicates use of Diagnose X'250'.

DataSpace
Indicates use of VM Data Spaces.

Page Reads:

IO/s The page read I/O rate per second.

Pages/s
The number of pages read per second.

msec/Pg
The average time needed to read a page, in msec. Page read time can be

shown only if Diagnose X'A4' was used for executing I/Os; the value is not available for other I/O techniques.

Page Writes:

IO/s The page write I/O rate per second.

Pages/s
The number of pages written per second.

msec/Pg
The average time needed to write a page, in msec. Page write time can be shown only if Diagnose X'A4' was used for executing I/Os; the value is not available for other I/O techniques.

Memory Subpool Activity: Shows utilization and activity data obtained from Memory data rows. Entries are sorted alphabetically for memory subpool names.

Subpool Name
The memory subpool name.

A '>Total>>' entry with overall totals for all memory subpools is inserted first if data for multiple subpools can be shown.

Storage Total
The total storage used by the subpool, i.e. the sum of free storage in server kernel cache plus allocated storage.

Storage Used %
The percentage of total subpool storage that has been allocated.

ssMemory Activity:

Allocate Rate/s
The ssMemoryAllocate rate per second.

Allocate Bytes
The number of bytes allocated by ssMemoryAllocate during the whole interval.

Release Rate/s
The ssMemoryRelease rate per second.

Release Bytes
The number of bytes released by ssMemoryRelease during the whole interval.

CMSSTOR Activity:

Extended Times
The number of times storage was extended through CMSSTOR during the interval.

Extended Bytes
The number of bytes obtained through CMSSTOR during the interval.

Depleted Times
The number of times storage was depleted through CMSSTOR during the interval.

Depleted Bytes
The number of bytes returned through CMSSTOR during the interval.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields, except for the 'Worker API' fields that are not affected by current/average settings.

FCX218, Reusable Server Kernel Performance Log Screen – RSKLOG

Performance Toolkit Subcommand: "RSKLOG" on page 269.

The Reusable Server Kernel Performance Log Screen (FCX218):

```
FCX218      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Reusable Server Kernel Log: BPSERV

          <----- Services ------>  <--- Line-Drivers ---->  <------------- Tri
Interval  Act Trans <---Bytes--->  Act Trans <---Bytes--->  Act  Total    %
End Time  ive    /s Recv/s Sent/s  ive    /s Recv/s Sent/s  ive MBytes Used Re
>>Mean>>   23 6.806    336   369k    5 6.806    336   369k    2   4096   53  7
11:36:05   23  .000      0      0    5  .000      0      0    2   4096   53  7
11:41:05   23 10.43    516   651k    5 10.43    516   651k    2   4096   53  7
11:46:04   23 15.26    766  1020k    5 15.26    766  1020k    2   4096   53  7
11:51:05   23 16.44    794   613k    5 16.44    794   613k    2   4096   53  7
11:56:05   23 3.877    195   282k    5 3.877    195   282k    2   4096   53  7
12:01:05   23  .000      0      0    5  .000      0      0    2   4096   53  7
12:06:05   23  .000      0      0    5  .000      0      0    2   4096   53  7
12:11:04   23  .000      0      0    5  .000      0      0    2   4096   53  7
12:16:04   23  .000      0      0    5  .000      0      0    2   4096   53  7
12:21:04   23  .000      0      0    5  .000      0      0    2   4096   53  7
12:26:05   23  .000      0      0    5  .000      0      0    2   4096   53  7
12:31:05   23  .000      0      0    5  .000      0      0    2   4096   53  7
12:36:05   23  .000      0      0    5  .000      0      0    2   4096   53  7

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 111. Layout of Reusable Server Kernel Performance Log Screen (FCX218)

The information shown is based on CP monitor APPLDATA domain SAMPLE data, provided by the RSK server machine.

The display shows activity for a number of Reusable Server Kernel components by time. The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval or the BYTIME interval for which the values were obtained.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Interval End Time
The end time of the monitor interval for which the values were obtained.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Services: Shows total activity data obtained from Service data rows.

Active
The number of services for which data rows were obtained.

Trans/s
The total services transaction rate per second.

Bytes Recv/s
The total number of bytes received per second.

Bytes Sent/s
The total number of bytes sent per second.

Line Drivers: Shows total activity data obtained from Line Driver data rows.

Active
The number of line drivers for which data rows were obtained.

Trans/s
The total line drivers transaction rate per second.

Bytes Recv/s
The total number of bytes received per second.

Bytes Sent/s
The total number of bytes sent per second.

Trie Indexing: Shows activity data obtained from Trie data rows.

Active
The number of trie indices for which data rows were obtained.

Total MBytes
The storage reserved for trie indexing, in MB.

% Used
The percentage of storage in use.

Total Records
The total number of indexed records.

Total Nodes
The total number of nodes.

Activity/s: Lookups
The number of lookups per second.

Activity/s: Records
The number of records returned per second.

Dots can be shown instead of RSK activity data, and either of the strings:

```
Not updated
Logged off
```

inserted, when no new monitor records have been received for an interval, or when the server was found to have been logged off. Dots will also be shown for specific components if no new performance data could be obtained for the component.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX219, Reusable Server Kernel Disk Performance Log Screen – RSKDISK

Performance Toolkit Subcommand: "RSKDISK" on page 268.

The Reusable Server Kernel Disk Performance Log Screen (FCX219):

```
FCX219      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Reusable Server Kernel Disk Perf. Log: BPSERV

          <------ Authorize ------->  <------- Enrollment Sets -------->  <---
Interval  Permit Inquire <Retrieval>  Act <--Total---> <--Activity/s--->  Act
End Time     /s      /s Rows/s %Hit  ive Record Bytes Insrt Remov Retrv  ive
>>Mean>>    .000   12.29  36.86   87    2    212 71232  .000  .000 27.05    1
11:36:05    .000    .000   .000   ..    2    212 71232  .000  .000  .000    1
11:41:05    .003    .000   .067   80    2    212 71232  .000  .000 41.06    1
11:46:04    .000    .000   .000   ..    2    212 71232  .000  .000 60.83    1
11:51:05    .000    .007   .020   50    2    212 71232  .000  .000 65.54    1
11:56:05    .000    .200   .600   ..    2    212 71232  .000  .000 15.44    1
12:01:05    .000    .367  1.100   ..    2    212 71232  .000  .000  .000    1
12:06:05    .000    .167   .500   ..    2    212 71232  .000  .000  .000    1
12:11:04    .000    .017   .050   ..    2    212 71232  .000  .000  .000    1
12:16:04    .000    .000   .000   ..    2    212 71232  .000  .000  .000    1
12:21:04    .000    .000   .000   ..    2    212 71232  .000  .000  .000    1
12:26:05    .000    .000   .000   ..    2    212 71232  .000  .000  .000    1
12:31:05    .000    .000   .000   ..    2    212 71232  .000  .000  .000    1
12:36:05    .000    .000   .000   ..    2    212 71232  .000  .000  .000    1

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 112. Layout of Reusable Server Kernel Disk Performance Log Screen (FCX219)

The information shown is based on CP monitor APPLDATA domain SAMPLE data, provided by the RSK server machine.

The display shows activity for a number of disk related Reusable Server Kernel components by time. The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were obtained.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were obtained.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Authorize: Shows activity data obtained from the Authorization data row.

Permit/s
The permit rate per second.

Inquire/s
The inquire rate per second.

Rows/s
The number of rows retrieved per second.

%Hit The row retrieval hit percentage.

Enrollment Sets: Shows total utilization and activity data obtained from Enrollment data rows.

Active
The number of enrollment sets for which data rows were obtained.

Total Record
The total number of records in all enrollment sets.

Total Bytes
The total number of bytes used by all enrollment sets.

Activity/s Insrt
The total insertion rate per second.

Activity/s Remov
The total removal rate per second.

Activity/s Retrv
The total retrieval rate per second.

Cache: Shows total utilization and activity data obtained from Cache data rows.

Active
The number of caches for which data rows were obtained.

Total Bytes
The total cache size in bytes.

% Used
The percentage of bytes used.

Total Files
The total number of files cached.

Opens /s
The total file opens rate per second.

Opens %Hit
The percentage of cache hits, out of all opens.

Discard /s
The total files discarded rate per second.

Dots can be shown instead of RSK activity data, and either of the strings:

```
Not updated
Logged off
```

inserted, when no new monitor records have been received for an interval, or when the server was found to have been logged off. Dots will also be shown for specific components if no new performance data could be obtained for the component.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX220, Reusable Server Kernel Storage Log Screen – RSKSTOR

Performance Toolkit Subcommand: "RSKSTOR" on page 271.

The Reusable Server Kernel Storage Log Screen (FCX220):

```
FCX220      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Reusable Server Kernel Storage Log: BPSERV

          <------------ Storage Groups ------------>  <------------------------
          Act- <--------- Paging Activity --------->  Act-             <---- ss
Interval   ive <---- Reads -----> <---- Writes ---->   ive  Total Used <- Alloc
End Time  Rows  IO/s Page/s ms/Pg  IO/s Page/s ms/Pg  Rows  Bytes    % Rate/s
>>Mean>>    2 1.871  447.5   ... 1.870  447.4   ...    17   100M   90  54.06
11:41:05    3 9.524   2280   ... 9.524   2280   ...    17   138M   84  93.33
11:46:04    3 1.775  424.2   ... 1.775  424.2   ...    17   138M   97  114.3
11:51:05    3 1.716  410.6   ... 1.716  410.6   ...    17   138M   96  117.1
11:56:05    3 1.647  393.8   ... 1.647  393.8   ...    17   138M   98  33.92
12:01:05    3 1.642  393.4   ... 1.642  393.4   ...    17   138M   98  2.984
12:06:05    3 1.732  413.1   ... 1.732  413.1   ...    17   138M   98  3.136
12:11:04    3 1.738  416.4   ... 1.738  416.4   ...    17   138M   98  3.136
12:16:04    3 1.767  422.9   ... 1.767  422.9   ...    17   138M   98  3.220
12:21:04    3 1.766  421.9   ... 1.766  421.9   ...    17   138M   98  3.199
12:26:05    3 1.785  426.7   ... 1.785  426.7   ...    17   138M   98  3.233
12:31:05    3 1.799  431.1   ... 1.802  432.0   ...    17   138M   98  3.261
12:36:05    3 1.840  439.8   ... 1.836  439.0   ...    17   138M   98  3.332

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 113. Layout of Reusable Server Kernel Storage Log Screen (FCX220)

The information shown is based on CP monitor APPLDATA domain SAMPLE data, provided by the RSK server machine.

The display shows activity for Reusable Server Kernel storage groups and memory subpools. The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval or the BYTIME interval for which the values were obtained.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Interval End Time
The end time of the monitor interval for which the values were obtained.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Storage Groups: Shows total activity data for RSK storage groups.

Active Rows
The number of storage groups for which data rows were obtained.

Paging activity, Reads:

IO/s The total page read I/O rate per second.

Page/s
The total number of pages read per second.

ms/Pg
The average time needed to read a page, in msec. Any page read time shown will pertain only to I/Os made using Diagnose X'A4'; the time is not available if another I/O technique is used.

Paging activity, Writes:

IO/s The total page write I/O rate per second.

Page/s
The total number of pages written per second.

ms/Pg
The average time needed to write a page, in msec. Any page write time shown will pertain only to I/Os made using Diagnose X'A4'; the time is not available if another I/O technique is used.

Memory Subpools: Shows total utilization and activity data for RSK memory subpools.

Active Rows
The number of memory subpools for which data rows were obtained.

Total Bytes
The total storage used by all subpools, i.e. the sum of all free storage in server kernel cache plus allocated storage.

Used %
The percentage of total subpool storage that has been allocated.

ssMemory Activity:

Allocate Rate/s
The total ssMemoryAllocate rate per second.

Allocate Bytes
The total number of bytes allocated by ssMemoryAllocate during the whole interval.

Release Rate/s
The total ssMemoryRelease rate per second.

Release Bytes
The total number of bytes released by ssMemoryRelease during the whole interval.

CMSSTOR Activity:

Extended Times
The total number of times storage was extended through CMSSTOR during the interval.

Extended Bytes
The total number of bytes obtained through CMSSTOR during the interval.

Depleted Times
The total number of times storage was depleted through CMSSTOR during the interval.

Depleted Bytes
The total number of bytes returned through CMSSTOR during the interval.

Dots can be shown instead of RSK storage activity data, and either of the strings:

```
Not updated
Logged off
```

inserted, when no new monitor records have been received for an interval, or when the server was found to have been logged off. Dots will also be shown for specific components if no new performance data could be obtained for the component.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX221, SFS and BFS Logs Selection Menu – SFSMENU

Performance Toolkit Subcommand: "SFSMENU" on page 284.

The SFS and BFS Logs Selection Menu (FCX221) shows a list of all the available Shared File System and Byte File System performance logs:

```
FCX221      CPU nnnn  SER nnnnn         SFS/BFS Displays         Perf. Monitor


  Shared File System Logs
S Log Name    Description
_ SFSIOLOG    Shared file system I/O activity log
_ SFSLOG      General shared file system performance log
_ SFSREQ      Shared file system requests log

  Byte File System Logs
S Log Name    Description
_ BFSFILES    Byte file system file activity log
_ BFSLOCKS    Byte file system locking activity log
_ BFSPIPES    BFS pipes and linking activity log









Select performance screen with cursor and press ENTER
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 114. Layout of SFS and BFS Logs Selection Menu (FCX221)

All Shared File System logs are based on APPLDATA monitor records created by the server machines. They can be built and displayed only when APPLDATA sample data collection has been enabled for the server(s).

Field Description:

S Cursor selection field. The field will be highlighted and made cursor-selectable (set as 'unprotected') only if the corresponding shared file system or byte file system performance log is available.

Log Name
The log file name, equal to the subcommand with which the log data can be selected for display. The field will be highlighted if the corresponding shared file system or byte file system performance log is available.

Description
Description of the performance display.

FCX222, TCP/IP I/O Activity Log Screen – TCPIOLOG

Performance Toolkit Subcommand: "TCPIOLOG" on page 315.

The TCP/IP I/O Activity Log Screen (FCX222):

```
FCX222      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

TCP/IP I/O Activity Log for Server TCPIP

          <---- I/O per sec. ----->  <---- QDIO Activity per sec. ---->  <----
Interval  <Requests-> <-- Bytes -->  <Data Transfers>   PCI <--Polls-->    Re-
End Time   Read Write Receive X-mit  Inbound Outbound Inter Total  Idle  ceive
>>Mean>>  75.14 76.97    795k 10284     .000      .000  .000  .000  .000  1.546
07:11:35  69.38 69.18    768k  5011     .000      .000  .000  .000  .000  1.575
07:16:35  88.17 88.77    993k  6567     .000      .000  .000  .000  .000  1.702
07:21:34  79.38 80.08    906k  6668     .000      .000  .000  .000  .000  1.658
07:26:34  19.16 18.84    164k  3019     .000      .000  .000  .000  .000  1.626
07:31:35  89.74 90.93    988k  7024     .000      .000  .000  .000  .000  1.654
07:36:35  90.28 92.51   1027k  9141     .000      .000  .000  .000  .000  1.671
07:41:35  77.15 79.18    880k  7625     .000      .000  .000  .000  .000  1.609
07:46:35  15.49 15.35   97910  3089     .000      .000  .000  .000  .000  1.765
07:51:35  56.86 58.35    579k  6310     .000      .000  .000  .000  .000  1.862
07:56:35  91.77 92.25    924k  8709     .000      .000  .000  .000  .000  1.648
08:01:35  94.34 95.01    913k  8036     .000      .000  .000  .000  .000  1.737
08:06:34  75.62 75.83    765k  6452     .000      .000  .000  .000  .000  1.674
08:11:34  34.43 34.67    337k  5005     .000      .000  .000  .000  .000  1.587

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 115. Layout of TCP/IP I/O Activity Log Screen (FCX222)

The information shown is based on CP monitor APPLDATA domain SAMPLE data, provided by the TCP/IP server machine.

The display shows TCP/IP I/O activity by time. The leftmost column contains the end time
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT commands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The bytes received or bytes transmitted fields could wrap during the monitor interval on systems with a lot of activity so the numbers may not be accurate.

The first entry is reserved for the overall averages since the last RESET command, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

I/O per sec.:

Requests read
The read requests rate per second.

Requests write
The write requests rate per second.

Bytes Receive
The number of bytes received per second.

Bytes X-mit
The number of bytes transmitted per second.

QDIO activity per sec.:

Data Transfers Inbound
The number of inbound QDIO data transfers per second.

Data Transfers Outbound
The number of outbound QDIO data transfers per second.

PCI Inter
The number of PCI interrupts per second. The PCI interrupt is used by the hardware adapter to request additional QDIO buffers for inbound data transfers. This event should only occur if TCP/IP enters a wait state or is not polling the queues at a sufficient rate.

Polls Total
The total poll rate per second.

Polls Idle
The number of 'idle' polls per second, i.e. of polling operations in which no QDIO data transfer has taken place.

IUCV/s.:

Receive
The IUCV requests receive rate per second.

Reject
The IUCV requests reject rate per second.

Reply
The IUCV requests reply rate per second.

Send The IUCV requests send rate per second.

VMCF/s.:

Success
The rate per second of successful VMCF sends.

Abnorm
The rate per second of abnormal VMCF sends, and of send failures.

Dots can be shown instead of TCP/IP activity values, and either of the strings

```
Not updated
Logged off
```

inserted, when no new monitor records have been received for an interval, or when the server was found to have been logged off.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX223, Linux Systems Selection Screen – LINUX

Performance Toolkit Subcommand: "LINUX" on page 214.

The Linux Systems Selection Screen (FCX223) will be shown if you enter the LINUX subcommand with no *linuxid*:

```
FCX223      CPU nnnn  SER nnnnn          Linux Systems          Perf. Monitor


     Selectable Linux Systems
     GFREE18     LINUX1      LINUX2      LINUX3      LINUX4      LINUX5
     LINUX6      LINUX7      LNXBENKE    LNXBENK1    W3PILOT1    W3VML
     LX00001     LX00002     LX00003     LX00004     LX00005     LX00006
     LX00007     LX00008     LX00009     LX00010     LX00011     LX00012
     LX00013     LX00014     LX00015     LX00016     LX00017     LX00018









Select a system for Linux details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 116. Layout of Linux Systems Selection Screen (FCX223)

This is a menu that allows selecting different Linux systems for displaying detailed Linux internal performance data. The display simply lists all the systems for which an IP address has been defined in file `FCONX LINUXUSR`: actual performance data retrieval is done by sending XML requests to the RMF PM server interface on these Linux systems. Therefore, implementation and activation of that interface is an absolute prerequisite for reporting Linux performance with Performance Toolkit, and the corresponding TCP/IP interface of Performance Toolkit must also be activated (see the "Monitoring Linux Internal Performance Data" section in *z/VM: Performance Toolkit Guide* for implementation guidelines).

Field Description:

To select a Linux system for performance analysis either:

- Place the cursor on the name of the system you are interested in and press ENTER, or
- Select the system directly by entering the subcommand 'LINUX *linuxid*' on the command line.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX224, Linux Details Selection Screen – LINUX *linuxid*

Performance Toolkit Subcommand: "LINUX" on page 214.

The Linux Details Selection Screen (FCX224) will be shown if you specify a *linuxid* on the LINUX subcommand:

```
FCX224      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Linux Performance Data Selection for System LNXBENKE

  System Data
  Processes created per second         0.1
  Context switches per second        14.96
  Apache: Requests per second        0.017
          Bytes per request            433
          Busy threads                   1
          Idle threads                   1
          404 Errors per minute         20

S Perform. Reports    Description
_ LXCPU    LNXBENKE   CPU utilization details

_ LXMEM    LNXBENKE   Memory utilization & activity details

_ LXNETWRK LNXBENKE   Network activity (overall & by device)

_ LXFILSYS LNXBENKE   File system size and utilization

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 117. Layout of Linux Details Selection Screen (FCX224

All of the Linux performance information is retrieved via TCP/IP connection, from the RMF PM DDS interface of the selected Linux system. No data can be shown if either this interface is not available or if the TCP/IP link is down.

The display shows some general 'system' performance values for the selected Linux system and allows selecting other displays with performance data. For more detailed information on CPU, memory, network or Linux filesystem utilization either:

- Place the cursor on the line of the performance data you are interested in and press ENTER, or
- Select the desired screen directly by entering the corresponding subcommand on the command line.

Field Description for System Data:

Processes created per second
The number of processes created per second by this system.

Context switches per second
The number of context switches per second on this system.

Apache: Requests per second
The number of requests processed per second by the Apache HTTP server.

Apache: Bytes per request
The average number of bytes transferred per request to the Apache HTTP server.

Apache: Busy threads
The average number of busy threads in the Apache HTTP server.

Apache: Idle threads
The average number of idle threads in the Apache HTTP server.

Apache: 404 errors per minute
The number of 'file not found' errors (404 errors) per minute.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall period averages will be shown if possible. Linux performance data are collected in intervals that are independent of the CP monitor setup in VM, so it may not be possible to show averages for the same period.

FCX225, System Summary Log Screen – SYSSUMLG

Performance Toolkit Subcommand: "SYSSUMLG" on page 306.

The System Summary Log Screen (FCX225):

```
FCX225      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <------- CPU --------> <--Users--> <---I/O---> <Stg> <-Paging--> <Spl> <------- UP+MP Transactions ------->      P
               <--Ratio-->                     SSCH  DASD Users <-Rate/s-->       <-Response Time-> <-Transactions/s->      o
Interval    Pct              On-  Log-       +RSCH  Resp    in PGIN+ Read+ Pages        Non- Quick         Non- Quick      l
End Time   Busy   T/V  User line   ged Activ    /s  msec Elist PGOUT Write    /s  Triv  Triv  Disp  Triv   Triv  Disp UnPk z
>>Mean>>     .5  4.74 .4582 21.0    42    20  96.8    .4    .0    .0    .0   4.0  .036  .613  .187  4.01   1.37  2.45  7.0 V
09:25:52     .5  4.27 .4763 21.0    42    20  96.6    .5    .0    .0    .0   3.6  .048  .513  .185  4.64   1.05  2.55  7.1 V
09:30:52     .5  5.13 .4417 21.0    42    19  96.6    .4    .0    .0    .0   4.0  .026  .657  .199  3.62   1.58  2.35  7.0 V
09:31:52     .5  4.59 .4822 21.0    42    22  98.0    .2    .0    .1    .0   5.0  .035  .589  .144  4.03   1.30  2.62  7.0 V

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 118. Layout of System Summary Log Screen (FCX225)

The information shown is based on CP monitor SYSTEM, I/O and USER domain SAMPLE data.

The display shows a summary of system performance by time. The leftmost column contains the end time:
(format *hh:mm:ss*)

of the monitor interval for which the values were calculated.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

CPU: Shows processor load summary.

Pct Busy
Average processor percent busy for all processors.

Ratio T/V
The average ratio of total to virtual CPU time for all processors.

Ratio User
The ratio of user CPU time to total CPU time.

Online
The average number of processors that were online during the interval.

Users: Shows user counts.

Logged
The number of users logged on.

Activ The number of users that were active per monitor sample interval, i.e. that used some CPU.

I/O: Shows summary of I/O activity.

SSCH+RSCH/s
The total start subchannel and resume subchannel rate per second.

DASD Resp msec
The average DASD I/O response time, in milliseconds.

Stg: Resource contention.

Users in Elist
The number of VMDBKs found waiting in either E1, E2 or E3.

Paging Rate/s: Overall paging activity.

PGIN+PGOUT
The total expanded storage PGIN plus PGOUT rate per second.

Read+Write
The total DASD page read and write rate per second, excluding spool I/O.

Spl: Spooling activity.

Pages/s
The total rate of spool pages written to, and read from DASD, per second.

UP+MP Transactions, Response Time: User response time summary

Triv The average response time for trivial transactions of UP and MP users.

Non-Triv
The average response time for non-trivial transactions of UP and MP users.

Quick Disp
The average response time for transactions of UP and MP users with the QUICKDSP option.

UP+MP Transactions, Transactions/s: User transactions summary

Triv The average trivial UP and MP transactions rate/s

Non-Triv
The average non-trivial UP and MP transactions rate/s

Quick Disp
The average UP and MP transactions rate/s for users with the QUICKDSP option.

UnPk The average number of processors that were in unparked state during the interval. When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

Polz The polarization mode at the end of measured interval:
V vertical mode
H horizontal mode

When running on z/VM systems earlier than V6.3, you will see a dash ("-") in this field.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX226, User Configuration Screen – UCONF

Performance Toolkit Subcommand: "UCONF" on page 324.

The User Configuration Screen (FCX226) shows virtual machine configuration information for each user:

```
FCX226      CPU 2097  SER 0312E        Status   15:54:55        Perf. Monitor
______             .                        .
                                 No   Atta-                                  <- Share -->
                Mach Flg Qck MDC   ched  Stor Reserved <---- Virt. CPUs ----->          %
Userid     SVM Mode ReO DSP Fair XSTOR  Size    Pages Type Aff Def. Ded. Stop SRel.  SAbs.
OPERSYMP   No  ESA  Off On  Yes     0   32M        0 CP   On     1    0    0   100    ...
PORTMAP    Yes ESA  Off Off Yes     0   32M        0 CP   On     1    0    0   100    ...
PTKSSIA4   No  EME  Off On  Yes    2M  256M        0 CP   On     2    1    0   500    ...
                                                     ZAAP On     1  ...    0   ...      6
                                                     IFL  On     2  ...    0  1111    ...
                                                     ICF  On     1  ...    0   ...      1
                                                     ZIIP On     1  ...    0   500    ...
PVM        No  ESA  Off On  Yes     0    8M        0 CP   On     1    0    0   100    ...
RECOVERY   No  XC   Off Off No      0   32M        0 CP   On     1    0    0   100    ...
REXECD     Yes ESA  Off Off Yes     0   32M        0 CP   On     1    0    0   100    ...
RSCS       Yes ESA  Off On  Yes     0   32M        0 CP   On     1    0    0   100    ...
RSCSDNS    Yes ESA  Off On  Yes     0   32M        0 CP   On     1    0    0   100    ...
RSTL3      No  ESA  Off Off Yes     0  128M        0 CP   On     1    0    0   ...      3
RXAGENT1   Yes ESA  Off Off Yes     0   32M        0 CP   On     1    0    1   ...    ...
SFSFCFT    Yes XC   Off Off No      0   64M        0 CP   On     1    0    0   100    ...
SMTP       Yes ESA  Off Off Yes     0   32M        0 CP   On     1    0    0   100    ...
Select a user for user details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 119. Layout of User Configuration Screen (FCX226)

The information shown is originally based on CP monitor MONITOR domain configuration data. Where available the fields will be continually updated with the latest information from USER domain sample and event data because configuration records are only available for users that were already logged on when data collection was started.

The sample shows a screen with the users sorted in ascending userid sequence, the initial setting (indicated by the underscore characters '____' above the `Userid` header). Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the appropriate column heading as sort argument (see "SORT" on page 287), or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Note that the information extends beyond the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

For more detailed information on one specific user either:

- Place the cursor on the `Userid` field of the virtual machine you are interested in and press ENTER, or
- Enter the subcommand 'USER *userid*' on the command line.

Field Description:

Userid
User identification. The field will be highlighted for virtual machines that are currently logged on.

SVM Indicates whether this is a service virtual machine as defined by the SVMSTAT option in the user's directory entry (`Yes`) or (`No`).

Dots will be shown if the SVM status is not available for users that logged on after starting data collection.

Mach Mode
The architectural mode in which the virtual machine is running: `ESA`, `XC`, `XA`, or `370`. The string `EME` will be inserted for ESA mode virtual machines running in 64-bit mode.

Flg ReO
REORDER processing setting for this user (`On`) or (`Off`).

When running on z/VM systems earlier than V6.2, you will see dashes ("---") in this field.

Qck DSP
Indicates whether the QUICKDSP option has been set for the user (`On`) or (`Off`).

No MDC Fair
Indicates whether the NOMDCFS option has been set for the user (`Yes`) or (`No`).

Att. XSTOR
Size, in megabytes, of expanded storage attached to the user. If zero, no expanded storage is attached.

Dots will be shown if Performance Toolkit processes a trend file prepared by a version earlier than V6.2.

Stor Size
The virtual machine's storage size.

Reserved Pages
The number of pages reserved for the virtual machine.

Type The type of virtual CPU group. Valid values are:

CP Central Processor

ZAAP IBM System z Application Assist Processor (zAAP)

IFL Integrated Facility for Linux Processor

ICF Internal Coupling Facility Processor

ZIIP IBM System z Integrated Information Processor (zIIP)

.... The type of processor is unknown.

Aff Indicates the affinity of the virtual processor type.

On Indicates CPU affinity has been set on for this user with the SET CPUAFFINITY command and this virtual CPU is dispatched on a real CPU of the same type.

Sup Indicates CPU affinity is suppressed. Although CPU affinity has been set on for this user with the SET CPUAFFINITY command, there is currently no matching real processor on which to run.

Off indicates CPU affinity has not been set on for this user.

Def. The number of virtual processors of specified type in the virtual machine's configuration.

Ded. The count of dedicated real processors in running state (i.e. not in stopped state). It is applicable for the type of primary real processor only; dots ('...') will be displayed for any other type.

Stop The count of virtual processors in stopped state.

Share SRel.
The machine's relative share summary value for this CPU type group, if set. Dots will be inserted if an absolute share has been set for the virtual machine.

Share % SAbs.
The machine's absolute share summary value for this CPU type group, if set. Dots will be inserted if a relative share has been set for the virtual machine.

Dots will also be displayed when all virtual processors are in a stopped state or running but dedicated, and when the user ID is logged off (for AVERAGE and INTERIM intervals).

For z/VM Release 5.4 or later, a virtual machine's share is dynamically distributed across its started virtual processors rather than its defined virtual processors.

Max Share Limit
The type of limit set for the maximum share, either `Soft` or `Hard`.

Max Share MRel.
The machine's maximum share relative value, if set.

Max Share % MAbs.
The machine's maximum share absolute value, if set.

Dots will be inserted if no maximum share has been set for the machine or the user ID is logged off.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None: The last available status will always be shown.

FCX227, Linux Network Activity Screen – LXNETWRK *linuxid*

Performance Toolkit Subcommand: "LXNETWRK" on page 230.

The Linux Network Activity Screen (FCX227) will be shown if you specify a *linuxid* on the LXNETWRK subcommand:

```
FCX227      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Linux Network Activity for System LNXBENKE
_______             .         .         .         .         .         .      .
Network      <------- Received/s ------->  <----- Transmitted/s ------>
Device        RcvPack   RcvByte  RcvError   SndPack   SndByte  SndError
>Total>          0.68        17         0      0.78        17         0
ctc0              0.5         0         0       0.6         0         0
lo               0.18        17         0      0.18        17         0









Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 120. Layout of Linux Network Activity Screen (FCX227)

All of the Linux performance information is retrieved via TCP/IP connection, from the RMF PM DDS interface of the selected Linux system. No data can be shown if either this interface is not available or if the TCP/IP link is down.

The display shows network activity, both as total activity and by network device.

The sample shows a screen with the 'by device' values sorted in ascending device name sequence (indicated by the underscore characters '___' above the `'Network Device'` header), the initial setting. Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Field Description:

Network Device
: The name of the network device to which the remaining values apply. The string `>Total>` is inserted for overall totals.

Received/s

RcvPack
: The number of packets received per second. Though the size of a packet is not constant, this, together with the `SndPack` value, can give you an idea about the network processor utilization and the CPU utilization caused by network traffic. If you have many small network packets you do not have problems with bandwidth but with (network) processor speed.

RcvByte
The number of bytes received per second.

RcvError
The number of receive errors per second.

Transmitted/s

SndPack
The number of packets transmitted per second. Though the size of a packet is not constant, this, together with the `RcvPack` value, can give you an idea about the network processor utilization and the CPU utilization caused by network traffic. If you have many small network packets you do not have problems with bandwidth but with (network) processor speed.

SndByte
The number of bytes transmitted per second.

SndError
The number of transmit errors per second.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall period averages will be shown if possible. Linux performance data are collected in intervals that are independent of the CP monitor setup in z/VM, so it may not be possible to show averages for the same period.

FCX228, Linux Filesystem Usage Screen – LXFILSYS

Performance Toolkit Subcommand: "LXFILSYS" on page 226.

The Linux Filesystem Usage Screen (FCX228):

```
FCX228      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Linux Filesystem Usage for System LNXBENKE

DASD I/O Activity
I/O request rate per second            ...
I/O response time/request (msec)       ...
I/O response time/sector (msec)        ...

_________                        .         .      .     .
Filesystem                <---- MBytes ---->  <-Percent->
Name                          Size      Free  %Used %Free
>Total>                       2274       856   60.2  39.7
/dev/dasdb1                   2274       856   60.2  39.7









Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 121. Layout of Linux Filesystem Usage Screen (FCX228)

All of the Linux performance information is retrieved via TCP/IP connection, from the RMF PM DDS interface of the selected Linux system. No data can be shown if either this interface is not available or if the TCP/IP link is down.

The display shows overall DASD I/O activity and response time, and both overall and 'by filesystem' information on filesystem size and usage.

The sample shows a screen with the 'by filesystem' values sorted in descending 'filesystem name' sequence (indicated by the underscore characters '___' above the `'Filesystem Name` header), the initial setting. Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Field Description:

DASD I/O Activity: The following I/O related values are only available for Linux images running 2.4 kernel (or higher) on IBM S/390 or z/Series mainframes.

I/O request rate per second
Number of DASD I/O requests per second.

I/O response time/request (msec)
Image-wide average response time per DASD I/O request, in milliseconds.

I/O response time/sector (msec)
Image-wide average response time per sector, in milliseconds.

Filesystem Usage:

Filesystem Name
The mount point of the filesystem to which the remaining values apply. The string `>Total>` is inserted for overall totals.

MBytes Size
The filesystem size, in MBytes.

MBytes Free
The available space, in MBytes, at the end of a cycle time.

Percent %Used
The percentage of filesystem space that was used at the end of a cycle time.

Percent %Free
The percentage of filesystem space that was free at the end of a cycle time.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall period averages will be shown if possible. Linux performance data are collected in intervals that are independent of the CP monitor setup in z/VM, so it may not be possible to show averages for the same period.

FCX229, Linux Memory Utilization and Activity Screen – LXMEM *linuxid*

Performance Toolkit Subcommand: "LXMEM" on page 227.

The Linux Memory Utilization and Activity Screen (FCX229) will be shown if you specify a *linuxid* on the LXMEM subcommand:

```
FCX229      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Linux Memory Util. & Activity Details for System LNXBENKE

Total memory size          124MB      Swap space size          140MB
Total memory used          114MB      % Swap space used       0.51%
   Used for buffer          67MB      Swap-in rate               0/s
   Used for shared          37MB      Swap-out rate              0/s
   Used for cache           10MB      Page-in rate           1.566/s
Total free memory           10MB      Page-out rate          1.566/s

                          .  _______        .        .        .        .
                     <----- Size ----->  <------- Page Fault Rate/s -------->
                      (Bytes)      (kB)     Minor    Major  <-Incl.Children->
Process Name         VirtSize  ResidSet  MinPgFlt MajPgFlt  MinPFltC MajPFltC
httpd.4545           12857300      9332         0        0         0        0
httpd.3964           12636200      9100         0        0         0        0
httpd.199            12558300      8932         0        0         0        0
httpd.3963           12546000      8912         0        0         0        0
gpmddsrv.10882        7258110      5452        24        0         4       25
gpmddsrv.10883        7258110      5452         0        0         0        0
gpmddsrv.30333        7258110      5452         0        0         0        0
gpmddsrv.4667         7258110      5452         0        0         0        0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 122. Layout of Linux Memory Utilization and Activity Screen (FCX229)

All of the Linux performance information is retrieved via TCP/IP connection, from the RMF PM DDS interface of the selected Linux system. No data can be shown if either this interface is not available or if the TCP/IP link is down.

The display shows overall Linux memory utilization and activity, as perceived by the Linux system, and also utilization and activity details by process.

The sample shows a screen with the 'by process' values sorted in descending 'resident set' size sequence (indicated by the underscore characters '___' above the `'ResidSet'` header), the initial setting. Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Field Description:

Overall Utilization and Activity:

Total memory size
Total size of memory available, in MBytes.

Total memory used
Memory used, in MBytes, at the end of a cycle time. This includes memory used for buffer caches.

Used for buffer
Memory used for buffers, in MBytes, at the end of a cycle time. The Linux buffer cache is a disk cache intended to relieve processes from having to wait for relatively slow disks to retrieve or store data. Linux automatically uses otherwise unused memory for disk buffers. When free memory becomes scarce, buffer frames are automatically released.

The buffer cache kernel thread can be tuned using */proc/sys/vm/bdflush*. Refer to the file *Documentation/proc.txt* in the Linux kernel source tree.

Used for shared
Memory, in MBytes, usable by more than one process. If any part of memory could be used by more than one process it is counted to be shared memory.

Used for cache
Memory used for cache, in MBytes, at the end of a cycle time.

Total free memory
The size, in MBytes, of memory that was not allocated at the end of a cycle time.

Swap space size
The size of the max. available swap space, in MBytes.

% Swap space used
Percentage of swap space used at the end of a cycle time.

Swap-in rate
The number of pages swapped in per second. Note that the Linux kernel uses swapping only if there is not enough memory available. Swapping is normally bad for performance and application responsiveness. Exploiting VM virtual disks in storage as swapping devices can help reduce the negative impact to performance or swapping.

Swap-out rate
The number of pages swapped out per second. Note that the Linux kernel uses swapping only if there is not enough memory available. Swapping is normally bad for performance and application responsiveness. Exploiting VM virtual disks in storage as swapping devices can help reduce the negative impact to performance or swapping.

Page-in rate
The number of pages paged in per second.

Page-out rate
The number of pages paged out of memory per second.

Utilization and Activity by Process:

Process Name
The name of the process.

Size

VirtSize
Virtual memory size at the end of a cycle time, in bytes. This is normally a large number, but most parts of the virtual size are often never used (not even paged in).

ResidSet
Resident set size, in kBytes. The resident set size, RSS, is the total size of

all parts of a process (code, data, shared libraries) actually resident in memory. This can tell you how much memory the processes are 'really' using.

Page Fault Rate/s

Minor MinPgFlt
Number of minor page faults per second for the process. If there is (from the Kernel's perspective) no disk access involved in the page fault (like Copy on Write for a shared page), the page fault is called a *minor* page fault.

Major MajPgFlt
Number of major page faults per second for the process. A major page faults occurs if - from the Linux operating system's perspective - disk access is involved in handling the page fault.

Incl.Children MinPfltC
Number of minor page faults per second for the process, including all children processes. If there is (from the Kernel's perspective) no disk access involved in the page fault (like Copy on Write for a shared page), the page fault is called a *minor* page fault.

Incl.Children MajPfltC
Number of major page faults per second for the process, including all children processes. A major page faults occurs if - from the Linux operating system's perspective - disk access is involved in handling the page fault.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall period averages will be shown if possible. Linux performance data are collected in intervals that are independent of the CP monitor setup in VM, so it may not be possible to show averages for the same period.

FCX230, Linux CPU Utilization Screen – LXCPU *linuxid*

Performance Toolkit Subcommand: "LXCPU" on page 224.

The Linux CPU Utilization Screen (FCX230) will be shown if you specify a *linuxid* on the LXCPU subcommand:

```
FCX230      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Linux CPU Utilization for System LNXBENKE
                      _____          .       .       .            .       .       .
                     <--- Percent CPU Utilization ---->   <-Accumulated (s)->
Processor            Total   User  Kernel   Nice   Idle   TotTm UserTm KernTm
>>Mean>>              0.35   0.24    0.10      0  99.64     ---    ---    ---
cpu0                  0.68   0.46    0.21      0  99.31     ---    ---    ---
cpu1                  0.61   0.48    0.13      0  99.38     ---    ---    ---
cpu2                  0.04      0    0.04      0  99.95     ---    ---    ---
cpu3                  0.01      0    0.01      0  99.98     ---    ---    ---

Process Name
gpmddsrv.10882        0.95    0.8    0.15      0    ---   308.4  257.6  50.79
gengat.4651           0.03      0    0.03      0    ---   668.5   2.61  665.9
procgat.4662          0.03   0.01    0.01      0    ---   828.8  66.23  762.6
httpd.3964            0.01      0    0.01      0    ---    4.84   0.58   4.26
nscd.274              0.01      0    0.01      0    ---   62.89   3.49   59.4
atd.210                  0      0       0      0    ---       0      0      0
cron.255                 0      0       0      0    ---    0.07      0   0.07
httpd.199                0      0       0      0    ---    4.41   2.08   2.33
inetd.217                0      0       0      0    ---    0.06   0.05   0.01

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 123. Layout of Linux CPU Utilization Screen (FCX230)

All of the Linux performance information is retrieved via TCP/IP connection, from the RMF PM DDS interface of the selected Linux system. No data can be shown if either this interface is not available or if the TCP/IP link is down.

The display shows overall Linux CPU utilization, as it is perceived by the Linux system, and also utilization details by processor and by process.

The sample shows a screen with the 'by process' values sorted in descending total CPU utilization sequence (indicated by the underscore characters '___' above the `'Total'` header), the initial setting. Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER. The SORT subcommand does not affect the 'by processor' lines which will always be sorted in processor name sequence.

Field Description:

Processor/Process Name
: The processor designation (for CPU utilization by processor) or the name of the process (for CPU utilization by process). The string `>>Mean>>` is inserted for overall averages.

Percent CPU Utilization

Total Percentage of CPU total active time.

User Percentage of CPU time in user mode, i.e. executing ordinary user code. If a user program calls a system routine like *open()*, the execution time needed for the *open()* system routine is counted as kernel mode, while the normal processing of the user program is counted as user mode.

Kernel
Percentage of CPU time in kernel mode.

Nice *For >>Mean>> and 'by processor' lines:* Percentage of CPU time in 'nice' mode. A process runs in 'nice' mode if the scheduling priority is lower than normal. If the superuser has increased the scheduling priority of some processes to values higher than normal, this is not considered 'nice' mode.

For 'by process' lines: The 'nice' value assigned to the process. It can be changed with the *nice* operator command to values ranging from -20 (highest priority) to 19 (lowest priority).

Idle Percentage of CPU idle time. The value is inserted for the overall average and 'by processor' lines only.

Accumulated (s): Shows accumulated CPU time in seconds, by process.

TotTm
Accumulated CPU time, counted since process creation.

UserTm
Accumulated CPU time in user mode, counted since process creation.

KernTm
Accumulated CPU time in kernel mode, counted since process creation.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall period averages will be shown if possible. Linux performance data are collected in intervals that are independent of the CP monitor setup in VM, so it may not be possible to show averages for the same period.

FCX231, Hipersocket Channel Activity Screen – HIPSOCK

Performance Toolkit Subcommand: "HIPSOCK" on page 195.

The Hipersocket Channel Activity Screen (FCX231):

```
FCX231      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

_______           .         .         .         .         .         .         .
                <----------------- Hipersocket Activity/Sec. ----------------->
Channel         <--- Total for System --->  <--------- Own Partition --------->
Path            <-Transferred-->    Failed  <-Transferred-->  <--- Failed ---->
ID      Shrd    T_Msgs  T_DUnits  T_NoBuff  L_Msgs  L_DUnits  L_NoBuff  L_Other
FB      No         .63     15033      1.94     .59     15033      1.94     1.94
FC      No         .00       ...       .00     .00       .00       .00      .00
FD      No         .00       .00       .00     .00       .00       .00      .00
FE      No         .00       .00       .00     .00       .00       .00      .00









Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 124. Layout of Hipersocket Channel Activity Screen (FCX231)

Hipersocket channel load analysis is based on data from the Extended Channel Path Measurement Facility, available from the CP monitor SYSTEM domain. The screen shows a list of all hipersocket channels for which valid information was found.

The sample shows a screen with channels sorted in ascending channel path ID sequence (indicated by the underscore characters '___' above the 'ID' header), the initial sequence. Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT" subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Field Description for Hipersockets Channel Load:

Channel Path ID
The hexadecimal 'channel path identifier'

Shrd 'Shared' indicator for the channel. It can be either

YES For channels shared with other logical partitions, or

NO For dedicated channels

Hipersocket Activity/Sec.: The remainder of the screen shows hipersockets activity per second during the selected interval.

Total for System:

Transferred T_Msgs
The number of messages sent per second for the whole system.

Transferred T_DUnits
The number of data units sent per second for the whole system.

Failed T_NoBuff
The number of sends per second that failed due to unavailable receive buffers, for the whole system.

Own Partition:

Transferred L_Msgs
The number of messages sent per second by programs in the own partition.

Transferred L_DUnits
The number of data units sent per second for the own partition.

Failed L_NoBuff
The number of sends per second that failed due to unavailable receive buffers, for the own partition.

Failed L_Other
The number of sends per second that failed due to other problems, for the own partition.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields.

FCX232, I/O Processor Log Screen – IOPROCLG

Performance Toolkit Subcommand: "IOPROCLG" on page 202.

The I/O Processor Log Screen (FCX232):

```
FCX232      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Interval    Proc   <-Activity/Sec-->    Proc   <- Busy conditions per SSCH ->
End Time  Number   Beg_SSCH  I/O_Int   %Busy   Channel  Switch     CU  Device
>>Mean>>       0      462.7    466.0     1.2        .1      .2     .0      .0
>>Mean>>       1      252.4    298.2      .8       4.5      .0    4.3      .0

11:20:49       0      460.6    460.8     1.3        .1      .1     .0      .0
11:20:49       1      266.5    316.0      .8       3.8      .0    3.6      .0

11:21:49       0      460.7    453.8     1.1        .2      .1     .0      .0
11:21:49       1      256.7    295.0      .8       4.2      .0    3.9      .0

11:22:49       0      478.8    484.0     1.1        .1      .2     .0      .0
11:22:49       1      253.9    301.7      .8       3.8      .0    3.7      .0

11:23:49       0      479.5    484.7     1.2        .2      .2     .0      .0
11:23:49       1      258.4    311.3      .8       4.6      .0    4.5      .0

11:24:49       0      512.0    520.3     1.3        .1      .3     .0      .0
11:24:49       1      284.1    342.5      .9       3.9      .0    3.7      .0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 125. Layout of I/O Processor Log Screen (FCX232)

The information shown is based on CP monitor PROCESSOR domain SAMPLE data. It is available only for z/VM V.4.3 or later, running on z/Series processors.

The display shows I/O processor activity by time. The leftmost column contains the end time (format *hh:mm:ss*) of the interval for which the values were calculated.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string `>>Mean>>` in the 'Interval End Time' column.

Field Description:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

Proc Number
: The I/O processor number to which the following figures apply

Activity/Sec:

Beg_SSCH
: The number of times per second that the I/O processor began a 'start subchannel'

I/O_Int
: The number of times per second that the I/O processor generated an I/O interrupt

Proc %Busy
The percentage of high frequency samples that found the I/O processor to be busy.

Note: The HF sampling counters upon which this value is based may overflow within approximately 4 minutes. The value can only be meaningful, therefore, when working with monitor sample intervals not longer than 3 minutes.

Busy Conditions per SSCH:

Channel
The average number of channel busy conditions encountered for each SSCH begun on this I/O processor.

Switch
The average number of switch busy conditions encountered for each SSCH begun on this I/O processor.

CU The average number of control unit busy conditions encountered for each SSCH begun on this I/O processor.

Device
The average number of device busy conditions encountered for each SSCH begun on this I/O processor.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX233, TCP/IP Denial of Service Log Screen – TCPDOSLG

Performance Toolkit Subcommand: "TCPDOSLG" on page 313.

The TCP/IP Denial of Service Log Screen (FCX233):

```
FCX233      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

TCP/IP Denial of Service Log for Server TCPIP

Interval   <---------- Denial of Service Packet Discards/Sec ---------->
End Time   Smurf Fraggle PoDeath  BLAT Stream R4P3D   KOD   KOX SynFlood
>>Mean>>    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:46:04    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:47:03    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:48:04    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:49:03    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:50:03    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:51:03    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:52:03    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:53:03    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:54:03    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:55:03    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:56:03    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:57:03    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:58:03    .000    .000    .000  .000   .000  .000  .000  .000     .000
09:59:03    .000    .000    .000  .000   .000  .000  .000  .000     .000

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 126. Layout of TCP/IP Denial of Service Log Screen (FCX233)

The information shown is based on CP monitor APPLDATA domain SAMPLE data, provided by the TCP/IP server machine.

The display shows packet discard rates resulting from the TCP/IP stack's handling of various forms of 'denial of service' attacks. The leftmost column contains the end time (format *hh:mm:ss*) of the interval for which the values were calculated.

The first entry is reserved for the overall averages since the last RESET command, or since data collection was activated. It is designated by the string `>>Mean>>` in the 'Interval End Time' column.

Field Description:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

Denial of Service Packet Discards/Sec: These fields are available with TCP/IP function level 420 and later only; dots will be inserted otherwise.

Smurf
: Smurf denial of service packet discards, per second.

Fraggle
: Fraggle denial of service packet discards, per second.

PoDeath
: Ping-o-Death denial of service packet discards, per second.

The following fields are available with TCP/IP function level 430 and later only; dots will be inserted otherwise.

BLAT BLAT denial of service packet discards, per second.

Stream
Stream denial of service packet discards, per second.

R4P3D
R4P3D denial of service packet discards, per second.

KOD KOD denial of service packet discards, per second.

KOX KOX denial of service packet discards, per second.

SynFlood
SynFlood denial of service packet discards, per second.

Dots can be shown instead of TCP/IP activity values, and either of the strings

```
Not updated Logged off
```

inserted, when no new monitor records have been received for an interval, or when the server was found to have been logged off.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX234, Processor Configuration Log Screen – PROCCONF

Performance Toolkit Subcommand: "PROCCONF" on page 249.

The Processor Configuration Log Screen (FCX234):

```
FCX234      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Processor Configuration Log
Real CPU capability :  3712          Our level's config. name: ........
Real CPUs (total)   :    10          . higher levels, CP name: ........

Interval   <-- Real CPU Config.-->   <--- Second Level Configuration --->
End Time   Config StandBy Reserved   Count Config StandBy Reserved    CAF
>>Mean>>      9.0      .0      1.0      ..      ..       ..       ..    ...
08:24:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:25:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:26:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:27:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:28:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:29:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:30:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:31:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:32:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:33:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:34:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:35:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:36:22      9.0      .0      1.0      ..      ..       ..       ..    ...
08:37:22      9.0      .0      1.0      ..      ..       ..       ..    ...

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 127. Layout of Processor Configuration Log Screen (FCX234)

The information shown is based on CP monitor SYSTEM domain SAMPLE data.

The display shows processor configuration by time. The leftmost column contains the end time (format *hh:mm:ss*) of the interval for which the values were calculated.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Some Static Information:

Real CPU capability
: The capability of one of the CPUs in the configuration. This value is used as an indication of the capability of the CPU relative to the capability of other CPU models.

Real CPUs (total)
: The total number of CPUs in the configuration. It includes all CPUs in the configured, standby and reserved state.

Our level's config name
: The configuration name (the user identification in the higher level CP) of our configuration.

n **higher levels, CP name**
: Identifies the virtual machine control program that provides the virtual configuration, where *n* Indicates the number of higher CP levels.

By Time Values:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

For all of the following fields one single value is received per monitor sample interval, indicating the state at the end of the sample interval. Where data for more than one monitor interval is shown on one line, the average value for the whole interval is calculated and displayed.

Real CPU Config.:

Config
The average number of real CPUs found in the 'configured' state.

StandBy
The average number of real CPUs found in the 'standby' state.

Reserved
The average number of real CPUs found in the 'reserved' state.

Second Level Configuration:

Count
The average number of virtual CPUs found in this virtual configuration.

Config
The average number of virtual CPUs found in the 'configured' state.

StandBy
The average number of virtual CPUs found in the 'standby' state.

Reserved
The average number of virtual CPUs found in the 'reserved' state.

CAF The average value of the processor capability adjustment factor. It specifies the amount of underlying level-1, level-2 or level-3 configuration capability that is allowed to be used for this level-3 configuration by the virtual machine control program. The maximum level is 1000; lower values indicate a correspondingly lower available CPU capability.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX235, LPAR Configuration Log Screen – LPARCONF

Performance Toolkit Subcommand: "LPARCONF" on page 219.

The LPAR Configuration Log Screen (FCX235):

```
FCX235      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

LPAR Configuration Log for Partition K4       (Nr  5)

Interval   <------------ Logical CPU Configuration ------------>
End Time   Count Config StandBy Reserved Dedicated Shared    CAF
>>Mean>>     7.0    7.0      .0       .0        .0    7.0    777
08:24:22     7.0    7.0      .0       .0        .0    7.0    777
08:25:22     7.0    7.0      .0       .0        .0    7.0    777
08:26:22     7.0    7.0      .0       .0        .0    7.0    777
08:27:22     7.0    7.0      .0       .0        .0    7.0    777
08:28:22     7.0    7.0      .0       .0        .0    7.0    777
08:29:22     7.0    7.0      .0       .0        .0    7.0    777
08:30:22     7.0    7.0      .0       .0        .0    7.0    777
08:31:22     7.0    7.0      .0       .0        .0    7.0    777
08:32:22     7.0    7.0      .0       .0        .0    7.0    777
08:33:22     7.0    7.0      .0       .0        .0    7.0    777
08:34:22     7.0    7.0      .0       .0        .0    7.0    777
08:35:22     7.0    7.0      .0       .0        .0    7.0    777
08:36:22     7.0    7.0      .0       .0        .0    7.0    777
08:37:22     7.0    7.0      .0       .0        .0    7.0    777

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 128. Layout of LPAR Configuration Log Screen (FCX235)

The information shown is based on CP monitor SYSTEM domain SAMPLE data. It is available only for z/VM V.4.3 or later, running on z/Series processors.

The display shows LPAR CPU configuration by time for the logical partition that is collecting the monitor data. The leftmost column contains the end time (format *hh:mm:ss*) of the interval for which the values were obtained.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string `>>Mean>>` in the 'Interval End Time' column.

Field Description:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

Count
: The average number of logical CPUs found, in any state.

Config
: The average number of logical CPUs found in the 'configured' state.

StandBy
: The average number of logical CPUs found in the 'standby' state.

Reserved
: The average number of logical CPUs found in the 'reserved' state.

Dedicated
The average number of logical CPUs that were dedicated CPUs.

Shared
The average number of logical CPUs that were shared CPUs.

CAF The average value of the LPAR capability adjustment factor. It specifies the amount of underlying level-1 configuration capability that is allowed to be used for this level-2 configuration by the LPAR hypervisor. The maximum level is 1000; lower values indicate a correspondingly lower available CPU capability.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX236, Processor Load and Configuration Logs Menu – PROCMENU

Performance Toolkit Subcommand: "PROCMENU" on page 251.

The Processor Load and Configuration Logs Menu (FCX236) shows a list of all the processor specific 'by time' logs.

```
FCX236      CPU nnnn  SER nnnnn          Proc. Logs            Perf. Monitor


  Processor Load and Configuration Logs

  Processor Load Logs
S Log Name    Description
_ PROCSUM     Processor load summary by time
_ PROCLOG     Processor load by processor and by time
_ IOPROCLG    I/O processor load by processor and by time
_ PRCLOG      Processor load by processor and by time
_ DSVSLOG     DSVBK Steals per logical CPU by time

  Processor Config. Logs
S Log Name    Description
_ LPARCONF    Logical CPU configuration by time (own LPAR)
_ PROCCONF    Real and virtual CPU configuration by time
_ TOPOLOG     System topology machine organization event log
_ PUORGLOG    Logical PU Organization by time
_ PUCFGLOG    Logical PU Configuration event log
_ DSVCLOG     Dispatch Vector Configuration log

  Processor Spin Locks
S Log Name    Description
_ LOCKLOG     Processor Spin Locks by time

Select performance screen with cursor and press ENTER
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 129. Layout of Processor Load and Configuration Logs Menu (FCX236)

The processor load and configuration logs are based on SYSTEM and PROCESSOR domain SAMPLE data.

Field Descriptions:

S
: Cursor selection field. The field will be highlighted and made cursor-selectable (set as 'unprotected') only if the corresponding processor log is available.

Log Name
: The log file name, equal to the command with which the log data can be selected for display. The field will be highlighted if the corresponding processor load or configuration log is available.

Description
: Description of the performance display.

FCX237, I/O Priority Queueing Screen – IOPQUEUE

Performance Toolkit Subcommand: "IOPQUEUE" on page 201.

The I/O Priority Queueing Screen (FCX237) shows information on the use of the I/O priority queueing facility. User lines are shown highlighted on the screen if some of the I/Os got out-prioritized during the selected interval.

The information shown is based on USER domain SAMPLE data. It is available

```
FCX237      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

I/O Priority Queueing HW active
System minimum   9, maximum  15

______                          .        .       .        .         .
          Store  Range  <-Req. Range->  <-Eff. Range->  Outprior
Userid    Subch   Type  R_Low   R_High  E_Low   E_High    Rate/s
ACKERK       No    Abs      2       12      5       10       .00
CFT2NDA     Yes    Rel      0        0      5        5       .00
IRD00001     No    Rel     10       12      5        5       .00
IRD00002     No    Rel      8       10      5        5       .00
IRD00003     No    Rel     10       12      5        5       .00
IRD00004     No    Rel     10       12      5        5       .00
IRD00005     No    Rel     10       12      5        5       .00
IRD00006     No    Rel     10       12      5        5       .00
IRD00007     No    Rel      9       11      5        5       .00
IRD00008     No    Rel     10       12      5        5       .00
IRD00009     No    Rel     10       12      5        5       .00
IRD00010     No    Rel     10       12      5        5       .00
IRD00011     No    Rel     10       12      5        5       .00
Select a user for user details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 130. Layout of I/O Priority Queueing Screen (FCX237)

only for z/VM V.4.3 and later.

The sample shows a screen with the users sorted in ascending sequence of the user identifications, the initial setting (indicated by the underscore characters '____' above the `Userid` header). Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' subcommand with the appropriate column heading as sort argument (see "SORT" on page 287), or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

For more detailed information on one specific user either:

- Place the cursor on the `Userid` field of the virtual machine you are interested in and press ENTER, or
- Enter the subcommand 'USER *userid*' on the command line

Field Description:

The main header shows whether the I/O priority queueing hardware facility is active or not. Note that CP will simulate the facility to allow prioritizing I/O requests from different virtual machines even when the corresponding hardware facility is not active. System minimum *min*, maximum *max* indicates the minimum and maximum range limits set for the system.

The remaining lines describe the I/O priority queueing settings and activity for individual virtual machines:

Userid
User identification of the virtual machine for which the line contains I/O priority queueing information.

Store Subch
Awareness of subchannel details by virtual machine.

Yes Guest requested subchannel details which includes I/O priority facility status. This usually indicates that the guest is I/O priority aware, and that it may set its own I/O priorities.

No Guest not aware of I/O priority facility. This indicates that changes to the priority of the virtual machine's I/Os can only be made by CP command.

Range Type
The range type set: can be either

Abs If the range is absolute, or

Rel If the range is relative.

Req. Range R_Low
The low value of the requested range.

Req. Range R_High
The high value of the requested range.

Eff. Range E_Low
The low value of the effective range.

Eff. Range E_High
The high value of the effective range.

Outprior Rate/s
The number of I/O requests that were outprioritized per second for this user. Note that this value refers to CP's simulation of the I/O priority queueing facility when passing on I/O requests from virtual machines to the hardware. It does *not* reflect the activity of the hardware feature.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all numerical fields.

FCX238, Idle Users Screen – IDLEUSER

Performance Toolkit Subcommand: "IDLEUSER" on page 198.

The Idle Users Screen (FCX238):

```
FCX238      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
_______       .       _______       .       _______      .       _______      .
            Min                   Min                  Min                  Min
Userid     Idle   Userid   Idle   Userid   Idle   Userid   Idle   Userid   Idle
AVS           9   BEACH1   1722   BUCKETS  1722   DATAMOVE    2   DIRMAINT    2
DOUG       1722   GCS      1722   GREGORJL 1722   HAMILTJL 1722   HOLDER   1722
IMAP3SRV   1722   INTTAPE1 1722   ISPVM    1722   K4SERV   1722   MARINOKA 1722
MICHEL     1722   MULTISRV 1138   OPERACCT 1722   OPERATOR 1106   OPERSYMP 1722
PJC        1722   PORTMAP  1722   PVM         2   RXAGENT1 1722   SFCM1    1722
SFSESA     1722   SNMPD    1722   SQLMACH     2   TCPMAINB 1722   TOOLS    1722
TPOPER     1722   VMSERVS  1105   VMSERVU  1722   VSCS     1722   YVETTE      9
Select a user for user details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 131. Layout of Idle Users Screen (FCX238)

The display shows a list of all virtual machines that have been idle during the last monitor sample interval and the period during which they have been idle.

The sample shows a screen with the users sorted in ascending userid sequence, the initial setting (indicated by the underscore characters '____' above the `Userid` headers). The sequence can be changed by means of the 'SORT' subcommand with the appropriate column heading as sort argument (see "SORT" on page 287), or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

For more detailed information on one specific user either:

- Place the cursor on the `Userid` field of the virtual machine you are interested in and press ENTER, or
- Enter the subcommand 'USER *userid*' on the command line.

Field Description:

Userid
: User identification of idle users.

Min Idle
: The period in minutes since the users' last activity or since program initialization, whichever is shorter.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX239, Processor Summary Log Screen – PROCSUM

Performance Toolkit Subcommand: "PROCSUM" on page 252.

The Processor Summary Log Screen (FCX239):

```
FCX239     CPU nnnn  SER nnnnn  Interval  HH:MM:SS - HH:MM:SS    Perf. Monitor

           <------- CPU -------->  <------------- Spin Lock Collision Activity ------------>
                 <--Ratio-->       <---- Total ----->  <-- Scheduler ---> <- Timer Request > <--SIE/sec--> <--Diag 9C/sec-->
Interval    Pct              On-  Colls AvSpin   Pct  Colls AvSpin   Pct Colls AvSpin   Pct    In- Inter-
End Time   Busy   T/V  User line   /sec   usec  Spin   /sec   usec  Spin  /sec   usec  Spin struct   cept byDSP bySYN byHVR UnPk
>>Mean>>     .5  4.74 .4582 21.0   93.5  1.932  .001   84.5  2.050  .001   1.4   .342  .000   1288   1271    .0    .0    .0  7.0
09:25:52     .5  4.27 .4763 21.0   81.0  1.873  .001   71.9  1.978  .001   1.4   .336  .000   1343   1323    .0    .0    .0  7.1
09:30:52     .5  5.13 .4417 21.0   99.1  1.951  .001   90.2  2.074  .001   1.5   .354  .000   1259   1244    .0    .0    .0  7.0
09:31:52     .5  4.59 .4822 21.0  103.1  1.977  .001   94.3  2.096  .001   1.3   .292  .000   1265   1251    .0    .0    .0  7.0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 132. Layout of Processor Summary Log Screen (FCX239)

The information shown is based on CP monitor SYSTEM domain SAMPLE data.

The display shows a summary of processor activity by time. The leftmost column contains the end time (format *hh:mm:ss*) of the interval for which the values were calculated.

The first entry is reserved for the overall averages since the last RESET subcommand, or since data collection was activated. It is designated by the string `>>Mean>>` in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

CPU: Shows processor load summary.

Pct Busy
Average processor percent busy for all processors.

Ratio T/V
The average ratio of total to virtual CPU time for all processors.

Ratio User
The ratio of user CPU time to total CPU time.

Online
The average number of processors that were online during the interval.

Spin Lock Collision Activity: Shows overall, timer request and scheduler spin lock collision activity.

Total Colls/sec
Total spin lock collisions per second for all processors.

Total AvSpin usec
Average microseconds spent spinning per lock collision.

Total Pct Spin
Percentage of elapsed time spent in spin lock collisions.

Scheduler Colls/sec
Scheduler spin lock collisions per second for all processors.

Scheduler AvSpin usec
Average microseconds spent spinning per scheduler lock collision.

Scheduler Pct Spin
Percentage of elapsed time spent in scheduler spin lock collisions.

Timer Request Colls/sec
Timer request spin lock collisions per second for all processors.

Timer Request AvSpin usec
Average microseconds spent spinning per timer request collision.

Timer Request Pct Spin
Percentage of elapsed time spent in timer request spin lock collisions.

SIE/sec: Shows SIE activity.

Instruct
Total SIE calls per second for all processors.

Intercept
Total SIE intercepts per second for all processors.

Diag 9C/sec: Shows Diagnose instruction activity.

Diag 9C byDSP
Rate of issuing Diagnose X'9C' by HCPDSP.

Diag 9C bySYN
Rate of issuing Diagnose X'9C' by HCPSYN.

Diag 9C byHVR
Rate of issuing Diagnose X'9C' by HCPHVR.

UnPk The average number of processors that were in unparked state during the interval. When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX240, Virtual Switch Activity Screen – VSWITCH

Performance Toolkit Subcommand: "VSWITCH" on page 349.

In the Virtual Switch Activity Screen (FCX240), the lines for Virtual Switches which have been active during the last measuring interval are highlighted on the screen.

Note that besides issuing the VSWITCH subcommand, this screen can also be reached from the TCP/IP menu by selecting "Virtual Switch Activity", or by selecting any row in the General Virtual Switch Description Screen and pressing ENTER. (See "FCX266, General Virtual Switch Description Screen – GVSWITCH" on page 759.)

If you select any row in this screen and press ENTER, you will go to the Extended Virtual Switch Activity Screen for additional data. (See "FCX267, Extended Virtual Switch Activity Screen – EVSWITCH" on page 762.)

The information shown is based on CP monitor I/O domain SAMPLE data.

```
FCX240      Data for yyyy/mm/dd  Interval HH:MM:SS - HH:MM:SS    Monitor Scan

____ .         .           .       .       .       .       .       .       .       .       .       .
                        Q Time  <--- Outbound/s ---> <--- Inbound/s ----->  <--- Signals --->  < Intrpts > <- Bridge->
                        S  Out   Bytes <--Packets-->  Bytes <--Packets-->  <-- issued/s --->              <- Port  ->
Addr     Name  Controlr V  Sec  T_Byte T_Pack T_Disc R_Byte R_Pack R_Disc  Write  Read  Sync  Rcv/s Pro/s BufUs BufMx
>>   System (   7)   << 8  300      38      0      0      4      0      0     .0    .0    .0     .1    .1     0  8192
4113 PEGVSW    DTCVSW2  8  300       0      0      0      0      0      0     .0    .0    .0     .2    .2     0     0
4116 PEGTWO    DTCVSW2  8  300       0      0      0      0      0      0     .0    .0    .0     .0    .0     0     0
503D DTCINMN   DTCENS1  8  300     257      0      0     30      0      0     .3    .0    .0     .3    .3     0     0
F020 PEGVSW    DTCVSW2  8  300       6      0      0      0      0      0     .0    .0    .1     .0    .0     0  2048
F023 PEGTWO    DTCVSW2  8  300       0      0      0      0      0      0     .0    .0    .0     .0    .0     0  2048
F620 PEGMFS    DTCVSW2  8  300       0      0      0      0      0      0     .0    .0    .0     .0    .0     0  2048
F623 PEGMFS2   DTCVSW2  8  300       0      0      0      0      0      0     .0    .0    .0     .0    .0     0  2048

See EVSWITCH / GVSWITCH for other Virtual Switch reports
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 133. Layout of Virtual Switch Activity Screen (FCX240)

The sample shows a screen with Virtual Switches sorted in ascending device number sequence (indicated by the underscore characters '___' above the 'Addr' header). Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER. Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Addr Real device number. The first line contains the string >> System << instead of a device number and owner identification. It shows the average load figures for all Virtual Switches for which performance data were collected. The string >> System << also includes the total number of Virtual Switches (in parentheses).

Name The name of the Virtual Switch. A Virtual Switch is given a 16-byte identification, or LAN ID, when it is created. The VSWITCH LAN ID consists of two 8-byte character fields: OWNER||NAME. The OWNER is always SYSTEM. This column is the NAME component of the LAN ID.

Controlr
The user identification of the virtual machine the device is currently attached to.

QSV The queuestorage value (a value between 1 and 8).

Timeout sec
The timeout value set for the Virtual Switch, in seconds.

Outbound/s:

Bytes T_Byte
Number of bytes transmitted per second.

Packets T_Pack
Number of packets transmitted per second.

Packets T_Disc
Number of outbound packets discarded per second.

Inbound/s:

Bytes R_Byte
Number of bytes received per second.

Packets R_Pack
Number of packets received per second.

Packets R_Disc
Number of inbound packets discarded per second.

Signals issued/s:

Write Number of write signals issued per second.

Read Number of read signals issued per second.

Sync Number of sync signals issued per second.

Int Rcv/s
Number of interrupts, such as PCI and AI, received per second.

Int Pro/s
Number of interrupts, such as PCI and AI, that resulted in input queue processing, per second.

BufUs
Cardinal count of the number of configured buffers currently in use.

BufMx
Count of the maximum number of asynchronous buffers allowed.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all activity fields. The *QSV* and *Timeout* fields will always contain current information.

FCX241, VM Resource Manager Screen – VMRM

Performance Toolkit Subcommand: "VMRM" on page 347.

In the VM Resource Manager Screen (FCX241), the names of workloads which have been active during the last measuring interval are highlighted on the screen.

```
FCX241      CPU nnnn  SER nnnnn  Interval hh:mm:ss - hh:mm:ss    Perf. Monitor
______     .                      .      .     .      .     .       .
VM Resource Manager           Impor  <-- DASD -->  <-- CPU --->   Active
Server      Workload          tance  D-Goal D-Act  C-Goal C-Act  Samples
VMRMSVM     WORK1               10     100   ...     100   ...        1
VMRMSVM     WORK2                5      50   ...      50   ...        1
VMRMSVM     WORK3                1       1   ...       1   ...        1
VMRMSVM     WORK4               10     100   100     100    87        1
VMRMSVM     WORK5                5      50   100      50    43        1
VMRMSVM     WORK6                1       1   100       1     7        1
VMRMSVM     WORK7               10     100   100     100    83        1
VMRMSVM     WORK8                5      50   100      50    41        1
VMRMSVM     WORK9                1       1   ...       1   ...        1









Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 134. Layout of VM Resource Manager Screen (FCX241)

The information shown is based on CP monitor application data domain SAMPLE data.

The sample shows a screen with the workload information sorted in ascending server ID and workload name sequence (indicated by the underscore characters '___' above the 'Server' header). Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Note: If the VMRM server is restarted or a new configuration file is used, the VMRM data will be reset and data will be reported starting at the reset.

Field Description:

Server
: User identification of the virtual machine where the VM Resource Manager is running.

Workload
: The name of the workload for which information is shown. Workloads that have been active (i.e. are associated with virtual machines logged on) in the last monitor sample interval are highlighted.

Importance
: The importance value assigned to the workload.

DASD D-Goal
The target DASD velocity value assigned.

DASD D-Act
The actual DASD velocity value calculated. Dots will be inserted if a 'null' value has been received (i.e. if the velocity value could not be calculated because this would have resulted in a division by zero).

CPU C-Goal
The target CPU velocity value assigned.

CPU C-Act
The actual CPU velocity value calculated. Dots will be inserted if a 'null' value has been received (i.e. if the velocity value could not be calculated because this would have resulted in a division by zero).

Active Samples
The number of samples processed for the workload. Monitor data will be generated for a workload only while that workload is considered 'active' with one or more virtual machines that are logged on.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages or totals will be shown for all fields, except in the case of the 'Active Samples' field which will show the total count of active samples in the interval.

FCX242, Linux Data Selection Menu – LINUXMEN

Performance Toolkit Subcommand: "LINUXMEN" on page 215.

The Linux Data Selection Menu (FCX242) is the master menu for selecting Linux performance data displays:

```
FCX242     CPU nnnn  SER nnnnn          Linux Displays         Perf. Monitor


   Linux screens selection
S Display    Description
  LINUX      RMF PM system selection menu
  LXCPU      Summary CPU activity display
  LXMEM      Summary memory util. & activity display
  LXNETWRK   Summary network activity display









 Select performance screen with cursor and press ENTER
 Command ===> _
 F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 135. Layout of Linux Data Selection Menu (FCX242)

All Linux performance displays with summary data are based on APPLDATA monitor records created by the server machines: They can be built and displayed only when APPLDATA sample data collection has been enabled for the server(s), and when the Linux systems themselves have been set up to provide APPLDATA records.

The prerequisites for using RMF PM based Linux performance data are described in the "Monitoring Linux Internal Performance Data" section in *z/VM: Performance Toolkit Guide*.

Field Description:

S
: Cursor selection field. The field will be highlighted and made cursor-selectable (set as 'unprotected') only if the corresponding display is available.

Display
: The name of the screen, equal to the command with which it can be selected for display. The field will be highlighted if the corresponding display is available.

Description
: Description of the performance display or selection menu.

FCX243, General Linux CPU Utilization Screen – LXCPU

Performance Toolkit Subcommand: "LXCPU" on page 224.

The General Linux CPU Utilization Screen (FCX243) will be shown if you enter the LXCPU subcommand with no *linuxid*:
The display shows overall Linux CPU utilization and processes, as perceived by

```
FCX243      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
 ______       .      .     .      .     .     .       .      .     .      .
               <------------------- Total CPU -------------------------->
Linux    Virt <---------------- Utilization (%) ------------------------>
 Userid   CPUs TotCPU  User Kernel  Nice   IRQ SoftIRQ IOWait  Idle Stolen
 >System<  1.0     .3    .1     .1    .0    .0      .1     .3 129.4    ...
 LXM00001    4    1.4    .0     .3    .0    .0      .9     .6 398.0    ...
 LX00001     1    ...   ...    ...   ...   ...     ...    ...   ...    ...
 LX00002     1    ...   ...    ...   ...   ...     ...    ...   ...    ...
 LX00003     1    ...   ...    ...   ...   ...     ...    ...   ...    ...









Select a highlighted guest for RMF PM Linux details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 136. Layout of General Linux CPU Utilization Screen (FCX243)

the Linux guest systems. Data can be collected and an output line built only:

- If the Linux system makes the data available to the CP monitor, and
- If the APPLDATA sample domain has been enabled for the Linux guest.

The sample shows a screen with the summary lines from different Linux guests sorted in ascending 'Userid' sequence (indicated by the underscore characters '___' above the `'Linux Userid'` header), the initial setting. Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Field Description

The following field descriptions apply to both the LXCPU and LXCPULOG *userid* displays, with the exception of the `Linux Userid` field which will be replaced by the field `Interval End Time` on the LXCPULOG display.

Linux Userid
The user identification of the Linux guest.

Virt CPUs
The number of virtual CPUs defined for the guest.

Total CPU Utilization (%): Total CPU utilization, i.e. the **sum** of the utilization for all virtual processors, is shown to allow sorting Linux guests according to their overall CPU load. This logic also corresponds to the manner in which CPU load is indicated on the 'User Resource Usage Screen' FCX112.

See the "Usage Notes" in "LXCPU" on page 224 for information on the accuracy of CPU utilization percentages.

TotCPU
Percent total CPU utilization.

User Percent user mode CPU utilization.

Kernel
Percent kernel mode CPU utilization.

Nice Percent 'nice' mode CPU utilization (modified priority).

Idle Percent CPU idle.

IRQ Percent time in interrupts.

SoftIRQ
Percent time in soft IRQs.

IOWait
Percent time in I/O Wait.

Stolen Percent time hypervisor in control.

Processes:

Current Runabl
The number of runable processes at sampling time.

Current Waiting
The number of processes waiting for I/O at sampling time.

Current Total
Total number of processes at sampling time.

Average Running 1_Min
The average number of processes found running during the last minute.

Average Running 5_Min
The average number of processes found running during the last 5 minutes.

Average Running 15_Min
The average number of processes found running during the last 15 minutes.

Nr of Users
The number of Linux guests that contributed to the averages shown in this line.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields for all users.

FCX244, General Linux Memory Utilization Screen – LXMEM

Performance Toolkit Subcommand: "LXMEM" on page 227.

The General Linux Memory Utilization Screen (FCX244) will be shown if you enter the LXMEM subcommand with no *linuxid*:

```
FCX244      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
______           .       .       .       .       .       .       .       .
          <------------ Memory Allocation (MB) -------------> <------- Swappin
Linux     <--- Main ---> <--- High --->        Buffers  Cache <-Space (MB)-> <
Userid    M_Total %MUsed H_Total %HUsed Shared /CaFree   Used S_Total %SUsed
>System<    237.0   45.1      .0     .0     .0    14.1   55.8   272.4     .0
LINUX23     227.8   63.3      .0     .0     .0     9.0   90.8   288.9     .0
LINUX24     246.3   26.8      .0     .0     .0    19.3   20.7   256.0     .0









Select a highlighted guest for RMF PM Linux details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 137. Layout of General Linux Memory Utilization Screen (FCX244)

The display shows overall Linux memory utilization and activity, as perceived by the Linux system. Data can be collected and an output line built only:

- If the Linux system makes the data available to the CP monitor, and
- If the APPLDATA sample domain has been enabled for the Linux guest.

The sample shows a screen with the summary lines from different Linux guests sorted in in ascending 'Userid' sequence (indicated by the underscore characters '___' above the `'Linux Userid'` header), the initial setting. Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Field Description

The following field descriptions apply to both the LXMEM and LXMEMLOG *userid* displays, with the exception of the `Linux Userid` field which will be replaced by the field `Interval End Time` on the LXMEMLOG display.

Linux Userid
The user identification of the Linux guest.

Memory Allocation (MB):

Main M_Total
Total main memory size, in MBytes. This value does not include some space reserved by the kernel.

Main %MUsed
Main memory utilization, in percent.

High H_Total
High memory size, in MBytes.

High %HUsed
High memory utilization, in percent.

Shared
Memory, in MBytes, that is usable by more than one process. If any part of memory could be used by more than one process it is counted to be shared memory. Value currently set to zero by Linux kernel (2.4 and 2.6).

Buffers/CaFree
Memory reserved for buffers and free cache, in MBytes.

Cache Used
Memory used for buffers, in MBytes. The Linux buffer cache is a disk cache intended to relieve processes from having to wait for relatively slow disks to retrieve or store data. Linux automatically uses otherwise unused memory for disk buffers. When free memory becomes scarce, buffer frames are automatically released. The buffer cache kernel thread can be tuned using */proc/sys/vm/bdflush*. Please refer to the file *Documentation/proc.txt* in the Linux kernel source tree.

Swapping:

Space (MB) S_Total
The size of the max. available swap space, in MBytes.

Space (MB) %SUsed
Percentage of swap space used.

Pgs/sec In
Swap in rate, in 4kB pages per second. Please note that the Linux kernel uses swapping only if there is not enough memory available. If not backed by IBM VM on a S/390 or zSeries mainframe, swapping is normally very bad for performance and application responsiveness.

Pgs/sec Out
Swap out rate, in 4kB pages per second. Please note that the Linux kernel uses swapping only if there is not enough memory available. If not backed by IBM VM on a S/390 or zSeries mainframe, swapping is normally very bad for performance and application responsiveness.

Paging:

Allocates
Number of physical page allocations per second in the system.

Faults Major
Number of major page faults per second for the process. A major page faults occurs if -- from the Linux operating system's perspective -- disk access is involved in handling the page fault.

Faults Minor
Number of minor page faults per second for the process. If there is (from the Kernel's perspective) no disk access involved in the page fault (like Copy-on-Write for a shared page), the page fault is called a minor page fault.

Block IO:

kB/sec Read
Block I/O data read rate, in kB per second.

kB/sec Write
Block I/O data write rate, in kB per second.

Nr of Users
The number of Linux guests that contributed to the averages shown in this line.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Averages will be shown as requested.

Usage Note: The Linux internal data collection is not synchronized with CP's data collect activity. That is, The Linux internal data will usually have been obtained for a different period than that used for collecting other VM data. This can lead to discrepancies between the internal Linux values and the VM activity seen from the outside.

FCX245, General Linux Networking Activity Screen – LXNETWRK

Performance Toolkit Subcommand: "LXNETWRK" on page 230.

The General Linux Networking Activity Screen (FCX245) will be shown if you enter the LXNETWRK subcommand with no *linuxid*:

```
FCX245      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
______        .      .      .      .      .      .      .      .      .        .
                <--- Data Transfer/sec ---> <---------- Errors/sec ---------->
Linux    Inter <--Packets--> <---Bytes---> BadPac Packet <-No Space-> Transmit
Userid   faces P_Recv P_Xmit B_Recv B_Xmit  Recvd  X_Mit Buffer Linux  Collisn
>System<   3.0  1.528   .332    239     45   .000   .000   .000  .000     .000
LINUX24    3.0  1.528   .332    239     45   .000   .000   .000  .000     .000









Select a highlighted guest for RMF PM Linux details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 138. Layout of General Linux Networking Activity Screen (FCX245)

The display shows overall Linux networking activity, as perceived by the Linux guest systems. Data can be collected and an output line built only:

- If the Linux system makes the data available to the CP monitor, and
- If the APPLDATA sample domain has been enabled for the Linux guest.

The sample shows a screen with the summary lines from different Linux guests sorted in in ascending 'Userid' sequence (indicated by the underscore characters '___' above the `'Linux Userid'` header), the initial setting. Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Field Description

The following field descriptions apply to both the LXNETWRK and LXNETWRK *userid* displays, with the exception of the `Linux Userid` field which will be replaced by the field `Interval End Time` on the LXNETWRK display.

Linux Userid
The user identification of the Linux guest.

Interfaces
The number of networking interfaces defined.

Data Transfer/sec:

Packets P_Recv
The number of packets received per second.

Packets P_Xmit
The number of packets transmitted per second.

Bytes B_Recv
The number of Bytes received per second.

Bytes B_Xmit
The number of Bytes transmitted per second.

Errors/sec:

BadPac Recvd
Bad packets received per second.

Packet X_Mit
Packet transmit problems per second.

No Space Buffer
No space found in Linux buffers, per second.

No Space Linux
No space available in Linux, per second.

Transmit Collisn
Collisions while transmitting, per second.

Nr of Users
The number of Linux guests that contributed to the averages shown in this line.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields.

FCX246, Linux CPU Load Log Screen – LXCPULOG

Performance Toolkit Subcommand: "LXCPULOG" on page 225.

When requesting the Linux CPU Load Log Screen (FCX246) for a user, the *userid* must be that of a Linux guest machine which has previously been selected for benchmarking, and for which Linux APPLDATA records were collected. It shows a 'by time' log of the selected guest's internal view of CPU utilization.

```
FCX246      CPU nnnn  SER nnnnn  Interval hh:mm:ss - hh:mm:ss    Perf. Monitor
Linux CPU Load Log for User LINUX24

             <------------------- Total CPU ---------------------------> <-------------
Interval Virt <---------------- Utilization (%) ------------------------> <---- Current
End Time CPUs TotCPU  User Kernel  Nice   IRQ SoftIRQ IOWait  Idle Stolen Runabl Waiting
>>Mean>>    2   26.7    .6    8.1    .0   5.4    12.6    3.5  65.6  104.1   15.2      .0
09:13:19    2    2.3    .2     .7    .0    .6      .8    2.6 182.8   12.3     30       0
09:14:18    2   29.2    .8    9.0    .0   5.8    13.7    4.1  44.7  121.9     24       0
09:15:22    2   26.6    .7    8.2    .0   5.3    12.4     .2  42.1  131.0     12       0
09:16:22    2   29.2    .8    9.0    .0   5.7    13.6    4.0  45.3  121.5     19       0
09:17:22    2   28.6    .8    8.9    .0   5.6    13.3    4.2  41.5  125.7     21       0
09:18:22    2   28.3    .7    8.9    .0   5.7    12.9    6.1  45.8  119.7     31       0









Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 139. Layout of Linux CPU Load Log Screen (FCX246)

The information shown is based on APPLDATA domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval for which the values were calculated.

In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Linux Userid' field, all data columns are identical to the ones of the 'General Linux CPU Utilization' (LXCPU) display. Please see "LXCPU" on page 224 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX247, Linux Memory Utilization Log Screen – LXMEMLOG

Performance Toolkit Subcommand: "LXMEMLOG" on page 228.

When requesting the Linux Memory Utilization Log Screen (FCX247) for a user, the *userid* must be that of a Linux guest machine which has previously been selected for benchmarking, and for which Linux APPLDATA records were collected. It shows a 'by time' log of the selected guest's internal view of memory utilization.

```
FCX247      CPU nnnn  SER nnnnn  Interval hh:mm:ss - hh:mm:ss    Perf. Monitor

Linux Memory Utilization Log for User LINUX24

          <------------ Memory Allocation (MB) -------------> <------- Swappin
Interval  <--- Main ---> <--- High --->        Buffers  Cache <-Space (MB)-> <
End Time  M_Total %MUsed H_Total %HUsed Shared /CaFree   Used S_Total %SUsed
>>Mean>>    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:11:29    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:12:29    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:13:29    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:14:29    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:15:29    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:16:29    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:17:29    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:18:30    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:19:30    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:20:30    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:21:30    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:22:30    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0
17:23:30    246.3   29.6      .0     .0     .0    32.9   14.5   256.0     .0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 140. Layout of Linux Memory Utilization Log Screen (FCX247)

The information shown is based on APPLDATA domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column. Note that the information extends beyond the 80 columns of an ordinary screen: use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Interval End Time
: The end time of the monitor interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Linux Userid' field, all data columns are identical to the ones of the 'General Linux Memory Utilization' (LXMEM) display. Please see "LXMEM" on page 227 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX248, Linux Network Activity Log Screen – LXNETLOG

Performance Toolkit Subcommand: "LXNETLOG" on page 229.

When requesting a Linux Network Activity Log (FCX248) for a user, the *userid* must be that of a Linux guest machine which has previously been selected for benchmarking, and for which Linux APPLDATA records were collected. It shows a 'by time' log of the selected guest's internal view of network activity.

```
FCX248      CPU nnnn  SER nnnnn  Interval hh:mm:ss - hh:mm:ss    Perf. Monitor
Linux Network Activity Log for User LINUX24

               <--- Data Transfer/sec ---> <---------- Errors/sec ---------->
Interval Inter <--Packets--> <---Bytes---> BadPac Packet <-No Space-> Transmit
End Time faces P_Recv P_Xmit B_Recv B_Xmit  Recvd  X_Mit Buffer Linux  Collisn
>>Mean>>   3.0  1.077   .358    230     48   .000   .000   .000  .000     .000
16:56:26   3.0  1.198   .333    216     45   .000   .000   .000  .000     .000
16:57:26   3.0   .782   .366    154     49   .000   .000   .000  .000     .000
16:58:27   3.0   .982   .333    242     45   .000   .000   .000  .000     .000
16:59:27   3.0   .899   .316    222     43   .000   .000   .000  .000     .000
17:00:27   3.0  1.179   .432    242     58   .000   .000   .000  .000     .000
17:01:27   3.0  1.096   .432    227     58   .000   .000   .000  .000     .000
17:02:27   3.0  1.146   .432    242     58   .000   .000   .000  .000     .000
17:03:27   3.0  1.113   .432    234     58   .000   .000   .000  .000     .000
17:04:27   3.0   .965   .349    212     47   .000   .000   .000  .000     .000
17:05:28   3.0  1.065   .366    234     49   .000   .000   .000  .000     .000
17:06:28   3.0   .781   .316    191     43   .000   .000   .000  .000     .000
17:07:28   3.0   .998   .316    228     43   .000   .000   .000  .000     .000
17:08:28   3.0  1.096   .316    233     43   .000   .000   .000  .000     .000

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 141. Layout of Linux Network Activity Log Screen (FCX248)

The information shown is based on APPLDATA domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
: The end time of the monitor interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Linux Userid' field, all data columns are identical to the ones of the 'General Linux Networking Activity' (LXNETWRK) display. Please see "LXNETWRK" on page 230 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX249, SCSI Device Screen – SCSI

Performance Toolkit Subcommand: "SCSI" on page 274.

The SCSI Device Screen (FCX249):

```
FCX249      Data for YYYY/MM/DD Interval HH:MM.SS - HH:MM.SS   Monitor Scan
.          ___       .     .     .      .        .       .

         Bytes  <--------- Activity/sec --------->
Device     per         Trans        <---Blocks---> Percent EDEV
Number   block   KByte  fers Seeks   Read  Written Connect Attr
9954       512    5004 80.57  .000   5001     5007      13 2107

Select a device for I/O device details
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 142. Layout of SCSI Device Screen (FCX249)

Field Descriptions:

Device Number
The real emulated FBA device (EDEV) number.

Bytes per block
Number of bytes in a block for this DASD.

KByte The calculated number of kilobytes per second transfer rate of the device, calculated from written and read blocks, and bytes per block data.

Transfers
The number of data transfers per second to and from the device.

Seeks The number of seek operations per second associated with the device. Note that the transfer rate is only meaningful for devices which support discrete seeks. SCSI DASD do not support discrete seeks and return a value of 0 for this field.

Blocks Read
Number of blocks read per second during the selected interval.

Blocks Written
Number of blocks written per second during the selected interval.

Percent Connect
The device-busy time over the selected interval. This is a function of the time the device is connected to the channel over the selected interval.

EDEV Attr
The value of this device's EDEV attribute.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields.

FCX250, SCSI Resource Utilization Log Screen – SCSILOG

Performance Toolkit Subcommand: "SCSILOG" on page 275.

The SCSI Resource Utilization Log Screen (FCX250) shows a 'by time' log of SCSI performance data for the selected device (which must have been previously selected for benchmarking).

```
FCX250      CPU nnnn  SER nnnnn  Interval 11:56:39 - 12:08:39  Performance Monitor

Resource Utilization Log for SCSI Device 9954

           Bytes  <--------- Activity/sec --------->
Interval     per         Trans        <---Blocks---> Percent EDEV
End Time   block   KByte  fers Seeks   Read  Written Connect Attr
>>Mean>>     512   19693  1769  .000   7902    31484      47 2107
11:57:39     512    4995 80.45  .000   4992     4998       4 2107
11:58:39     512    5004 80.57  .000   5001     5007       3 2107
11:59:39     512    7505 120.9  .000   7501     7510       4 2107
12:00:39     512    7505 120.9  .000   7501     7510       4 2107
12:01:39     512    7505 120.9  .000   7501     7510       4 2107
12:02:39     512   18782  1547  .000   6739    30826      40 2107
12:03:39     512   34269  3300  .000  11256    57283      83 2107
12:04:39     512   32465  3357  .000   8879    56052      83 2107
12:05:39     512   34163  3283  .000  11248    57079      83 2107
12:06:39     512   28747  3022  .000   8412    49083      85 2107
12:07:39     512   28443  3084  .000   7801    49085      86 2107
12:08:39     512   26953  3115  .000   8000    45906      85 2107

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 143. Layout of SCSI Resource Utilization Log Screen (FCX250)

The information shown is based on MONITOR domain and I/O domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string `>>Mean>>` in the 'Interval End Time' column.

Field Description:

Interval End Time
The end time of the monitor interval for which the values were calculated.

In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Addr' field, all data columns are identical to those found on the 'SCSI Device Screen'. See "FCX249, SCSI Device Screen – SCSI" on page 727 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX251, QDIO Activity Screen – QDIO

Performance Toolkit Subcommand: "QDIO" on page 255.

The QDIO Activity Screen (FCX251):

```
FCX251      Data for yyyy/mm/dd  Interval HH:MM:SS - HH:MM:SS    Monitor Scan

_____ .             .      .    .     .     .     .     .     .     .     .     .     .     .     .     .
                                  <----- SIGA Instructions/sec ------>  <---- Data Transfer/sec ---->  <- Intrpts/sec -->
Device <-Attached-->  QDIO  <Queues>  <-- By Guest --->  <---- By CP ---->  <-- Written -> <-- Read ---->       Input   Dis-
Number Userid   Vdev  Fmt    In  Out  Gst-r Gst-w Gst-s   CP-r  CP-w  CP-s  WBuffer WBytes RBuffer RBytes  Total  Reqd carded
>> All QDIO <<  ----  ----  ---  ---   .000  .000  .000   .000  .269  .000     .333    255    .238     39   .269  .269   .000
4113   DTCVSW2  4113  QDIO    1    1   .000  .000  .000   .000  .000  .000     .000      0    .000      0   .000  .000   .000
503D   DTCENS1  503D  INMN    1    1   .000  .000  .000   .000  .283  .000     .350    268    .250     41   .250  .250   .000
F020   DTCVSW2  F020  HBRDG   2    2   .000  .000  .000   .000  .000  .000     .000      0    .000      0   .019  .019   .000
F620   DTCVSW2  F620  HBRDG   2    2   .000  .000  .000   .000  .000  .000     .000      0    .000      0   .024  .024   .000
F623   DTCVSW2  F623  HBRDG   2    2   .000  .000  .000   .000  .000  .000     .000      0    .000      0   .000  .000   .000



Select a device for I/O device details or UQDIO for user interrupts
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 144. Layout of QDIO Activity Screen (FCX251)

This display shows QDIO device activity. It is based on I/O domain SAMPLE data.

Note: Because of the limits in the FCP protocol, if the selected QDIO device is an FCP device, the count fields in this screen may not be accurate.

The sample shows a screen with the data lines for different QDIO devices sorted in ascending device number sequence (the initial setting), indicated by the underscore characters above the Device Number header. Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the 'SORT' command with the string shown in the lowest line of the column heading as sort argument or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Field Descriptions:

The following field descriptions apply to both the QDIO and QDIOLOG *devno* displays, with the exception of the `Device Number` field, which will be replaced by the field `Interval End Time` on the QDIOLOG display.

Device Number
The QDIO device number.

Attached Userid
The userid of the virtual machine the QDIO device is dedicated to.

Attached Vdev
The virtual device number assigned to the QDIO device.

QDIO Fmt
The format type of the QDIO device:

Hiper Hipersockets

FCP Fiber channel protocol

QDIO Queued direct I/O (OSD, OSA, OSE)

OSN QDIO - OSA for NCP device

INMN
QDIO - OSM CHPID

IEDN QDIO - OSX CHPID

HBRDG
IQD Hiper-Bridge chpid

HIEDN
IQD Hiper-IEDN chpid

???? Unrecognized format.

Note: OSN, INMN, IEDN are valid only on z/VM Release 6.1.0 with the PTF for VM64780 or higher. HBRDG and HIEDN are valid only on z/VM Release 6.2.0 with PTFs for VM65042 and PM46988 or higher.

Queues In
The number of input queues.

Queues Out
The number of output queues.

SIGA Instructions/sec:

By Guest Gst-r
The number of SIGA-r instructions executed per second by the guest.

By Guest Gst-w
The number of SIGA-w instructions executed per second by the guest.

By Guest Gst-s
The number of SIGA-s instructions executed per second by the guest.

By CP CP-r
The number of SIGA-r instructions executed per second by CP.

By CP CP-w
The number of SIGA-w instructions executed per second by CP.

By CP CP-s
The number of SIGA-s instructions executed per second by CP.

Data Transfer:

Written WBuffer
The number of QDIO buffers written to the adapter per second.

Written WBytes
The number of bytes written to the adapter per second.

Read RBuffer
The number of QDIO buffers read from the adapter per second.

Read RBytes
The number of bytes read from the adapter per second.

Int/sec:

Total Total number of interrupts (including PCI and AI) per second for the device.

Input Reqd
The number of interrupts (including PCI and AI) per second that required a response and caused an input operation.

Discarded
The number of interrupts (including PCI and AI) per second that were discarded because they did not require a response.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Averages will be shown as requested for all activity fields. Current data will be inserted for owner, vdev, format and number of queues.

FCX252, QDIO Activity Log – QDIOLOG

Performance Toolkit Subcommand: "QDIOLOG" on page 256.

The QDIO Activity Log (FCX252) shows a 'by time' log of the selected device's activity. Note that the QDIO device selected must have been previously selected for benchmarking.

```
FCX252      CPU nnnn  SER nnnnn  Interval hh:mm:ss - hh:mm:ss    Perf. Monitor

QDIO Activity Log for Device 2308

                                          <----- SIGA Instructions/sec ------>
Interval <-Attached-->  QDIO  <Queues>  <-- By Guest --->  <---- By CP ---->
End Time Userid   Vdev  Fmt    In  Out  Gst-r Gst-w Gst-s   CP-r  CP-w  CP-s
>>Mean>> LANTZY   2308  QDIO    1    1   .181  .038 2.030   .000  .038  .000
12:24:34 LANTZY   2308  QDIO    1    1   .033  .033 1.433   .000  .033  .000
12:25:34 LANTZY   2308  QDIO    1    1   .017  .000 1.217   .000  .000  .000
12:26:34 LANTZY   2308  QDIO    1    1   .333  .067 2.817   .000  .067  .000
12:27:34 LANTZY   2308  QDIO    1    1   .500  .400 4.683   .000  .400  .000
12:28:34 LANTZY   2308  QDIO    1    1   .317  .050 2.683   .000  .050  .000
12:29:34 LANTZY   2308  QDIO    1    1   .017  .000 1.217   .000  .000  .000
12:30:34 LANTZY   2308  QDIO    1    1   .067  .017 1.483   .000  .017  .000
12:31:34 LANTZY   2308  QDIO    1    1   .000  .000 1.150   .000  .000  .000
12:32:34 LANTZY   2308  QDIO    1    1   .033  .000 1.283   .000  .000  .000
12:33:35 LANTZY   2308  QDIO    1    1   .167  .000 1.800   .000  .000  .000
12:34:34 LANTZY   2308  QDIO    1    1   .200  .000 1.967   .000  .000  .000
12:35:34 LANTZY   2308  QDIO    1    1   .533  .033 3.483   .000  .033  .000
12:36:34 LANTZY   2308  QDIO    1    1   .067  .000 1.417   .000  .000  .000

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 145. Layout of QDIO Activity Log (FCX252)

The information shown is based on I/O domain SAMPLE data.

Note: Because of the limits in the FCP protocol, if the selected QDIO device is an FCP device, the count fields in this screen may not be accurate.

The first entry is reserved for averages since the last RESET command, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Description:

Interval End Time
: The end time of the monitor interval for which the values were calculated.

  In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field which replaces the 'Device Number' field, all data columns are identical to the ones of the 'QDIO Activity' (QDIO) display. Please see "FCX251, QDIO Activity Screen – QDIO" on page 729 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX253, Storage Utilization Log Screen – STORLOG

Performance Toolkit Subcommand: "STORLOG" on page 295.

The Storage Utilization Log Screen (FCX253):

```
FCX253      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <----------------------------- Storage Utilization (Page Frames) ----------------------------->
          <------- DPA ------->  Stor                 <----------- Locked ------------>
Interval  <--Pageable--> Nonpgb  Util    Save   Track  <-LOCK REAL-> <-SXS Alias->  Diag      Re-   Resid
End Time    <2GB    >2GB   <2GB     %   Areas   Cache    <2GB   >2GB  Total   LOCK X'98'   served  Shared
>>Mean>>  493420  77482k  30868   101     127   12936       0      0    134      0   540  3864576    8094
04:39:19  493413  77482k  30875    97     102   15134       0      0    122      0   540  3864576    8043
04:44:19  493413  77482k  30875    98     339   14899       0      0    142      0   540  3864576    8066
04:49:19  493413  77482k  30875    98     136   14892       0      0    141      0   540  3864576    8062
04:54:19  493419  77482k  30869   101     102   13742       0      0    136      0   540  3864576    8056
04:59:19  493420  77482k  30868   101     166   13718       0      0    136      0   540  3864576    8055
05:04:19  493421  77482k  30867   100     111   13718       0      0    137      0   540  3864576    8057
05:09:19  493421  77482k  30867   101     103   13057       0      0    135      0   540  3864576    7928
05:14:19  493420  77482k  30868   101     109   14098       0      0    138      0   540  3864576    8883
05:19:19  493420  77482k  30868   102     186   12973       0      0    135      0   540  3864576    7928
05:24:19  493422  77482k  30866   101     102   12927       0      0    140      0   540  3864576    7933

See AVAILLOG, DEMNDLOG and PAGELOG for more storage related information

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 146. Layout of Storage Utilization Log Screen (FCX253)

The information shown is based on CP monitor SYSTEM and STORAGE domain SAMPLE data.

The display shows general storage utilization data by time. The leftmost column contains the end time (format hh:mm:ss) of the monitor interval for which the values were calculated.

The first entry is reserved for the overall report period averages. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the >>Mean>> entry you can find the relevant interval in the header line.

DPA: (Shows page frame counts in the dynamic paging area)

Pageable <2GB
The number of pageable DPA frames below the 2GB line.

Pageable >2GB
The number of pageable DPA frames above the 2GB line.

Nonpgb <2GB
The number of DPA frames below the 2GB line that have been made non-pageable. This includes pages locked for I/O, CP LOCK command, virtual system lock functions, etc.

Stor Util %
The percentage of pageable DPA used by the working sets of in-queue (i.e. non dormant) users.

Save Areas
The number of page frames in use for save areas.

Track Cache
The number of real storage page frames used by the full track cache. (See "MDCSTOR" on page 232 log for a <2GB and >2GB page count split.)

Locked:

LOCK REAL <2GB
The number of pages locked below the 2GB line by the CP LOCK REAL command.

LOCK REAL >2GB
The number of pages locked above the 2GB line by the CP LOCK REAL command.

SXS Alias Total
The total number of System Execution Space alias pages locked in logical.

SXS Alias LOCK
The number of System Execution Space alias pages locked in logical via the CP LOCK command. This is a subset of the 'SXS Alias Total' pages.

Diag X'98'
The number of pages locked by Diagnose X'98'.

Reserved
The number of reserved pages.

Resid Shared
The number of resident shared pages.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX254, Available List Log Screen – AVAILLOG

Performance Toolkit Subcommand: "AVAILLOG" on page 136.

The Available List Log Screen (FCX254):

```
FCX254      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <---------------------------------------------- Available List Managem
          <---- Thresholds ----->  <---------- Page Frames ---------->  <-Times
Interval  <---Low---> <--High--->  <Available> <Obtains/s> <Returns/s>  <-Empty
End Time   <2GB  >2GB  <2GB  >2GB   <2GB  >2GB  <2GB  >2GB  <2GB  >2GB  <2GB >2
>>Mean>>    276  ....   554  ....   4694  .... 185.0   ... 170.2   ...   911  .
08:30:20    372  ....   652  ....   9022  .... 428.4   ...  90.8   ...     0  .
08:35:20    372  ....   652  ....   9685  ....  46.4   ...  14.0   ...     0  .
08:40:20    372  ....   652  ....   9490  .... 292.9   ...  37.4   ...     0  .
08:45:20    372  ....   652  ....   9129  ....  85.7   ...  14.6   ...     0  .
08:50:20    354  ....   634  ....   3855  .... 120.5   ...  36.3   ...     0  .
08:55:20    286  ....   566  ....   2928  ....  81.1   ...  30.9   ...     0  .
09:00:20    286  ....   566  ....   3057  ....  26.3   ...  15.5   ...     0  .
09:05:20    286  ....   566  ....   3327  .... 204.2   ...  37.8   ...     0  .
09:10:20    286  ....   566  ....   3111  .... 239.8   ...  32.4   ...     0  .
09:15:20    340  ....   620  ....   1406  .... 408.1   ...  79.1   ...     4  .
09:20:20    308  ....   588  ....   2836  .... 362.8   ... 172.7   ...     0  .
09:25:20    387  ....   667  ....   7478  .... 294.6   ... 136.1   ...    27  .
09:30:20    358  ....   638  ....  10068  ....  1530   ... 429.5   ...    41  .
09:35:20    514  ....   794  ....    757  ....  1627   ...  1014   ...   248  .
09:40:20    540  ....   820  ....   1119  ....  1175   ... 721.6   ...   570  .
See DEMNDLOG, PAGELOG and STORLOG for more storage related information
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 147. Layout of Available List Log Screen (FCX254)

This display applies only to monitor data from V6.2 and earlier releases.

The information shown is based on CP monitor SYSTEM and STORAGE domain SAMPLE data.

The display shows available list status and activity by time. The leftmost column contains the end time (format hh:mm:ss) of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen – use the LEFT/RIGHT commands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall report period averages. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the >>Mean>> entry you can find the relevant interval in the header line.

Thresholds: Lists the minimum frame counts below which a replenishment scan should be started (low), or above which no further scan is necessary (high).

Low <2GB
The low threshold for frames below 2GB.

Low >2GB
The low threshold for frames above 2GB.

High <2GB
The high threshold for frames below 2GB.

High >2GB
The high threshold for frames above 2GB.

Page Frames: Shows the number of frames available, and the rate at which they are obtained and returned.

Available <2GB
The number of frames available on the below 2GB available list.

Available >2GB
The number of frames available on the above 2GB available list.

Obtains/s <2GB
The rate per second at which frames were obtained from the below 2GB available list.

Obtains/s >2GB
The rate per second at which frames were obtained from the above 2GB available list.

Returns/s <2GB
The rate per second at which frames were returned to the below 2GB available list.

Returns/s >2GB
The rate per second at which frames were returned to the above 2GB available list.

Times Empty <2GB
The number of times the below 2GB available list became empty during the interval.

Times Empty >2GB
The number of times the above 2GB available list became empty during the interval.

Replenishment: Shows the system's activity for replenishing the available list when the available frame count fell below the low threshold. So as not to impact active users more than absolutely necessary, the demand scan will try to obtain page frames from dormant users first.

All values are totals for the periods displayed, i.e. for the overall reporting period in the case of the `>>Mean>>` line, or for the last monitor sample interval, or the 'by time' period, in the case of the detail lines.

All of the following field show totals for scans ended after, and pages obtained from, the different user lists. See "FCX259, Demand Scan Log Screen – DEMNDLOG" on page 744 for more details on demand scan operation.

Scan1 Compl
The number of times the replenishment scan stopped after scan 1 because it could obtain a sufficient number of page frames.

Scan1 Pages
The number of page frames obtained during scan 1.

Scan2 Compl
The number of times the replenishment scan stopped after scan 2 because it could obtain a sufficient number of page frames.

Scan2 Pages
The number of page frames obtained during scan 2.

Em-Scan Compl
The number of times the replenishment scan stopped after the emergency scan because it could obtain a sufficient number of page frames.

Em-Scan Pages
The number of page frames obtained during the emergency scan.

Scan Fail
The number of times the replenishment scan failed, i.e. it could not obtain a sufficient number of frames even after the emergency scan.

Perct Emerg Scan
The percentage of scans that did not end after the first pass. This is a measure of how difficult it is for the system to keep a sufficient number of page frames on the available list: low numbers are good, high numbers indicate insufficient storage.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX255, QEBSM Activity Screen – QEBSM

Performance Toolkit Subcommand: "QEBSM" on page 257.

The QEBSM Activity Screen (FCX255):

```
FCX255      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
______        .      .      .      .      .       .       .       .      .
        <-------------- Executed/s by z/VM --------------->  <-QIOBK/QSD-->  <P
Device  <-- SQBS ---> <-- EQBS ---> <---- SIGA Instr ----->  <Lock Fails/s>  <-
Number  SCompl SPartl ECompl EPartl SIGA-wt SIGA-rt SIGA-lt  General Output
>>All<<   .817   .000  1.117   .000    .217    .000    .000     .000   .000   .
800A      .733   .000  1.167   .000    .100    .000    .000     .000   .000   .
CE02      .900   .000  1.067   .000    .333    .000    .000     .000   .000   .









Select a device for I/O device details or UQDIO for user interrupts
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 148. Layout of QEBSM Activity Screen (FCX255)

This display shows QEBSM device specific activity. It is based on I/O domain SAMPLE data. See also "FCX251, QDIO Activity Screen – QDIO" on page 729 for general QDIO device related information, and "FCX257, User QDIO Activity Screen – UQDIO" on page 741 for QDIO guest interrupt handling.

The sample shows a screen with the data lines for different QEBSM devices sorted in ascending device number sequence (the initial setting), indicated by the underscore characters above the 'Device Number' header. Other possible sort sequences are indicated by dots above the corresponding columns – they can be set using the 'SORT' command with the column heading as sort argument (see "SORT" on page 287), or by placing the cursor on the header for the field which is to be sorted and then pressing the ENTER key.

The first line contains the prefix `>>All<<` instead of a device number. It provides the average load figures for all QEBSM devices.

Use the scrolling PF-keys or commands to view data not visible on the initial screen, or use the locate command if you want to search for a specific device.

Field Descriptions:

The following field descriptions apply to both the QEBSM and 'QEBSMLOG devno' displays, with the exception of the 'Device Number' field which will be replaced by the field 'Interval End Time' on the QEBSMLOG display.

Device Number
The QEBSM device number.

Executed/s by z/VM:

SQBS SCompl
The number of SQBS instructions per second that could not be executed by microcode, and that had to be completely processed by CP.

SQBS SPartl
The number of SQBS instructions per second that could not be completely executed by microcode, and that had to be partially processed by CP.

EQBS ECompl
The number of EQBS instructions per second that could not be executed by microcode, and that had to be completely processed by CP.

EQBS EPartl
The number of EQBS instructions per second that could not be completely executed by microcode, and that had to be partially processed by CP.

SIGA-wt
The number of SIGA-wt instructions executed per second by CP.

SIGA-rt
The number of SIGA-rt instructions executed per second by CP.

SIGA-lt
The number of SIGA-lt instructions executed per second by CP.

QIOBD/QSD Lock Fails/s:

General
The number of unsuccessful attempts per second to obtain a general QIOBD/QSD lock for serializing input or output.

Output
The number of unsuccessful attempts per second to obtain a QIOBD/QSD output lock. This lock is used for serializing a format 1 FCP device used for SCSI communications, but not for OSA express or Hipersocket devices.

Pin Probl Rate/s:

Pin The number of 'pin' requests per second that could not be handled by the microcode, and that had to be processed by CP.

UnPin The number of 'unpin' requests per second that could not be handled by the microcode, and that had to be processed by CP.

FOBLK:

Resrce Exh/s
The number of times per second FOBLK resources were exhausted.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all activity fields.

FCX256, QEBSM Activity Log – QEBSMLOG

Performance Toolkit Subcommand: "QEBSMLOG" on page 258.

The QEBSM Activity Log (FCX256) shows a 'by time' log of the selected device's QEBSM specific activity. Note that the QEBSM device selected must have been previously selected for benchmarking.

```
FCX256      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
          <-------------- Executed/s by z/VM ---------------->  <-QIOBK/QSD-->
Interval  <-- SQBS ---> <-- EQBS ---> <---- SIGA Instr ----->  <Lock Fails/s>
End Time  SCompl SPartl ECompl EPartl SIGA-wt SIGA-rt SIGA-lt  General Output
>>Mean>>   1.189   .000  1.867   .000    .119    .000    .000     .000   .000
13:37:03   2.367   .000  3.500   .000    .100    .000    .000     .000   .000
13:37:33   1.200   .000  1.900   .000    .133    .000    .000     .000   .000
13:38:03    .733   .000  1.167   .000    .100    .000    .000     .000   .000
13:38:33    .500   .000   .900   .000    .133    .000    .000     .000   .000
13:39:03   2.733   .000  3.933   .000    .033    .000    .000     .000   .000
13:39:33   1.267   .000  2.000   .000    .133    .000    .000     .000   .000
13:40:03    .533   .000   .967   .000    .133    .000    .000     .000   .000
13:40:33    .733   .000  1.333   .000    .167    .000    .000     .000   .000
13:41:03    .633   .000  1.100   .000    .133    .000    .000     .000   .000



Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 149. Layout of QEBSM Activity Log (FCX256)

The information shown is based on I/O domain SAMPLE data.

The first entry is reserved for overall report averages since the last RESET command, or since data collection was activated. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
: The end time of the monitor interval for which the values were calculated. In the case of the>>Mean>> entry, you can find the relevant interval in the header line.

Except for the 'Interval End Time' field, which replaces the 'Device Number' field, all other data columns are identical to those in the 'QEBSM Activity' display. See "FCX255, QEBSM Activity Screen – QEBSM" on page 738 for their description.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX257, User QDIO Activity Screen – UQDIO

Performance Toolkit Subcommand: "UQDIO" on page 333.

The User QDIO Activity Screen (FCX257) contains detailed information on each user's QDIO related interrupt and instruction intercept activity during the last measuring interval (for current data), or for the current INTERIM or REPORT period (when INTERIM or AVERAGE data has been selected). The information shown is based on CP monitor USER domain SAMPLE data, but the screen only shows users that had some QDIO related activity since logging on – users with any QDIO related activity during the selected interval are shown highlighted on the screen.

```
FCX257      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
______         .         .         .        .         .         .
          <Guest Instruct>       Alert  <- Adapter Interruptions/s ->
          <-Intercepts/s->  Interrupts  <Delivered to Guest>  Stacked  Nr of
Userid      TVS        SVS        /sec  ViaTPI         InSIE     ByCP  Users
>System<     .0        6.7          .0      .0            .0     44.3     18
User Class Data:
TCP/IP       .0         .0          .5      .0            .5       .0      1
User Data:
LXM00001     .0         .0          .0      .0            .0    232.2
LX00014      .0         .0          .0      .0            .0      3.9
LX00015      .0         .0          .0      .0            .0      3.4
LX00016      .0       20.2          .0      .0            .0     20.2
LX00017      .0       20.2          .0      .0            .0     20.2
LX00018      .0       19.8          .0      .0            .0     19.8
LX00019      .0       19.9          .0      .0            .0     19.9
LX00020      .0       20.2          .0      .0            .0     20.2
LX00021      .0       20.3          .0      .0            .0     20.3
LX00022      .0         .0          .0      .0            .0       .0
LX00023      .0         .0          .0      .0            .0       .0
Select a user for user details
Command ===> _
 F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 150. Layout of User QDIO Activity Screen (FCX257)

The sample shows a screen with the user IDs sorted in ascending sequence, the default (indicated by the underscore characters '____' above the 'Userid' header). Other possible sort sequences are indicated by dots above the corresponding columns – they can be set using the 'SORT' command with the column heading as sort argument (see "SORT" on page 287), or by placing the cursor on the header for the field which is to be sorted and then pressing the ENTER key.

The first entry is reserved for the overall system average for all users, regardless of the current sorting sequence. It is identified by the `>System<` user ID.

Some additional lines with user class averages will be shown at the top when user classes have been defined (see "FCONTROL UCLASS" on page nnn). The user ID shown will then be the user class name.

Use the scrolling PF-keys or commands to view data not visible on the initial screen, or use the locate command if you want to search for a specific user.

For more detailed information on one specific user, either place the cursor on the Userid field of the virtual machine you are interested in and press ENTER, or enter the command 'USER userid' on the command line

Field Descriptions:

The following field descriptions apply to both the 'UQDIO' and 'UQDIOLOG userid' displays, with the exception of the 'Userid' field which will be replaced by the field 'Interval End Time' on the UQDIOLOG display.

Userid
User identification

Guest Instruct Intercepts/s:

TVS Guest TVS instructions intercepted per second.

SVS Guest SVS instructions intercepted per second.

Alert Interrupts/sec
The number of alert interruptions handled per second by the guest.

Adapter Interruptions/s:

Delivered to Guest ViaTPI
The number of adapter interruptions delivered to the guest per second via TPI.

Delivered to Guest InSIE
The number of adapter interruptions delivered to the guest per second inside SIE.

Stacked by CP
The number of adapter interruptions that were stacked for the guest per second by CP.

Nr of users
The number of users which contributed to the average shown on this line (values are inserted only for lines with averages – the field remains empty for normal user data lines).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all fields. All of a user's sessions during the selected period contribute to the averages shown.

FCX258, User QDIO Activity Log – UQDIOLOG

Performance Toolkit Subcommand: "UQDIOLOG" on page 334.

The User QDIO Activity Log (FCX258) shows a 'by time' log of the selected user's QDIO interrupt and instruction intercept activity. Note that the specified userid must have been previously selected for benchmarking.

```
FCX258      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

QDIO Activity Log for User LNXP2C

           <Guest Instruct>       Alert  <- Adapter Interruptions/s ->
Interval  <-Intercepts/s->  Interrupts  <Delivered to Guest>  Stacked
Userid       TVS        SVS        /sec  ViaTPI         InSIE     ByCP
>>Mean>>      .0         .0        1734      .0          2037       .1
13:13:02      .0         .0        1725      .0          2029       .2
13:14:02      .0         .0        1734      .0          2037       .1
13:15:02      .0         .0        1736      .0          2037       .1
13:16:02      .0         .0        1736      .0          2043       .1
13:17:02      .0         .0        1733      .0          2035       .1
13:18:02      .0         .0        1737      .0          2044       .1









Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 151. Layout of User QDIO Activity Log (FCX258)

The information shown is based on USER domain SAMPLE data.

The first entry is reserved for overall report period averages. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Descriptions:

Except for the 'Interval End Time' field which replaces the 'Userid' field, all data columns are identical to those for the 'User QDIO Activity' (UQDIO) display. Please see "FCX257, User QDIO Activity Screen – UQDIO" on page 741 for their description.

Interval End Time
The end time of the monitor interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX259, Demand Scan Log Screen – DEMNDLOG

Performance Toolkit Subcommand: "DEMNDLOG" on page 167.

The Demand Scan Log Screen (FCX259):

```
FCX259      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <--------- Demand Scan Pass 1 ----------> <------- Demand Scan Pass 2
          <-- Ended After --> <--- Page Frames ---> <-Ended After-> <--- Page F
Interval  Lng Drm NSS Eli Dsp Long Dor- NSS Eli Dsp Lng Drm Eli Dsp Long Dor- N
End Time  Drm ant Shr Lst Lst Dorm mant Shr Lst Lst Drm ant Lst Lst Dorm mant S
>>Mean>>    0   0   0   0  23    0 1747   0   0 51k   0   3   0   0    0 5608
07:54:48    0   1   0   0  57    0 1811   0   0 59k   0   3   0   0    0 7561
07:56:18    0   1   0   0  40    0 2851   0   0 68k   0   3   0   0    0 4119
07:57:48    0   0   0   0  19    0  658   0   0 59k   0   2   0   0    0 3738
07:59:18    0   0   0   0  12    1 2677   0   0 44k   0   3   0   0    0 6237
08:00:48    0   1   0   0  20    1 2133   0   0 50k   0   4   0   0    0 7249
08:02:18    0   0   0   0   9    3 2277   0   0 49k   0   4   0   0    0 6113
08:03:48    0   0   0   0  12    0  683   0   0 38k   0   3   0   0    0 5427
08:04:48    0   0   0   0  10    0  461   0   0 36k   0   4   0   0    0 3829
See AVAILLOG, PAGELOG and STORLOG for more storage related information
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 152. Layout of Demand Scan Log Screen (FCX259)

This display applies only to monitor data from V6.2 and earlier releases.

The information shown is based on CP monitor STORAGE domain SAMPLE data.

The display shows detailed demand scan information by time. The leftmost column contains the end time (format hh:mm:ss) of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen – use the LEFT/RIGHT commands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall report period averages. It is designated by the string `>>Mean>>` in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

Demand Scan Pass 1: Provides demand scan details for the initial pass 1.

Ended After
: The number of times pass 1 of the demand scan ended after scanning a certain list of users or system pages:

  Lng Drm
  : Users on the long term dormant list

  Drm ant
  : Users on the dormant list

  NSS Shr
  : System VMDBK, NSSs, DCSSs, shared address space

Eli Lst Users on the eligible list

Dsp Lst
Users on the dispatch list

Page Frames
The number of page frames obtained during pass 1 of the demand scan:

Long Dorm
From users on the long term dormant list

Dormant
From users on the dormant list

NSS Shr
From System VMDBK, NSSs, DCSSs, shared spaces

Eli Lst From users on the eligible list

Dsp Lst
From users on the dispatch list

Demand Scan Pass 2: Provides demand scan details for the second pass. A second pass may become necessary if sufficient page frames could not be obtained during the first pass.

Ended After
The number of times pass 2 of the demand scan ended after scanning a certain list of users:

Lng Drm
Users on the long term dormant list

Drm ant
Users on the dormant list

Eli Lst Users on the eligible list

Dsp Lst
Users on the dispatch list

Page Frames
The number of page frames obtained during pass 2 of the demand scan:

Long Dorm
From users on the long term dormant list

Dormant
From users on the dormant list

NSS Shr
From System VMDBK, NSSs, DCSSs, shared spaces

Eli Lst From users on the eligible list

Dsp Lst
From users on the dispatch list

Emergency Scan: Provides details for the emergency scan. An emergency scan may become necessary if sufficient page frames could not be obtained during pass 1 and pass 2.

Ended After
The number of times the emergency scan ended after scanning a certain list of users or system pages:

Drm ant
Users on the dormant list

NSS Shr
System VMDBK, NSSs, DCSSs, shared address space

Eli Lst Users on the eligible list

Dsp Lst
Users on the dispatch list

Page Frames
The number of page frames obtained during the emergency scan:

Dormant
From users on the dormant list

NSS Shr
From System VMDBK, NSSs, DCSSs, shared spaces

Eli Lst From users on the eligible list

Dsp Lst
From users on the dispatch list

Scan Failed
The number of times the replenishment function failed obtaining a sufficient number of page frames even after the emergency scan.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX260, Storage Management Logs Menu – STORMENU

Performance Toolkit Subcommand: "STORMENU" on page 296.The Storage Management Logs Menu (FCX260) shows a list of all available 'by time' logs that are related to storage management.

```
FCX260      CPU nnnn  SER nnnnn         Storage Logs            Perf. Monitor
  General Storage/Paging
S Log Name    Description
_ AVLB2GLG    Below 2G Available list management log
_ AVLA2GLG    Above 2G Available list management log
_ STEALLOG    Frame steal details log
_ AGELLOG     Age List details log
_ AVAILLOG    Available list management log
_ DEMNDLOG    Demand scan details log
_ PAGELOG     Paging activity log
_ STORLOG     Storage utilization log

  System Execution Space
S Log Name    Description
_ SXSAVAIL    SXS page queues management log
_ SXSDEFER    SXS deferred tasks management log
_ SXSPAGE     SXS page management log
_ SXSUTIL     SXS storage utilization log




Select performance screen with cursor and press ENTER
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 153. Layout of Storage Management Logs Menu (FCX260)

All of the selectable logs are based on CP monitor SYSTEM and STORAGE domain SAMPLE data.

Field Descriptions:

S
Cursor selection field. The field will be highlighted and made cursor-selectable (set as 'unprotected') only if the corresponding storage mgmt. log is available.

Log Name
The log file name, equal to the command with which the log data can be selected for display. The field will be highlighted if the corresponding storage management log is available.

Description
Description of the storage management log.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX261, SXS Available Page Queues Management Log Screen – SXSAVAIL

Performance Toolkit Subcommand: "SXSAVAIL" on page 297.The SXS Available Page Queues Management Log Screen:

```
FCX261      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <-- Backed <2GB Page Queue -->  <-- Backed >2GB Page Queue -->  <----
Interval  Avail <-Pages/s--> <Preferred>  Avail <-Pages/s--> <Preferred>  Avail
End Time  Pages Taken Return  Used Empty  Pages Taken Return  Used Empty  Pages
>>Mean>>     31  .275   .306  .231  .000      0  .000   .000  .000  .000 251570
15:12:01     32  .233   .600  .200  .000      0  .000   .000  .000  .000 251546
15:12:31     32  .300   .300  .267  .000      0  .000   .000  .000  .000 251553
15:13:01     32  .233   .233  .200  .000      0  .000   .000  .000  .000 251564
15:13:31     32  .333   .333  .233  .000      0  .000   .000  .000  .000 251564
15:14:01     32  .267   .267  .233  .000      0  .000   .000  .000  .000 251571
15:14:31     32  .267   .267  .233  .000      0  .000   .000  .000  .000 251571
15:15:01     32  .267   .267  .233  .000      0  .000   .000  .000  .000 251576
15:15:31     32  .300   .300  .233  .000      0  .000   .000  .000  .000 251576
15:16:01     32  .267   .267  .233  .000      0  .000   .000  .000  .000 251582
15:16:31     32  .267   .267  .233  .000      0  .000   .000  .000  .000 251588
15:17:01     32  .267   .267  .233  .000      0  .000   .000  .000  .000 251591
15:17:31     32  .300   .300  .233  .000      0  .000   .000  .000  .000 251591



Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 154. Layout of SXS Available Page Queues Management Log Screen (FCX261)

The information shown is based on CP monitor SYSTEM and STORAGE domain SAMPLE data.

The display shows SXS available page queues management information by time. The leftmost column contains the end time (format hh:mm:ss) of the monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen – use the LEFT/RIGHT commands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall report period averages. It is designated by the string `>>Mean>>` in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

Backed <2GB Page Queue: Information on the backed below 2GB System Execution Space available page queue.

Avail Pages
: The number of pages available on the backed below 2GB SXS page queue.

Pages/s Taken
: The number of pages taken per second from the backed below 2GB SXS page queue.

Pages/s Return
The number of pages returned per second to the backed below 2GB SXS page queue.

Preferred Used
The number of times per second the backed below 2GB SXS page queue was the preferred queue, and was used to satisfy the request.

Preferred Empty
The number of times per second the backed below 2GB SXS page queue was the preferred queue for the request, but was empty.

Backed >2GB Page Queue: Information on the backed above 2GB System Execution Space available page queue.

Avail Pages
The number of pages available on the backed above 2GB SXS page queue.

Pages/s Taken
The number of pages taken per second from the backed above 2GB SXS page queue.

Pages/s Return
The number of pages returned per second to the backed above 2GB SXS page queue.

Preferred Used
The number of times per second the backed above 2GB SXS page queue was the preferred queue, and was used to satisfy the request.

Preferred Empty
The number of times per second the backed above 2GB SXS page queue was the preferred queue for the request, but was empty.

Unbacked Page Queue: Information on the unbacked System Execution Space page queue.

Avail Pages
The number of pages available on the unbacked SXS page queue.

Pages/s Taken
The number of pages taken per second from the unbacked SXS page queue.

Pages/s Return
The number of pages returned per second to the unbacked SXS page queue.

Preferred Used
The number of times per second the unbacked SXS page queue was the preferred queue, and was used to satisfy the request.

Preferred Empty
The number of times per second the unbacked SXS page queue was the preferred queue for the request, but was empty.

Replenishment: Provides information on replenishment management of the SXS unbacked page queue.

Thres The threshold that triggers replenishment of the available unbacked SXS page queue.

Att/s The number of attempts made per second to replenish the available unbacked SXS page queue.

Stolen The number of aliases that are stolen during a single replenishment of the available unbacked SXS page queue.

MinPgs
The smallest number of pages on the available, unbacked SXS page queue at the completion of replenishment.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX262, SXS Page Management Log Screen – SXSPAGE

Performance Toolkit Subcommand: "SXSPAGE" on page 299.

The SXS Page Management Log Screen (FCX262):

```
FCX262      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <---- Page Requests/s ---->  <------------ Page Returns/s -----------
Interval   Free Non-FS <-Contiguous->   Free Non-FS <Contiguous-> <Queues of Pg
End Time   Stor Single Requests Pages   Stor Single Returns Pages Returns   Pag
>>Mean>>   .000   .233     .033  .233   .156   .389    .033  .233    .019    .0
15:12:01   .000   .233     .033  .233   .800  1.033    .033  .233    .233    .2
15:12:31   .000   .233     .033  .233   .000   .233    .033  .233    .000    .0
15:13:01   .000   .233     .033  .233   .367   .600    .033  .233    .000    .0
15:13:31   .000   .233     .033  .233   .000   .233    .033  .233    .000    .0
15:14:01   .000   .233     .033  .233   .233   .467    .033  .233    .000    .0
15:14:31   .000   .233     .033  .233   .000   .233    .033  .233    .000    .0
15:15:01   .000   .233     .033  .233   .167   .400    .033  .233    .000    .0
15:15:31   .000   .233     .033  .233   .000   .233    .033  .233    .000    .0
15:16:01   .000   .233     .033  .233   .200   .433    .033  .233    .000    .0
15:16:31   .000   .233     .033  .233   .000   .233    .033  .233    .000    .0
15:17:01   .000   .233     .033  .233   .100   .333    .033  .233    .000    .0
15:17:31   .000   .233     .033  .233   .000   .233    .033  .233    .000    .0


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 155. Layout of SXS Page Management Log Screen (FCX262)

The information shown is based on CP monitor SYSTEM and STORAGE domain SAMPLE data.

The display shows SXS page management information by time. The leftmost column contains the end time (format hh:mm:ss) of the last monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT commands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall report period averages. It is designated by the string `>>Mean>>` in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
: The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

Page Requests/s:

Free Stor
: The number of free storage pages requested per second.

Non-FS Single
: The number of non-free storage single (non-contiguous) SXS pages requested per second.

Contiguous Requests
: The number of SXS page requests per second for two or more contiguous pages.

Contiguous Pages
The number of contiguous SXS pages obtained per second for contiguous page requests.

Page Returns/s:

Free Stor
The number of free storage pages returned per second.

Non-FS Single
The number of non-free storage single (non-contiguous) SXS pages returned per second.

Contiguous Returns
The number of SXS page returns per second for two or more contiguous pages.

Contiguous Pages
The number of contiguous SXS pages returned per second for contiguous page returns.

Queues of Pgs Returns
The number of returns per second of queues of SXS pages.

Queues of Pgs Pages
The number of SXS pages returned per second via queues.

Aliases Requests/sec:

Create The number of 'create alias' requests per second.

Remove
The number of 'remove alias' requests per second.

Queue
The number of 'queue SXSTE' requests per second, to requeue aliases dequeued by the SXS page manager when locked during a search for aliases to steal.

PTE Invalidation Rates/sec:

Steal The number of aliases stolen per second by the SXS page manager.

CSP The number of CSP instructions used per second instead of IPTE when invalidating multiple page table entries.

IPTE The number of IPTE instructions executed per second to invalidate an SXS page table entry.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX263, SXS Deferred Tasks Management Log Screen – SXSDEFER

Performance Toolkit Subcommand: "SXSDEFER" on page 298.

The SXS Deferred Tasks Management Log Screen (FCX263):

```
FCX263      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <-Req. Deferred/s->  <--Non-Deferrable--->  <--Deferred-->  <---- Def
Interval   On a  <On a Frame>  <-Requests Failed/s->  <Create Alias>        <Wi
End Time   Page     Any   <2GB  Alias  NoPage NoFrame  Average Rate/s  Total   A
>>Mean>>   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:12:01   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:12:31   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:13:01   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:13:31   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:14:01   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:14:31   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:15:01   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:15:31   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:16:01   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:16:31   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:17:01   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0
15:17:31   .000   .000   .000   .000    .000    .000     .000   .000   .000  .0



Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 156. Layout of SXS Deferred Tasks Management Log Screen (FCX263)

The information shown is based on CP monitor SYSTEM and STORAGE domain SAMPLE data.

The display shows SXS deferred tasks management information by time. The leftmost column contains the end time (format hh:mm:ss) of the last monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen – use the LEFT/RIGHT commands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall report period averages. It is designated by the string >>Mean>> in the 'Interval End Time' column.\

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Req. Deferred/s:

On a Page
The number of times per second an SXS page request deferred on a page.

On a Frame, Any
The number of times per second an SXS page request deferred on any frame.

On a Frame <2GB
The number of times per second an SXS page request deferred on a frame below 2GB.

Non-Deferrable Requests Failed/s:

Alias The number of times per second a non-deferrable SXS alias request could not be fulfilled.

NoPage
The number of times per second a non-deferrable SXS page request failed due to the lack of a page.

NoFrame
The number of times per second a non-deferrable SXS page request failed due to the lack of a frame.

Deferred Create Alias:

Average
The average number of SXS 'create alias' requests deferred at the end of each sample interval during the corresponding period.

Rate/s The number of times per second a 'create alias' request was deferred.

Deferred Page Requests:

Total The average total number of SXS page requests that were deferred at the end of each sample interval during the corresponding period.

With Backing Any
The average number of SXS page requests with backing=any that were deferred at the end of each sample interval during the corresponding period.

With Backing <2GB
The average number of SXS page requests with backing below 2GB that were deferred at the end of each sample interval during the corresponding period.

For Frame, Any
The average number of SXS page requests that were deferred for any frame at the end of each sample interval during the corresponding period.

For Frame <2GB
The average number of SXS page requests that were deferred for a frame below 2GB at the end of each sample interval during the corresponding period.

Redrives/s:

Attempts
The number of attempts made per second to redrive tasks waiting for an available page.

Ind.Task Redrives
The number of individual redrives per second for tasks waiting for an available page.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX264, SXS Storage Utilization Log Screen – SXSUTIL

Performance Toolkit Subcommand: "SXSUTIL" on page 300.

The SXS Storage Utilization Log Screen (FCX264):

```
FCX264      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

           <------------------------ System Execution Space Utilization (Pages
                        <----------------------- Used ----------------------->
                Avail-        <------- CP ------->  <------- Aliases -------->
Interval   Total   able           ID                          <--Locked-->    No-
End Time   Pages Queues  Total Mapped   Free  Other  Total  Total CPLock  Owned
>>Mean>>     882 251600   6456   3244    381   1924    906     16       0      0
15:12:01     718 251578   6478   3244    397   1924    913     16       0      0
15:12:31     382 251585   6471   3244    397   1924    906     15       0      0
15:13:01     718 251596   6460   3244    386   1924    906     15       0      0
15:13:31     382 251596   6460   3244    386   1924    906     15       0      0
15:14:01     718 251603   6453   3244    379   1924    906     15       0      0
15:14:31     382 251603   6453   3244    379   1924    906     15       0      0
15:15:01     718 251608   6448   3244    374   1924    906     15       0      0
15:15:31     882 251608   6448   3244    374   1924    906     15       0      0
15:16:01     718 251614   6442   3244    368   1924    906     15       0      0
15:16:31     382 251620   6436   3244    368   1924    900     15       0      0
15:17:01     718 251623   6433   3244    365   1924    900     15       0      0
15:17:31     882 251623   6433   3244    365   1924    900     15       0      0


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 157. Layout of SXS Storage Utilization Log Screen (FCX264)

The information shown is based on CP monitor SYSTEM and STORAGE domain SAMPLE data.

The display shows SXS storage utilization information by time. The leftmost column contains the end time (format hh:mm:ss) of the last monitor interval for which the values were calculated. Note that only part of the performance variables can be shown on the 80 columns of an ordinary screen: use the LEFT/RIGHT commands, or the corresponding PF-keys, for shifting the display window to the left or to the right for viewing the remaining data columns.

The first entry is reserved for the overall report period averages. It is designated by the string >>Mean>> in the 'Interval End Time' column.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

System Execution Space Utilization (Pages):

Total Pages
The total system execution space size in pages.

Available Queues
The total number of SXS pages on the different available page queues (backed<2GB, backed>2GB and unbacked). See "FCX261, SXS Available Page Queues Management Log Screen – SXSAVAIL" on page 748 for details.

Used:

Total The total number of SXS pages that are in use as CP pages or aliases, including no-owned aliases and SXS pages assigned to tasks deferred on frames in the real storage manager.

CP ID Mapped
The number of ID-mapped CP pages (host logical = host real), primarily CP nucleus and prefix pages.

CP Free
The total number of CP free storage pages, with backing frames both below and above 2GB.

CP Other
Count of other CP type pages (excluding ID-mapped and free storage pages).

Aliases Total
The number of SXS alias pages associated with 'pageable FRMTEs'. They may be stealable if not last translated or locked.

Aliases Locked Total
The number of locked SXS alias pages.

Aliases Locked CPLock
The number of locked SXS alias pages that were locked by CP LOCK command.

Aliases No-Owned
The number of no-owned SXS alias pages.

Pages Backed <2GB
The number of SXS pages backed below 2GB.

Pages Backed >2GB
The number of SXS pages backed above 2GB.

Potential Steal Queue
The number of pages on the SXS potentially stealable queue.

Contiguous Pages
The number of SXS pages in use as part of a contiguous page request for more than one page. This count does not include pages that were pre-allocated as part of initialization.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX265, Spin Lock Log Screen – LOCKLOG

Performance Toolkit Subcommand: "LOCKLOG" on page 217.

The Spin Lock Log Screen (FCX265) shows spin lock information by time.

```
FCX265      CPU 2817  SER 36D85  Interval 00:00:30 - 07:33:30    Perf. Monitor

                    <-------------- Spin Lock Collision Activity --------------->
                    <----- Total ----->  <--- Exclusive --->  <----- Shared ---->
Interval            Colls AvgSpin   Pct  Colls AvgSpin   Pct  Colls AvgSpin   Pct
End Time LockName    /sec    usec  Spin   /sec    usec  Spin   /sec    usec  Spin
>>Mean>> RSAAGINL    85.7   719.9  .617   85.7   719.9  .617     .0    .000  .000
>>Mean>> HCPDSVTL      .0    .000  .000     .0    .000  .000     .0    .000  .000
>>Mean>> SRMATDLK      .6    .602  .000     .6    .602  .000     .0    .000  .000
>>Mean>> RSAAVCLK      .0    .000  .000     .0    .000  .000     .0    .000  .000
>>Mean>> RSA2GCLK      .0    .000  .000     .0    .000  .000     .0    .000  .000
>>Mean>> BUTDLKEY      .0    .000  .000     .0    .000  .000     .0    .000  .000
>>Mean>> HCPTMFLK      .0    .000  .000     .0    .000  .000     .0    .000  .000
>>Mean>> RSA2GLCK     14.4    .405  .000   14.4    .405  .000     .0    .000  .000
>>Mean>> HCPRCCSL      .0    .000  .000     .0    .000  .000     .0    .000  .000
>>Mean>> RSASXQLK      .2    .287  .000     .2    .287  .000     .0    .000  .000
>>Mean>> HCPRCCMA      .0    .000  .000     .0    .000  .000     .0    .000  .000
>>Mean>> RCCSFQL       .0    .418  .000     .0    .418  .000     .0    .000  .000
>>Mean>> RSANOQLK      .0    .000  .000     .0    .000  .000     .0    .000  .000
>>Mean>> NSUNLSLK      .0    .000  .000     .0    .000  .000     .0    .000  .000

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 158. Layout of Spin Lock Log Screen (FCX265)

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Lock Name
The name of the CP spin lock.

Total Colls/sec
The total exclusive and shared spin lock collisions per second.

Total AvgSpin usec
The total average microseconds spent spinning on both exclusive and shared spin lock collisions.

Total Pct Spin
The percentage of total elapsed time spent in both exclusive and shared spin lock collisions.

Exclusive Colls/sec
The total exclusive spin lock collisions per second.

Exclusive AvgSpin usec
The average total microseconds spent spinning on exclusive spin lock collisions.

Exclusive Pct Spin
The percentage of total elapsed time spent in exclusive spin lock collisions.

Shared Colls/sec
The total shared spin lock collisions per second.

Shared AvgSpin usec
The average total microseconds spent spinning on shared spin lock collisions.

Shared Pct Spin
The percentage of total elapsed time spent in shared spin lock collisions.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX266, General Virtual Switch Description Screen – GVSWITCH

Performance Toolkit Subcommand: "GVSWITCH" on page 194.

In the General Virtual Switch Description Screen (FCX266), all of the virtual switches are shown, by name, without any associated performance data. If you select any row in this screen and press ENTER, you will go to the Virtual Switch Activity Screen for that device. (See "FCX240, Virtual Switch Activity Screen – VSWITCH" on page 712.)

```
FCX266      Data for yyyy/mm/dd  Interval HH:MM:SS - HH:MM:SS    Monitor Scan

___ .        .         .                   .                .      .     .         .
                                           < SNMP Network Management >       OSA           <------- Bridge Port ------->
Addr Name     Group     Vswitch Macaddr     IP address         Userid   Layer Port Isol Conf Role State Flag MFSs LPARname
4113 PEGVSW             02-00-00-00-00-B4   ........                       2   00 OFF  USER .... ..... .... .... ........
503D DTCINMN            02-11-11-00-00-01   ........                       2   00 ON   USER .... ..... .... .... ........
F020 PEGVSW             02-00-00-00-00-B4   ........                       2   00 OFF  USER SEC  ACTIV    8 16K  BCT2
F620 PEGMFS             02-00-00-00-00-B5   ........                       2   00 OFF  USER PRIM ACTIV    8 40K  BCT2
F623 PEGMFS2            02-00-00-00-00-B6   ........                       2   00 OFF  USER SEC  STNBY    8 40K  BCT2



See VSWITCH / EVSWITCH for other Virtual Switch reports
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 159. Layout of General Virtual Switch Description Screen (FCX266)

The sample shows a screen with virtual switches sorted in ascending device number sequence (indicated by the underscore characters '___' above the 'Addr' header). Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER. Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Addr The real device number.

Name The name of the Virtual Switch. A Virtual Switch is given a 16-byte identification, or LAN ID, when it is created. The VSWITCH LAN ID consists of two 8-byte character fields: Owner and Name. The Owner is always SYSTEM. This column is the Name component of the LAN ID.

Group
The name of the link aggregation port group in use for this VSWITCH.

Vswitch Macaddr
The LAN management MAC address.

IP address
The LAN Management IP address. This address is used by clients involved in switch management. For example, a Network Management System can request Bridge MIB information from an SNMP agent using this address. If an SNMP agent has not been assigned, the IP address field will contain dots.

Userid
The LAN Management user ID. This is the user ID of the z/VM TCP/IP stack that has assigned an SNMP agent to the virtual switch in its HOME statement. If an SNMP agent has not been assigned, the userid field will contain blanks.

Layer The session layer, 2 or 3.

OSA Port
The OSA port number specified on the RDEV parameter of the DEFINE VSWITCH command.

When running on z/VM systems earlier than V5.4, you will see dashes ("---") in this field.

Isol The isolation level, as specified on the SET VSWITCH or MODIFY VSWITCH command.

When running on z/VM systems earlier than V5.4, you will see dashes ("---") in this field. For z/VM 5.4, the value can be FORW, DROP, or OFF. For z/VM 6.1.0 and later, the value can be ON or OFF.

Conf Configuration: access type for a virtual switch.

USER User based. Specifies that the virtual switch will be on a user ID basis. Authorization and configuration will be for the user. Use SET VSWITCH GRANT and REVOKE commands for authorization. Port numbers for guests will be assigned by CP.

PORT Port based. Specifies that the virtual switch will be port based. All connections will be on a port basis. Each port must be configured with the SET VSWITCH PORTNUMBER command. This configuration will allow a guest to have multiple unique access ports connected to the same VSWITCH instance.

When running on z/VM systems earlier than V6.2, you will see dashes ("---") in this field.

Role Configured bridge port role:

Prim Primary

Sec Secondary

State Current bridge port state:

UNDEF
Undefined

INACT
Inactive

STNBY
Standby

ACTIV
Active

Flag The state of the bridge port connection:

1 VSWITCH defined

2 Controller not available

3 Operator intervention required

| **4** Disconnected
| **5** VDEVs attached to controller
| **6** Initialization in process
| **7** Device not ready
| **8** Device ready
| **9** Devices being detatched
| **10** VSWITCH delete pending
| **11** VSWITCH failover recovering
| **12** Autorestart in progress

| **MFSs** CHPID configured MFS size

| **LPARname**
| When BPBSTATE is Active or Standby, the LPAR name acting as the active
| bridge port connection. This field contains blanks otherwise.

Effect of 'AVERAGE' and 'INTERIM' subcommands: These subcommands have no effect since all data on the display pertains to current information. There is no activity data on the display.

FCX267, Extended Virtual Switch Activity Screen – EVSWITCH

Performance Toolkit Subcommand: "EVSWITCH" on page 177.

The Extended Virtual Switch Activity Screen (FCX267) shows additional data beyond that which is shown on the Virtual Switch Activity Screen. Note that besides issuing the EVSWITCH subcommand, this screen can also be reached by selecting any row in the Virtual Switch Activity Screen and pressing ENTER. (See "FCX240, Virtual Switch Activity Screen – VSWITCH" on page 712.)

```
FCX267      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
____ .           .      .      .      .      .      .      .      .      .
                   <-- Lock and waits /sec -->  <-----  Total Value for Int
                BAL   LOCK    LAN     TX     RX  <-NIC Marker PDU Packets->
Addr Name       Int   Reqs Defers Defers Defers   SENT RSPRCV RSPSNT  TIMEO
>> System  <<   30     .0     .0     .0     .0     .0     .0     .0     .0
28BA CCBVSW1    30     .0     .0     .0     .0     .0     .0     .0     .0
2902 CCBVSW1    30     .0     .0     .0     .0     .0     .0     .0     .0
See VSWITCH / GVSWITCH for other Virtual Switch reports
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 160. Layout of Extended Virtual Switch Activity Screen (FCX267)

The information shown is based on CP monitor I/O domain SAMPLE data.

The sample shows a screen with virtual switches sorted in ascending device number sequence (indicated by the underscore characters '___' above the 'Addr' header). Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER. Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Addr Real device number. The first line contains the string ">> System <<" instead of a device number and owner identification. It shows the average load figures for all virtual switches for which performance data was collected.

Name The VSWITCH LAN ID consists of two 8 byte character fields: OWNER and NAME. The OWNER is always SYSTEM. This column is the NAME component of the LAN ID.

Load Balance
The load balancing interval. This is the number of seconds between load balancing operations.

Lock Requests
Number of lock requests made for the network lock, per second.

LAN Defers
Number of times per second that CP waited for the network lock.

TX Defers
Number of times per second that CP waited for any lock when sending data from this VSWITCH port.

RX Defers
Number of times per second that CP waited for any lock when receiving data on this VSWITCH port.

PDU Sent
Number of marker PDUs sent to this port. This is the total value for the monitor interval.

PDU response
Number of marker responses received. This is the total value for the monitor interval.

PDU response
Number of marker response PDUs sent to this port in response to receiving a marker PDU from the partner port. This is the total value for the monitor interval.

Timeouts
Number of times timed out waiting for a marker response PDU for a marker request sent by CP to a partner port. This is the total value for the monitor interval.

LAC sent
Number of LACP PDUs sent on this port. This is the total value for the monitor interval.

LAC rcvd
Number of LACP PDUs received on this port. This is the total value for the monitor interval.

Input/s:

Buffr IProc
Number of input buffers processed per second.

Queue IOvfl
Number of input queue overflows per second.

Output/s:

Buffr OProc
Number of output buffers processed per second.

Queue OOvfl
Number of output queue overflows per second.

ucode level
OSA device microcode level.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all activity fields.

FCX268, General Virtual Network Device Description Screen – GVNIC

Performance Toolkit Subcommand: "GVNIC" on page 193.

In the General Virtual Network Device Description Screen (FCX268), all of the virtual network devices are shown, by name, without any associated performance data. If you select any row in this screen and press ENTER, you will go to the Virtual Network Device Activity Screen for that device. (See "FCX269, Virtual Network Device Activity Screen – VNIC" on page 766.)

```
FCX268      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
____ .                 .        .    .          .     .
     <---  LAN ID  --> Adapter  Base Vswitch  V            Port
Addr Owner    Name     Owner    Addr Grpname  S Tranp Type Num  B
0100 SYSTEM   DTCSMAPI DTCSMAPI 0100 ........ X     2 QDIO    1 X
0100 SYSTEM   DTCINMN  ZVMLXAPP 0100 ........ X     2 QDIO    2 X
0200 SYSTEM   SW2      ZVMLXAPP 0200 ........ X     2 QDIO    1 X
1000 SYSTEM   DTCINMN  DTCENS1  1000 ........ X     2 INMN    1 X




See VNIC / EVNIC for other Virtual Network Device reports
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 161. Layout of General Virtual Network Device Description Screen (FCX268)

The sample shows a screen with virtual network devices sorted in ascending device number sequence (indicated by the underscore characters '___' above the 'Addr' header). Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Field Description:

Addr The virtual device address.

LAN ID
The VNIC LAN ID, consisting of two 8-byte character fields, Owner and Name.

Adapter Owner
The user ID owning the adapter.

Base Addr
The NIC base device address.

Vswitch Grpname
The name of the link aggregation port group in use for this VSWITCH, when the device is a VSWITCH.

VS VSWITCH indicator. X indicates that this network device is a VSWITCH.

Tranp The transport type used in the communication between the VNIC and CP. This is referred to as the session layer. 2 = Ethernet, 3 = IP.

Type Represents the type of the virtual NIC.

Hiper HiperSockets

QDIO Queued direct I/O adapter (OSD, OSA, OSE)

INMN
QDIO - OSM CHPID

IEDN QDIO - OSX CHPID

VSW VSWITCH (QDIO+UPLINK)

HBRDG
IQD Hiper-Bridge port

HIEDN
Hiper-IEDN device

???? Unrecognized type

Note: INMN and IEDN are valid only on z/VM Release 6.1.0 with the PTF for VM64780 or higher. HBRDG is valid only on z/VM Release 6.2.0 with the PTFs for VM65042 and PM46988 or higher.

Port Num
The port value for the guest connection.

When running on z/VM systems earlier than V6.2, you will see dashes ("---") in this field.

B Bridge Port indicator. X indicates that this network device is connected to a logical LAN.

Effect of 'AVERAGE' and 'INTERIM' subcommands: These subcommands have no effect since all data on the display pertains to current information. There is no activity data on the display.

FCX269, Virtual Network Device Activity Screen – VNIC

Performance Toolkit Subcommand: "VNIC" on page 348.

In the Virtual Network Device Activity Screen (FCX269), the lines for virtual network devices which have been active during the last measuring interval are highlighted on the screen.

Note that besides issuing the VNIC subcommand, this screen can also be reached from the TCP/IP menu by selecting "Virtual Network Devices", or by selecting any row in the General Virtual Network Device Description Screen and pressing ENTER. (See "FCX268, General Virtual Network Device Description Screen – GVNIC" on page 764.)

If you select any row in this screen and press ENTER, you will go to the Extended Virtual Network Device Activity Screen for additional data. (See "FCX270, Extended Virtual Network Device Activity Screen – EVNIC" on page 769.)

```
FCX269      Data for yyyy/mm/dd  Interval HH:MM:SS - HH:MM:SS    Monitor Scan

___ .               .       .    .                  .     .     .     .     .     .     .     .     .     .
                                                <--- Outbound/s ---> <--- Inbound/s ---->            <----- Locks/sec ---->
     <---  LAN ID  --> Adapter  Base Vswitch  V       Bytes <  Packets  >  Bytes <  Packets  > < Intrpts >  Lock LAN   TX    RX
Addr Owner    Name     Owner    Addr Grpname  S L T B T_Byte T_Pack T_Disc R_Byte R_Pack R_Disc Out/s  In/s  Reqs Defer Defer Defer
<<  -----------------   System (   4)  ----------  >>     64     .1     .0      8     .1     .0    .0    .1    .1    .0    .0    .0
0100 SYSTEM   DTCSMAPI DTCSMAPI 0100 ........ X 2 Q       0     .0     .0      0     .0     .0    .0    .0    .0    .0    .0    .0
0100 SYSTEM   DTCINMN  ZVMLXAPP 0100 ........ X 2 Q     257     .4     .0     30     .4     .0    .0    .3    .4    .0    .0    .0
0200 SYSTEM   SW2      ZVMLXAPP 0200 ........ X 2 Q       0     .0     .0      0     .0     .0    .0    .0    .0    .0    .0    .0
1000 SYSTEM   DTCINMN  DTCENS1  1000 ........ X 2 N       0     .0     .0      0     .0     .0    .0    .0    .0    .0    .0    .0




See EVNIC / GVNIC for other Virtual Network Device reports
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 162. Layout of Virtual Network Device Activity Screen (FCX269)

The information shown is based on CP monitor I/O domain SAMPLE data.

The sample shows a screen with virtual network devices sorted in ascending device number sequence (indicated by the underscore characters '___' above the `'Addr'` header). Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER. Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Addr The virtual device number. The first line contains the string `<< System >>` instead of a device number and owner identification. It shows the average load figures for all VNICs for which performance data were collected. The string `<< System >>` also includes the total number of VNICs (in parentheses).

LAN ID
The VNIC LAN ID, consisting of two 8-byte character fields, OWNER and NAME.

Owner
The userid owning the adapter.

Base address
NIC base device address.

Group Name
Name of the link aggregation port group in use for this VSWITCH, when the device is a VSWITCH.

Vswitch indicator
X indicates that this network device is a VSWITCH.

L The transport type used in the communication between the VNIC and CP. This is referred to as the session layer. 2 = Ethernet, 3 = IP.

T Represents the type of the virtual NIC.

- **H** HiperSockets
- **Q** Queued direct I/O adapter (OSD)
- **N** QDIO with OSM CHPID (INMN)
- **E** QDIO with OSX CHPID (IEDN)
- **B** IQD bridge port (BRDG)
- **?** Unrecognized type

Note: INMN and IEDN are valid only on z/VM Release 6.1.0 with the PTF for VM64780 or higher. BRDG is valid only on z/VM Release 6.2.0 with the PTFs for VM65042 and PM46988 or higher.

B Bridge port indicator. X indicates that this network device is connected to a logical LAN.

T_Byte
Bytes sent to OSA per second.

T_Pack
Packets sent to OSA per second.

T_Disc
Outbound packets discarded per second,

R_Byte
Bytes received from OSA per second.

R_Pack
Packets received from OSA per second.

R_Disc
Inbound packets discarded per second

Int out/s
Number of PCI (or AIF) events reflected for output queues per second.

Int in/s
Number of PCI (or AIF) events reflected for input queues per second.

Lock Requests
Number of lock requests made for the network lock, per second.

LAN Defer
Number of times per second that CP waited for the network lock.

TX Defer
Number of times per second that CP waited for any lock when sending data from this port.

RX Defer
Number of times per second that CP waited for any lock when receiving data on this port.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all activity fields.

FCX270, Extended Virtual Network Device Activity Screen – EVNIC

Performance Toolkit Subcommand: "EVNIC" on page 176.

The Extended Virtual Network Device Activity Screen (FCX270) shows additional data beyond that which is shown on the Virtual Network Device Activity Screen. Note that besides issuing the EVNIC subcommand, this screen can also be reached by selecting any row in the Virtual Network Device Activity Screen and pressing ENTER. (See "FCX269, Virtual Network Device Activity Screen – VNIC" on page 766.)

```
FCX270      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
____                          .    .   . .       . .       . .       . .
     <---  LAN ID  --> Adapter   Bal  <-------- VSWITCH Port Information
Addr Owner    Name     Owner     Int  Dev1 Pkts Dev2 Pkts Dev3 Pkts Dev4
>>     System       <<           ....  .... .... .... .... .... .... ....
B000 SYSTEM   LNXSRV   TCPIP     ....  .... .... .... .... .... .... ....
F000 SYSTEM   CCBVSW1  LNXIMG1   ....  .... .... .... .... .... .... ....
F000 SYSTEM   CCBVSW1  LNXREGC   ....  .... .... .... .... .... .... ....
F000 SYSTEM   CCBVSW2  LNXVSWC   ....  .... .... .... .... .... .... ....
F000 SYSTEM   LCSNET   TCPIP     ....  .... .... .... .... .... .... ....
F004 SYSTEM   CCBFTP   LNXREGC   ....  .... .... .... .... .... .... ....
F004 SYSTEM   CCBFTP   LNXVSWC   ....  .... .... .... .... .... .... ....
F004 SYSTEM   CCBFTP   TCPCB1    ....  .... .... .... .... .... .... ....
F004 SYSTEM   CCBFTP   TCPCB2    ....  .... .... .... .... .... .... ....
F010 SYSTEM   LOCALNET TCPIP     ....  .... .... .... .... .... .... ....



See VNIC / GVNIC for other Virtual Network Device reports
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 163. Layout of Extended Virtual Network Device Activity Screen (FCX270)

The information shown is based on CP monitor I/O domain SAMPLE data.

The sample shows a screen with virtual network devices sorted in ascending device number sequence (indicated by the underscore characters '___' above the 'Addr' header). Other possible sort sequences are indicated by dots above the corresponding columns; they can be set using the 'SORT' subcommand with the string shown in the lowest line of the column heading as sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER. Note that the information extends beyond the 80 columns of an ordinary screen, use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Addr The virtual device number.

LAN ID
The VNIC LAN ID consists of two 8-byte character fields, OWNER and NAME.

Adapter Owner
The userid owning the adapter.

Load Balance
Number of seconds between load balancing operations.

Address/packets

The port information for the last load balancing interval is displayed for each OSA device. The OSA device number is displayed under the Devn column where n is a value 1-8 to reflect up to 8 ports. The Pkts column displays the number of packets transmitted on this port in the last load balancing interval.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all activity fields.

FCX271, SSI Data Menu – SSIMENU

Performance Toolkit Subcommand: "SSIMENU" on page 290.

The SSI Data Menu (FCX271) displays a selection menu of available SSI / ISFC reports.

```
FCX271      CPU nnnn  SER nnnnn  SSI Data Menu                Perf. Monitor

  SSI performance reports
S Command Description
_ SSICONF  SSI configuration
_ SSISCHLG SSI State Change Synchronization Activity log
_ SSISMILG SSI State/Mode Information log

  ISFC performance reports
S Command Description
_ ISFECONF ISFC End Point configuration
_ ISFEACT  ISFC End Point activity
_ ISFLCONF ISFC Logical Link configuration
_ ISFLACT  ISFC Logical Link activity state
_ ISFLALOG ISFC Logical Link activity log

  LGR performance reports
S Command Description
_ LGRDATA  Live Guest Relocation data
_ LGRELOG  Live Guest Relocation event log


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 164. Layout of SSI Data Menu (FCX271)

Field Description:

S Cursor selection field. The field will be highlighted and made cursor-selectable (set as 'unprotected') only if the corresponding SSI, ISFC, or LGR performance screen is available.

Command
The command name equal to the screen name that can be selected for display. The field will be highlighted if the corresponding SSI, ISFC, or LGR performance screen is available.

Description
Description of the performance display.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX272, ISFC End Point Configuration – ISFECONF

Performance Toolkit Subcommand: "ISFECONF" on page 204.

The ISFC End Point Configuration Screen (FCX272) displays the ISFC end points present on this system. There is one row for each end point. The information shown is based on MONITOR domain (SAMPLE) and ISFC domain (EVENT) data.

```
FCX272      CPU nnnn  SER nnnnn  ISFC Config.                        Perf. Monitor

Initial Status on 2011/08/13 at 16:03:14

EndPoint Typ Act PortName AssocNam OthrNode OthrPort <----- End point name -------
00000001 DGR BND *SYNC    ---      ---      ---      'Synchronization services
00000002 DGR BND *PLMVOTE ---      ---      ---      ''
00000003 DGR BND *PLMDCSN ---      ---      ---      ''
00000004 DGR BND *PLMSUSP ---      ---      ---      ''
00000005 DGR BND *PLMBITM ---      ---      ---      ''
00000006 DGR BND *PLMBEAT ---      ---      ---      ''
00000007 LSN BND *XSCIF   ---      ---      ---      'Cross system SCIF listen'
00000008 LSN BND *QITEMS  ---      ---      ---      'Shared SPOOL et al listen'
00000009 DGR BND *XDISK   ---      ---      ---      ''
0000000A DGR BND *NETWORK ---      ---      ---      'SSI Network Services'
0000000B LSN BND *LGR     ---      ---      ---      'Live Guest Relocation Listen'
0000000C DGR BND *RELODOM ---      ---      ---      'Relocation Domain Synch Port'
0000000D LSN BND *AT      ---      ---      ---      'AT command listen'
0000000E DGR BND *USRBKS  ---      ---      ---      'USRBK synchronization'
0000000F DGR BND *LXCHECK ---      ---      ---      'LOGON cross check'
00000010 DGR BND *RPI     ---      ---      ---      ''

Changed Config Status
Date   Time       Changed
.....  ........   No status changes received

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 165. Layout of ISFC End Point Configuration Screen (FCX272)

The information shown is initially provided by a MONITOR domain record when Performance Toolkit connects to the *MONITOR service. If the program has been set up to collect the monitor data from another machine's disk file, the program will attempt to obtain the monitor domain data from the first monitor sample in the disk file; the data cannot be shown if the required information is not found in that first sample.

ISFECONF primarily uses the following System records:

- Domain 1, Record 22 - MRMTRISC, ISFC End Point Configuration, Sample Config
- Domain 9, Record 1 - MRISFISC, ISFC End Point Status Change, Event

The information shown is based on MONITOR domain (SAMPLE) and ISFC domain (EVENT) data. Note that the information extends beyond the 80 columns of an ordinary screen. Use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Initial/Refresh Status
: Shows date (in *yyyy/mm/dd* format) and time (in *hh:mm:ss* format) when the status was obtained -- that is, when monitoring was last activated (or

reactivated). Initial Status is displayed the first time status information is shown; Refresh Status is displayed when a new configuration record arrives.

Endpoint
Unique sequence number associated with this end point.

Typ End point type: Listen (LSN), Stream (STR) or Datagram (DGR).

Act End point activity: Bind (BND), Connect (CON), Accept (ACC) or Close (CLS).

PortName
Bound port name, port name, or name generated by CP if no Bind.

AssocNam
The name of the service (PortName) that resulted in the creation of this end point.

OthrNode
Node at the other end of the connection represented by this end point.

OthrPort
Service at the other end of the connection represented by this end point.

End point name
Free-form name assigned to this end point by its creator; can up to 120 characters.

Changed Config Status
Shows time and nature of any changes in the state of an ISFC end point.

Date Date (format *mm/dd*) of the status change

Time Time (format *hh:mm*) of the status change

Changed
Describes how the status changed, as follows:

```
EndPoint= endpoint typ/act
OthrNode=node
OthrPort=port AssocNam=name
PortName=port Name= tttt
```

Where:

endpoint
Is the four-byte binary numeric unique identifier associated with this end point.

typ Is the end point type (LSN - Listen, STR - Stream, DGR - Datagram).

act Is the end point activity: Bind (BND), Connect (CON), Accept (ACC) or Close (CLS).

node Is the name of the node on the other end of the connection.

port Is a CP-generated EBCDIC character string name for the endpoint.

name For an ACC event only, this is the port name of the associated listen end point. For all other events, this field not meaningful.

tttt Is a free-form name assigned to this end point; may be up to 120 characters.

For an explanation of the messages that can appear in this area, see "FCX149, Monitor Settings Screen – MONSET" on page 513.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX273, ISFC End Point Activity – ISFEACT

Performance Toolkit Subcommand: "ISFEACT" on page 203.

The ISFC End Point Activity Screen displays the traffic on ISFC Transport, by EndPoint. There is one row for each endpoint. The information shown is based on ISFC domain (SAMPLE, EVENT) data.

```
FCX273      CPU nnnn  SER nnnnn  Interval 09:39:42 - 09:40:42         Perf. Monitor

________       .     .      .     .      .       .          .      .      .      .
                <-------- Sent ---------> <------ Received -------> <-- Others -> ...
EndPoint LifeT  SByte SBRat  SMsgs SMRat  RByte RBRat  RMsgs RMRat  Buffd  Discd ...
00000001   ...   8928 37.20     62   .26   9072 37.80     63   .26      0      0
00000002   ...    586  2.44      7   .03    716  2.98      7   .03      0      0
00000003   ...    160   .67      2   .01    848  3.53      8   .03      0      0
00000004   ...      0   .00      0   .00      0   .00      0   .00      0      0
00000005   ...    952  3.97      1   .00    952  3.97      1   .00      0      0
00000006   ...    848  3.53      8   .03   1590  6.62     15   .06      0      0
00000007   ...      0   .00      0   .00     80   .33      1   .00      0      0
00000008   ...      0   .00      0   .00     80   .33      1   .00      0      0
00000009   ...  22952 95.63    167   .70  22016 91.73    168   .70      0      0
0000000A   ...   4536 18.90      3   .01   4536 18.90      3   .01      0      0
0000000B   ...      0   .00      0   .00      0   .00      0   .00      0      0
0000000C   ...     80   .33      1   .00    112   .47      1   .00      0      0
0000000D   ...      0   .00      0   .00      0   .00      0   .00      0      0
0000000E   ...    912  3.80     10   .04   1328  5.53     11   .05      0      0
0000000F   ...      0   .00      0   .00      0   .00      0   .00      0      0
00000010   ...     87   .36      1   .00     94   .39      1   .00      0      0
00000013   ...     80   .74      1   .01     80   .74      1   .01      0      0
00000014   ...     80   .74      1   .01     80   .74      1   .01      0      0
00000015   ...      0   .00      0   .00      0   .00      0   .00      0      0
00000016   ...     96   .40      1   .00     96   .40      1   .00      0      0
00000017 20.00    624 31.20      3   .15    256 12.80      3   .15      0      0
00000018 137.2     80   .58      1   .01      0   .00      0   .00      0      0
00000019 137.2    912  6.65      8   .06    968  7.06      8   .06      0      0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 166. Layout of ISFC End Point Activity Screen (FCX273)

ISFEACT primarily uses the following System records:

- Domain 9, Record 1 - MRISFISC - ISFC End Point Status Change (Event)
- Domain 9, Record 2 - MRISFISA - ISFC End Point Activity (Sample)

Note that the information extends beyond the 80 columns of an ordinary screen. Use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Description:

Endpoint
Unique sequence number associated with this end point.

LifeT The total time, in seconds, of end point existence (from the time of creation up to closure, or up to present time if the end point is not closed yet). For end points for which Performance Toolkit can't determine moment of creation the field contains dots: '...'.

Sent Includes the following information:

SByte The number of bytes sent.

SBRat The number of bytes sent per second.

SMsgs
The number of messages sent.

SMRat
The number of messages sent per second.

Received
Includes the following information:

RByte
The number of bytes received.

RBRat The number of bytes received per second.

RMsgs
The number of messages received.

RMRat
The number of messages received per second.

Others
Includes the following information:

Buffd Sent messages awaiting recovery.

Discd Messages that could not be sent, typically due to the loss of a link.

Description
The short (no more than 40 characters) description of the end point. The description contains the end point name if present. Otherwise the Performance Toolkit generates a temporary name.

For closed end points the description contains the flag (CLS) before all text.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Averages will be shown for all activity fields as requested.

FCX274, ISFC Logical Link Activity – ISFLACT

Performance Toolkit Subcommand: "ISFLACT" on page 206.

The ISFC Logical Link Activity Screen displays ISFC logical link transport activity. There is one row for each ISFC logical link. The information shown is based on ISFC domain (SAMPLE, EVENT) data.

```
FCX274      CPU nnnn  SER nnnnn  Interval 09:39:42 - 09:40:42         Perf. Monitor

________     .       .     .     .    .      .     .     .    .

          <------- Sent --------> <------- Received --------->
Partner   Devs LSByte LSBRt LSMsg LSMR LRByte LRBRt LRMsg LRMR
AAACHOO    1.0     71  1.18     1  .02     71  1.18     1  .02
BCT12NDA   1.0     71  1.18     1  .02     71  1.18     1  .02
CFT2NDA    1.0     71  1.18     1  .02     71  1.18     1  .02
GDLBCT1    1.0    654 10.89     4  .07    766 12.75     4  .07
GDLLCPX1   9.0    487  8.11     3  .05    571  9.50     3  .05
GDLRCTS1   1.0    487  8.11     3  .05    571  9.50     3  .05
GDLRCT1    1.0    487  8.11     3  .05    571  9.50     3  .05


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 167. Layout of ISFC Logical Link Activity Screen (FCX274)

ISFLACT primarily uses the System records:

- Domain 9, Record 3 - MRISFILC - ISFC Logical Link Definition Change (Event)
- Domain 9, Record 4 - MRISFNOD - ISFC Logical Link Activity (Sample)

Field Description:

Partner
The node on the other end of this logical link.

Devs The number of real devices comprising the logical link to the specified node.

Sent Includes the following information:

LSByte
The number of bytes sent on this link originating from this system.

LSBRt The number of bytes sent on this link originating from this system per second.

LSMsg
The number of messages sent on this link originating from this system.

LSMR The number of messages sent on this link originating from this system per second.

Received
Includes the following information:

LRByte
The number of bytes received on this link destined for this system.

LRBRt
The number of bytes received on this link destined for this system per second.

LRMsg
The number of messages received on this link destined for this system.

LRMR
The number of messages received on this link destined for this system per second.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Averages will be shown for all activity fields as requested.

FCX275, ISFC Logical Link Configuration – ISFLCONF

Performance Toolkit Subcommand: "ISFLCONF" on page 208.

The ISFC Logical Link Configuration Screen displays the configuration of ISFC logical links. There is one row for each ISFC logical link. The information shown is based on MONITOR domain (SAMPLE) and ISFC domain (EVENT) data.

```
FCX275      CPU nnnn  SER nnnnn  ISFC LL Config.                    Perf. Monitor

Initial Status on 2008/12/15 at 11:55

Partner  Devs   Rdevs
CFT2NDA   1     96A1
PLXA01    0     ...
PLXA02    1     912A
Changed Config Status
Date  Time      Changed
06/15 16:06:28  Rdev 912A has been deactivated for Node PLXA02 (last)

Not applicable in Trend Scan mode,
... (oldest lines not displayed) ...,
*** Status refreshed ***.

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 168. Layout of ISFC Logical Link Configuration Screen (FCX275)

The information shown is initially provided by a MONITOR domain record when Performance Toolkit connects to the *MONITOR service. If the program has been set up to collect the monitor data from another machine's disk file, the program will attempt to obtain the monitor domain data from the first monitor sample in the disk file; the data cannot be shown if the required information is not found in that first sample.

ISFLCONF primarily uses the following System records:

- Domain 1, Record 23 - MRMTRILC - ISFC Logical Link Configuration Record (Sample configuration)
- Domain 9, Record 3 - MRISFILC - ISFC Logical Link Definition Change (Event)

The primary configuration of ISFC Logical Links is obtained from Domain 1 Record 23 monitor records. Performance Toolkit updates this screen according to logical link configuration changes expressed in Domain 9 Record 3 monitor records.

Field Description:

Initial/Refresh Status
: Shows date (in *yyyy/mm/dd* format) and time (in *hh:mm:ss* format) when the status was obtained -- that is, when monitoring was last activated (or reactivated). Initial Status is displayed the first time status information is shown; Refresh Status is displayed when a new configuration record arrives.

Partner
: The partner node name.

Devs
: The number of real devices comprising the logical link to the specified node.

Rdevs The set of real devices comprising the logical link to the specified node.

Changed Config Status
Shows time and nature of any changes in the state of an ISFC logical link.

Date Date (format *mm/dd*) of the status change.

Time Time (format *hh:mm*) of the status change.

Changed
Describes how the status changed, as follows:

```
Rdev xxxx has been activated Node=node
Rdev xxxx has been activated Node=node (first)
Rdev xxxx has been deactivated Node=node
Rdev xxxx has been deactivated Node=node (last)
```

Where:

xxxx Is the real device number of the ISFC link device comprising the logical link to the specified node.

node Is the partner node name.

For an explanation of the messages that can appear in this area, see "FCX149, Monitor Settings Screen – MONSET" on page 513.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX276, SSI Configuration – SSICONF

Performance Toolkit Subcommand: "SSICONF" on page 289.

The SSI Configuration Screen displays the SSI configuration of this system. The information shown is based on MONITOR domain (SAMPLE) and SSI domain (EVENT) data.

```
FCX276      CPU nnnn  SER nnnnn  SSI Config.                    Perf. Monitor

Initial Status on 2008/12/15 at 11:55

SSI Name                   DWSSI
Number of slots configured 4
Number of slots in use     2

Members Information
Slot SystemID
   1 PLXA01
   2 PLXA02
   3 ...
   4 ...

Changed Config Status
Date  Time      Changed
06/15 09:58:16  System PLXA02   state: Joined -> Unknown
                SSI mode: Stable -> Safe
06/15 09:58:16  System PLXA01   state: Joined -> Suspended
                SSI mode: Safe

Not applicable in Trend Scan mode,
... (oldest lines not displayed) ...,
*** Status refreshed ***.

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 169. Layout of SSI Configuration Screen (FCX276)

The information shown is initially provided by a MONITOR domain record when Performance Toolkit connects to the *MONITOR service. If the program has been set up to collect the monitor data from another machine's disk file, the program will attempt to obtain the monitor domain data from the first monitor sample in the disk file; the data cannot be shown if the required information is not found in that first sample.

SSI Configuration uses the following System records:

- Domain 1, Record 25 - MRMTRSSI, SSI Configuration, Sample Config
- Domain 11. Record 3 - MRSSISCH, State Change Event, Event
- Domain 11, Record 4 - MRSSISLT, Slot Definition, Event

Field Description:

Initial/Refresh Status
: Shows date (in *yyyy/mm/dd* format) and time (in *hh:mm:ss* format) when the status was obtained -- that is, when monitoring was last activated (or reactivated). Initial Status is displayed the first time status information is shown; Refresh Status is displayed when a new configuration record arrives.

SSI Name
: SSI name as defined in the system configuration.

Number of slots configured
Number of slots configured for the system members.

Number of slots in use
Number of slots currently used by the system members.

Slot Slot number.

SystemID
Member system name.

Changed Config Status
Shows time and nature of any changes in the SSI state.

Date Date (format *mm/dd*) of the status change

Time Time (format *hh:mm*) of the status change

Changed
Describes how the status changed, as follows:

```
System name state: state1 ->
state2
SSI mode: mode1 -> mode2
```

Where:

name Is the member system name.

state1 Is the old (or current, if *state2* is missing) member system state.

state2 Is the new member system state.

mode1 Is the old (or current, if *mode2* is missing) SSI mode.

mode2 Is the new SSI mode.

Possible system states are: Down, Joining, Joined, Leaving, Isolated, Suspended, Unknown, Not valid (*xx*), where *xx* is the hex state value.

Possible SSI modes are: Not_In_SSI, Stable, Influx, Safe, Unknown (*xx*), where *xx* is the hex mode value.

For an explanation of the messages that can appear in this area, see "FCX149, Monitor Settings Screen – MONSET" on page 513.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX277, SSI State Change Synchronization Activity Log – SSISCHLG

Performance Toolkit Subcommand: "SSISCHLG" on page 291.

The SSI State Change Synchronization Activity Log Screen displays the current SSI state change synchronization activity. The information shown is based on SSI domain SAMPLE data.

```
FCX277      CPU nnnn  SER nnnnn  Interval hh:mm:ss - hh:mm:s       Perf. Monitor

Interval   Init  <- Count of Xmit ->  <- Sync Duration ->
End Time   Sync  PWRep   Proc   Abrt  PWRep   P&Ab   Vote
>>Mean>>     .0     .0     .0     .0     .0     .0     .0
16:59:16      0      0      0      0      0      0      0
16:59:31      0      0      0      0      0      0      0
16:59:46      0      0      0      0      0      0      0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 170. Layout of SSI State Change Synchronization Activity Log Screen (FCX277)

SSI State Change Synchronization Activity log uses the following System record:

- Domain 11, Record 1 - MRSSISCS, State Change Synchronization Activity, Sample

Field Description:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the **>>Mean>>** entry, you can find the relevant interval in the header line.

Init Synch
Cumulative number of times synchronization was initiated.

Count of Xmit
Include the following information:

PWRep
Cumulative number of times Proceed With Reply was transmitted.

Proc Cumulative number of times Proceed was transmitted.

Abort Cumulative number of times Abort was transmitted.

Sync Duration
Includes the following information:

PWRep
Cumulative duration in microseconds of Proceed With Reply phases.

P&Ab Cumulative duration in microseconds of Proceed and Abort phases.

Vote Cumulative duration in microseconds of Vote phases.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX278, SSI State/Mode Information Log – SSISMILG

Performance Toolkit Subcommand: "SSISMILG" on page 292.

The SSI State/Mode Information Log Screen displays SSI configuration of this system. The information shown is based on SSI domain SAMPLE data.

```
FCX278      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS       Perf. Monitor

          <------------------------ SSI State -------------------------> <-- SSI Mode ->
Interval  <-Joining--> <--Joined--> <-Leaving--> <-Isolated-><-Suspended-> <--Stable--> ...
End Time  Count  %Time Count  %Time Count  %Time Count  %Time Count  %Time Count  %Time ...
>>Mean>>     .0   .000    .3 73.955    .0   .000    .0   .000    .0 26.045     0       0 ...
16:59:16      0   .000     1 21.867     0   .000     0   .000     0 78.133     0       0 ...
16:59:31      0   .000     0 100.00     0   .000     0   .000     0   .000     0       0 ...
16:59:46      0   .000     0 100.00     0   .000     0   .000     0   .000     0       0 ...

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 171. Layout of SSI State/Mode Information Log Screen (FCX278)

SSI State/Mode Information Log uses the following System record:

- Domain 11, Record 2 - MRSSISMI, State/Mode Information, Sample

Note that the information extends beyond the 80 columns of an ordinary screen. Use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the **>>Mean>>** entry, you can find the relevant interval in the header line.

SSI State Joining
Includes the following information:

Count Cumulative number of times joining state entered.

%Time
Total percentage of time spent in joining state.

SSI State Joined
Includes the following information:

Count Cumulative number of times joined state entered.

%Time
Total percentage of time spent in joined state.

SSI State Leaving
Includes the following information:

Count Cumulative number of times leaving state entered.

%Time
Total percentage of time spent in leaving state.

SSI State Isolated
Includes the following information:

Count Cumulative number of times isolated state entered.

%Time
Total percentage of time spent in isolated state.

SSI State Suspended
Includes the following information:

Count Cumulative number of times suspended state entered.

%Time
Total percentage of time spent in suspended state.

SSI Mode Stable
Includes the following information:

Count Cumulative number of times stable mode was entered.

%Time
Total percentage of time spent in stable mode.

SSI Mode Influx
Includes the following information:

Count Cumulative number of times influx mode was entered.

%Time
Total percentage of time spent in influx mode.

SSI Mode Safe
Includes the following information:

Count Cumulative number of times safe mode was entered.

%Time
Total percentage of time spent in safe mode.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX279, ISFC End Point Activity Log – ISFELOG *epoint*

Performance Toolkit Subcommand: "ISFELOG" on page 205.

The ISFC End Point Activity Log screen shows a 'per sample' log of selected ISFC end points. When requesting an ISFC end point activity log for an ISFC end point, the *epoint* must have been previously selected for benchmarking and for which monitor records should be collected.

Figure 172 shows a sample ISFC End Point Activity Log for end point 00000001:

```
FCX279     CPU nnnn SER nnnnn Interval HH:MM:SS - HH:MM:SS Perf. Monitor

Activity log for End Point 00000001

Interval       <-------- Sent ---------> <------ Received -------> <-- Others -> ...
End Time LifeT  SByte SBRat  SMsgs SMRat  RByte RBRat  RMsgs RMRat  Buffd  Discd ...
>>Mean>>   ...   9216 19.20     64   .13   9216 19.20     64   .13      0      0
02:19:26   ...   1152 19.24      8   .13   1152 19.24      8   .13      0      0
02:20:26   ...   1152 19.16      8   .13   1152 19.16      8   .13      0      0
02:21:26   ...   1152 19.23      8   .13   1152 19.23      8   .13      0      0
02:22:26   ...   1152 19.20      8   .13   1152 19.20      8   .13      0      0
02:23:26   ...   1152 19.20      8   .13   1152 19.20      8   .13      0      0
02:24:26   ...   1152 19.20      8   .13   1152 19.20      8   .13      0      0
02:25:26   ...   1152 19.19      8   .13   1152 19.19      8   .13      0      0
02:26:26   ...   1152 19.21      8   .13   1152 19.21      8   .13      0      0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

Figure 172. Layout of ISFC End Point Activity Log Screen (FCX279)

The information shown is based on MONITOR and ISFC domain SAMPLE and EVENT data.

The leftmost column contains the end time (in the format *hh:mm:ss*) of the monitor interval for which the values were calculated. Note that the information extends beyond the 80 columns of an ordinary screen. Use the LEFT/RIGHT subcommands, or the corresponding PF-keys, for shifting the display window so as to view the remaining data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the Interval End Time column.

Field Descriptions:

Interval End Time
: The end time of the monitor interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

  Except for the Interval End Time field, which replaces the EPoint field, all data columns are identical to the fields in FCX273. See "FCX273, ISFC End Point Activity – ISFEACT" on page 775 for the descriptions of these fields.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX280, ISFC Logical Link Activity Log – ISFLLOG *partner*

Performance Toolkit Subcommand: "ISFLLOG" on page 209.

The ISFC Logical Link Activity Log displays a 'per sample' log of the selected ISFC logical link. When requesting an ISFC logical link activity log for an ISFC logical link, the *llink* must have been previously selected for benchmarking and for which monitor records should be collected.

Figure 173 shows a 'per sample' log for the logical link CFT2NDA1:

```
FCX280      FCX280 CPU nnnn SER nnnnn Interval HH:MM:SS - HH:MM:SS Perf. Monitor

Activity log for logical link CFT2NDA

Interval      <------- Sent --------> <----- Received ------>
End Time Devs LSByte LSBRt LSMsg LSMR LRByte LRBRt LRMsg LRMR
>>Mean>>  1.0  48191 114.8   167  .40  20456 48.72   164  .39
02:19:26  1.0      0   .00     0  .00      0   .00     0  .00
02:20:26  1.0   4809 79.99    47  .78   4800 79.84    48  .80
02:21:26  1.0  24688 412.2    57  .95   8091 135.1    54  .90
02:22:26  1.0   7397 123.3    14  .23   1897 31.62    14  .23
02:23:26  1.0  11226 187.1    48  .80   5597 93.29    47  .78
02:24:26  1.0     71  1.18     1  .02     71  1.18     1  .02
02:25:26  1.0      0   .00     0  .00      0   .00     0  .00

Command ===> _
F1=Help F4=Top F5=Bot F7=Bkwd F8=Fwd F10=Left F11=Right F12=Return
```

Figure 173. Layout of ISFC Logical Link Activity Log Screen (FCX280)

The information shown is based on MONITOR and ISFC domain SAMPLE and EVENT data.

The leftmost column contains the end time (in the format *hh:mm:ss*) of the monitor interval for which the values were calculated.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string `>>Mean>>` in the Interval End Time column.

Field Descriptions:

Interval End Time
The end time of the monitor interval for which the values were calculated. In the case of the `>>Mean>>` entry, you can find the relevant interval in the header line.

Except for the Interval End Time field, which replaces the Partner field, all data columns are identical to the fields in FCX274. See "FCX274, ISFC Logical Link Activity – ISFLACT" on page 777 for the descriptions of these fields.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX281, ISFC Logical Link Activity By-Time Log – ISFLALOG

Performance Toolkit Subcommand: "ISFLALOG" on page 207.

The ISFC Logical Link Activity By-Time Log displays overall performance data for all ISFC Logical Links existing in the system, by time. Each entry consists of a group of lines for every ISFC Logical Link per interval, as shown in Figure 174.

```
FCX281      FCX281 CPU nnnn SER nnnnn Interval HH:MM:SS - HH:MM:SS Perf. Monitor

Interval               <------- Sent --------> <----- Received ------>
End Time Partner  Devs  LSByte LSBRt LSMsg LSMR LRByte LRBRt LRMsg LRMR
>>Mean>> AAACHOO   1.0    2152  7.18    21  .07   1815  6.05    19  .06
>>Mean>> BCT12NDA  1.0    2212  7.38    22  .07   1815  6.05    19  .06
>>Mean>> CFT2NDA   1.0   48120 160.5   166  .55  20385 67.98   163  .54
>>Mean>> GDLBCT1   1.0    4832 16.11    27  .09   4823 16.08    24  .08
>>Mean>> GDLLCPX1  9.0   14251 47.52    72  .24  15042 50.16    69  .23
>>Mean>> GDLRCTS1  1.0    7361 24.55    39  .13   7652 25.52    36  .12
>>Mean>> GDLRCT1   1.0  436751  1456    70  .23  28386 94.66    69  .23

02:20:26 AAACHOO   1.0     689  5.74     7  .06    622  5.18     7  .06
02:20:26 BCT12NDA  1.0     678  5.65     7  .06    491  4.09     5  .04
02:20:26 CFT2NDA   1.0    4809 40.08    47  .39   4800 40.00    48  .40
02:20:26 GDLBCT1   1.0    1739 14.49    10  .08   1592 13.27     8  .07
02:20:26 GDLLCPX1  9.0    4522 37.69    23  .19   4963 41.36    23  .19
02:20:26 GDLRCTS1  1.0    2575 21.46    14  .12   2708 22.57    13  .11
02:20:26 GDLRCT1   1.0  231687  1931    33  .28  14998 125.0    33  .28

02:23:26 AAACHOO   1.0    1463  8.13    14  .08   1193  6.63    12  .07
02:23:26 BCT12NDA  1.0    1534  8.53    15  .08   1324  7.36    14  .08
02:23:26 CFT2NDA   1.0   43311 240.8   119  .66  15585 86.63   115  .64
02:23:26 GDLBCT1   1.0    3093 17.19    17  .09   3231 17.96    16  .09
02:23:26 GDLLCPX1  9.0    9729 54.08    49  .27  10079 56.03    46  .26
02:23:26 GDLRCTS1  1.0    4786 26.60    25  .14   4944 27.48    23  .13
02:23:26 GDLRCT1   1.0  205064  1140    37  .21  13388 74.42    36  .20

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 174. Layout of ISFC Logical Link Activity By-Time Log Screen (FCX281)

The information shown is based on MONITOR and ISFC domain SAMPLE and EVENT data.

The leftmost column contains the end time (in the format *hh:mm:ss*) of the monitor interval for which the values were calculated.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the Interval End Time column.

Field Descriptions:

Interval End Time
: The end time of the monitor interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

  Except for the Interval End Time field, all data columns are identical to the fields in FCX274. See "FCX274, ISFC Logical Link Activity – ISFLACT" on page 777 for the descriptions of these fields.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX282, HPF I/O Device Screen – DEVICE HPF

Performance Toolkit Subcommand: "DEVICE" on page 169.

The HPF I/O Device Screen (FCX282) is shown when you enter the DEVICE subcommand with the HPF parameter. The DASD devices are included in the display. Devices which have been active during the last measuring interval are highlighted on the screen.

```
FCX282      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

.   .                    .   . .    .      ______       .    .    .    .    .    .    .    .
<-- Device Descr. -->  Mdisk Pa- <--------- zHPF --------> <------ Time (msec) --------> Req.
Addr Type   Label/ID   Links ths Mask Featr Read/s Write/s Pend Disc Conn Serv Resp CUWt Qued
>>All DASD<< ( 3297)   ..... ... ..   ..       .7      .4 .132 .030 .638 .800 .800 .000  .00
5CCD 3390-3 RU5CCD        22   2 C0   EM      2088    1392 .087 .001 .102 .190 .190 .000  .00
1580 3390-A JS1580         0   2 C0   EM        .0      .0 .128 .000 .128 .256 .256 .000  .00
1581 3390-A                0   2 C0   EM        .0      .0 .192 .000 .064 .256 .256 .000  .00
1582 3390-A JS1582         0   2 C0   EM        .0      .0 .128 .000 .064 .192 .192 .000  .00
1583 3390-3 D226B3         0   2 C0   EM        .0      .0 .192 .000 .064 .256 .256 .000  .00
1584 3390-3 D226B4         0   2 C0   EM        .0      .0 .064 .000 .128 .192 .192 .000  .00
1585 3390-3 D226B5         0   2 C0   EM        .0      .0 .128 .000 .064 .192 .192 .000  .00
1A00 3390-3 CF1A00         0   2 00   D         .0      .0 .192 .000 1.41 1.60 1.60 .000  .00
1A01 3390-3 CF1A01         0   2 00   D         .0      .0 .192 .000 .192 .384 .384 .000  .00
1A02 3390-3 CF1A02         0   2 00   D         .0      .0 .192 .000 .448 .640 .640 .000  .00
1A03 3390-3 CF1A03         0   2 00   D         .0      .0 .192 .000 .448 .640 .640 .000  .00
1A04 3390-3 CF1A04         0   2 00   D         .0      .0 .192 .000 .192 .384 .384 .000  .00
1A05 3390-3 CF1A05         0   2 00   D         .0      .0 .192 .000 .192 .384 .384 .000  .00
1A06 3390-3 CF1A06         0   2 00   D         .0      .0 .192 .000 .192 .384 .384 .000  .00
1A07 3390-3 CF1A07         0   2 00   D         .0      .0 .128 .000 .192 .320 .320 .000  .00
1A08 3390-3 CF1A08         0   2 00   D         .0      .0 .128 .000 .128 .256 .256 .000  .00
1A09 3390-3 CF1A09         0   2 00   D         .0      .0 .128 .000 .384 .512 .512 .000  .00
1A0A 3390-3 CF1A0A         0   2 00   D         .0      .0 .192 .000 .192 .384 .384 .000  .00
1A0B 3390-3 CF1A0B         0   2 00   D         .0      .0 .192 .000 .192 .384 .384 .000  .00
1A0C 3390-3 CF1A0C         0   2 00   D         .0      .0 .128 .000 .192 .320 .320 .000  .00
1A0D 3390-3 CF1A0D         0   2 00   D         .0      .0 .192 .000 .128 .320 .320 .000  .00
1A0E 3390-3 CF1A0E         0   2 00   D         .0      .0 .192 .000 .192 .384 .384 .000  .00
1A0F 3390-3 CF1A0F         0   2 00   D         .0      .0 .192 .000 .128 .320 .320 .000  .00
1A10 3390-3 CF1A10         0   2 00   D         .0      .0 .192 .000 .128 .320 .320 .000  .00
1A11 3390-3 CF1A11         0   2 00   D         .0      .0 .128 .000 .192 .320 .320 .000  .00
1A12 3390-3 CF1A12         0   2 00   D         .0      .0 .192 .000 .192 .384 .384 .000  .00
1A13 3390-3 CF1A13         0   2 00   D         .0      .0 .128 .000 .192 .320 .320 .000  .00
1A14 3390-3 CF1A14         0   2 00   D         .0      .0 .192 .000 .192 .384 .384 .000  .00
1A15 3390-3 CF1A15         0   2 00   D         .0      .0 .192 .000 .192 .384 .384 .000  .00

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 175. Layout of HPF I/O Device Screen (FCX282)

The information shown is based on CP monitor MONITOR domain and I/O domain SAMPLE data.

Figure 175 shows a screen with DASD devices sorted in descending HPF Read rate sequence (indicated by the underscore character '_____' above the zHPF Read header). Other possible sort sequences are indicated by dots above the corresponding columns. They can be set using the SORT subcommand with the string shown in the lowest line of the column heading as the sort argument (see "SORT" on page 287) or by positioning the cursor on the header of the field which is to be sorted and then pressing ENTER.

Some additional lines with device group averages will be shown at the top when the device groups have been defined. (See "FCONTROL DEVGROUP" on page 26.) The device group name will be displayed in place of the device number and

device type. The number of devices field (the Label/ID field in the >> All DASD << and device-group lines) contains the number of active devices belonging to the device group on the current screen.

For more detailed information on the specific DASD device, you can perform either of the following actions:

- Place the cursor on the Addr field of the device you are interested in and press Enter.
- Enter the subcommand DEVICE *devno* on the command line.

The I/O Device Details screen will then be shown with detailed data for the selected device. See "FCX110, I/O Device Details Screen – DEVICE *devno*" on page 408 for more information.

Field Descriptions:

HPF Mask
Mask of paths that support HPF.

HPF Featr
HPF features supported on the CU. The following state codes are supported:

D HPF feature has been disabled.

E HPF feature has been enabled.

M Multi-track operations have been enabled.

HPF Read/s
The rate of read operations in the HPF mode.

HPF Write/s
The rate of write operations in the HPF mode.

Except for the HPF Mask, HPF Featr, HPF Read/s, and HPF Write/s fields, all data columns are identical to those on the I/O Device Screen. See "FCX110, I/O Device Details Screen – DEVICE *devno*" on page 408 for a description of these fields.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields. Real averages will be shown for all fields which display device load figures. The Label/ID and Links fields will always contain current information.

FCX283, HPF I/O Device Performance Log Screen – HPFLOG

Performance Toolkit Subcommand: "HPFLOG" on page 197.

The HPF I/O Device Performance Log Screen (FCX283) shows a 'by time' log of HPF I/O performance data for the selected disk (which must have been previously selected for benchmarking).

```
FCX283      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

HPF I/O Data Log for Device 5CCD

Interval <- Dev. Descr.->  Mdisk Pa- <--------- zHPF --------> <------ Time (msec) --------> Req.
End Time Type   Label/ID   Links ths Mask Featr Read/s Write/s Pend Disc Conn Serv Resp CUWt Qued
>>Mean>> 3390-3 RU5CCD        22   2 C0   EM      99.5    66.3 .087 .024 .101 .212 .212 .000  .00
10:21:22 3390-3 RU5CCD        22   2 C0   EM     392.1   261.4 .103 1.24 .095 1.43 1.43 .000  .00
10:22:22 3390-3 RU5CCD        22   2 C0   EM      1637    1091 .089 .091 .101 .281 .281 .000  .00
10:23:22 3390-3 RU5CCD        22   2 C0   EM      2247    1498 .088 .005 .102 .195 .195 .000  .00
10:24:22 3390-3 RU5CCD        22   2 C0   EM      2250    1500 .088 .002 .102 .192 .192 .000  .00
10:25:22 3390-3 RU5CCD        22   2 C0   EM      2258    1505 .087 .002 .101 .190 .190 .000  .00
10:26:22 3390-3 RU5CCD        22   2 C0   EM      2245    1497 .087 .002 .101 .190 .190 .000  .00
10:27:22 3390-3 RU5CCD        22   2 C0   EM      2264    1509 .086 .002 .100 .188 .188 .000  .00
10:28:22 3390-3 RU5CCD        22   2 C0   EM      2307    1538 .086 .001 .100 .187 .187 .000  .00
10:29:22 3390-3 RU5CCD        22   2 C0   EM      2300    1533 .086 .002 .099 .187 .187 .000  .00
10:30:22 3390-3 RU5CCD        22   2 C0   EM      2238    1492 .086 .005 .100 .191 .191 .000  .00
10:31:22 3390-3 RU5CCD        22   2 C0   EM      2189    1460 .086 .002 .100 .188 .188 .000  .00
10:32:22 3390-3 RU5CCD        22   2 C0   EM      2231    1487 .085 .003 .099 .187 .187 .000  .00
10:33:22 3390-3 RU5CCD        22   2 C0   EM      2207    1472 .086 .002 .100 .188 .188 .000  .00
10:34:22 3390-3 RU5CCD        22   2 C0   EM      2199    1466 .086 .001 .100 .187 .187 .000  .00
10:35:22 3390-3 RU5CCD        22   2 C0   EM      2222    1481 .086 .004 .100 .190 .190 .000  .00
10:36:22 3390-3 RU5CCD        22   2 C0   EM      2187    1458 .086 .001 .101 .188 .188 .000  .00
10:37:22 3390-3 RU5CCD        22   2 C0   EM      2124    1416 .090 .002 .109 .201 .201 .000  .00
10:38:22 3390-3 RU5CCD        22   2 C0   EM      2134    1423 .089 .002 .105 .196 .196 .000  .00
10:39:22 3390-3 RU5CCD        22   2 C0   EM      2158    1439 .087 .001 .102 .190 .190 .000  .00
10:40:22 3390-3 RU5CCD        22   2 C0   EM      2161    1441 .087 .002 .101 .190 .190 .000  .00


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 176. Layout of HPF I/O Device Performance Log Screen (FCX283)

The information shown is based on CP monitor MONITOR domain and I/O domain SAMPLE data.

The first entry is reserved for averages since the last RESET subcommand, or since data collection was activated. It is designated by the string >>Mean>> in the Interval End Time column.

Field Descriptions:

Interval End Time
: The end time of the monitor interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Except for the Interval End Time field, which replaces the Addr field, all data columns are identical to the fields in FCX282. See "FCX282, HPF I/O Device Screen – DEVICE HPF" on page 789 for the descriptions of these fields.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX284, I/O Device Data Selection Menu – DEVMENU

Performance Toolkit Subcommand: "DEVMENU" on page 171.

The I/O Device Data Selection Menu (FCX284) displays a selection menu of available device reports.

```
FCX284      CPU nnnn  SER nnnnn     I/O data menu        Perf. Monitor

  General I/O device performance reports
S Command             Description
_ DEVICE              I/O device load
_ DEVICE   DASD       General DASD load and performance

  Specific DASD performance reports
S Command             Description
_ DEVICE   CPOWNED    CPOWNED DASD load and performance
_ DEVICE   HPF        HPF DASD load and performance
_ SCSI                SCSI EDEV load and performance



Select performance screen with cursor and hit ENTER
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 177. Layout of I/O Device Data Selection Menu (FCX284)

Field Descriptions:

S
Cursor selection field. The field will be highlighted and made cursor-selectable (set as 'unprotected') only if the corresponding device performance screen is available.

Command
The command name equal to the screen name that can be selected for display. The field will be highlighted if the corresponding device performance screen is available.

Description
Description of the performance display.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX285, LGR Event Log Screen – LGRELOG

Performance Toolkit Subcommand: "LGRELOG" on page 213.

The LGR Event Log screen (FCX285) shows information about the Live Guest Relocation events that have occurred on the system:

```
FCX285      Data for 2010/02/23        LGR Log Events        Monitor Scan

LGR Event Log
Log started at 08:39:19 on 2010/02/23
User event data initially enabled  for selected users.
See MONSET display for later changes.

Date  Time     Changed
02/23 08:40:23 Guest relocation for WASAPP1  from GDLEST3  started by MAINT
               at 08:40:23.367 with options:
                  FORCE ARCH, ASYNCH,
                  MAXTOTAL=NOLIMIT, MAXQUIESCE=      0
               VMRelocation for this user is ALLOWED.

02/23 08:40:28 Guest relocation for WASAPP1  from GDLEST3  ended successfully
               at 08:40:28.167, completed in 00:00:04.799.

02/23 08:40:32 Guest relocation for WASAPP2  from GDLEST3  started by MAINT
               at 08:40:32.199 with options:
                  FORCE ARCH, ASYNCH,
                  MAXTOTAL=NOLIMIT, MAXQUIESCE=      0
               VMRelocation for this user is ALLOWED.

02/23 08:40:38 Guest relocation for WASAPP2  from GDLEST3  ended successfully
               at 08:40:38.789, completed in 00:00:06.590.
               The user has been selected for benchmarking, detailed timings:
                  Time to establish connection      08:40:32.200   1298 usec
                  Initial eligibility checks        08:40:32.212  11308 usec
                  Create skeleton                   08:40:32.214   2659 usec
                  Storage management set up         08:40:32.221   6753 usec
                  Memory transfer (pre-q. passes)   ...             ... usec
                  FCP I/O quiesce                   ...             ... usec
                  TIME to quiesce                   08:40:37.689    ... usec
                  I/O relocation                    08:40:37.771  82971 usec
                  Final stor.management elig.checks 08:40:37.705  16730 usec
                  Penultimate memory pass           ...             ... usec
                  Final VSIM eligibility checks     08:40:37.695   6666 usec
                  Machine state relocation          08:40:37.705  10124 usec
                  Crypto relocation                 ...             ... usec
                  Last memory pass                  08:40:38.773  1001k usec

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 178. Layout of LGR Event Log Screen (FCX285)

The information shown is based on CP monitor USER domain EVENT data.

An event message displayed on the screen can contain either general information about the guest relocation or detailed relocation phase timings. To display the detailed Live Guest Relocation phase timings the user identifier of the guest being relocated should be selected for benchmarking using the FC BENCHMRK USER subcommand.

Field Description:

Log started
Time and date when data collection was started.

User event data
The initial data collect setting for the USER domain. LGR events can be logged only for periods where USER event data were collected for the affected user(s).

Live Guest Relocation data
Shows date, time and nature of any Live Guest Relocation event.

Date Month and day (format *mm/dd*) of LGR event.

Time Time (format *hh:mm:ss*) of the LGR event.

Changed
Live Guest Relocation status changes as follows:

- Guest Relocation for *userid* from *srcnode* started by *issuer* at *start_time* with options:

  relocation_options
  VMRelocation for this user is ALLOWED.
- Guest Relocation for *userid* to *destnode* started by *issuer* at *start_time* with options:

  relocation_options
  VMRelocation for this user is ALLOWED.
- Guest Relocation for *userid* to *destnode* ended successfully at *end_time*, completed in *interval* seconds.
- Guest Relocation for *userid* from *destnode* ended successfully at *end_time*, completed in *interval* seconds.
- Guest Relocation for *userid* from *srcnode* ended with *error* (*nn*, *error_message*) at *end_time*, completed in *interval* seconds.
- Guest Relocation for *userid* to *destnode* ended successfully at *start_time*, completed in *interval* seconds. The user has been selected for benchmarking, detailed timings:

```
Time to establish connection      hh:mm:ss.sss  vvv usec
Initial eligibility checks        hh:mm:ss.sss  vvv usec
Create skeleton                   hh:mm:ss.sss  vvv usec
Storage management set up         hh:mm:ss.sss  vvv usec
Memory transfer (pre-q. Passes)   hh:mm:ss.sss  vvv usec
FCP I/O quiesce                   hh:mm:ss.sss  vvv usec
Time to quiesce                   hh:mm:ss.sss  vvv usec
I/O relocation                    hh:mm:ss.sss  vvv usec
Final stor.management elig.checks hh:mm:ss.sss  vvv usec
Penultimate memory pass           hh:mm:ss.sss  vvv usec
Final VSIM eligibility checks     hh:mm:ss.sss  vvv usec
Machine state relocation          hh:mm:ss.sss  vvv usec
Crypto relocation                 hh:mm:ss.sss  vvv usec
Last memory pass                  hh:mm:ss.sss  vvv usec
Final I/O eligibility checks      hh:mm:ss.sss  vvv usec
Resume guest                      hh:mm:ss.sss  vvv usec
Clean-up                          hh:mm:ss.sss  vvv usec
Total quiesce time                HH:MM:SS.SSS
Total relocation time             HH:MM:SS.SSS
```

Where:

userid User identifier of the virtual machine being relocated.

srcnode
The system identifier from which the virtual machine relocation was started.

destnode
The system identifier to which the virtual machine is being relocated or was relocated to.

start_time
Time when the relocation was started.

relocation_options
Options specified for the virtual machine relocation.

VMRelocation
Relocation mode value specified for the virtual machine.

issuer The user identifier from which the relocation was started.

end_time
Time when the virtual machine relocation was ended.

interval
The time interval length in which the relocation was completed.

nn CP error return code.

error_message
Error message text:

```
01  Canceled by VMRELOCATE CANCEL command
02  Canceled by CPHX command
03  Canceled due to lost ISFC connection
04  Canceled due to MAXTOTAL time limit  exceeded
05  Canceled due to MAXQUIESCE time limit exceeded
06  Canceled due to eligibility violation
07  Canceled due to virtual machine reset or logoff
08  Canceled due to internal processing error
09  Canceled because CP exit rejected this relocation
11  Canceled because CP exit gave a return code that is not valid
```

hh:mm:ss.sss
Time when a relocation phase was ended for a user identifier which was selected for benchmarking.

vvv The number of microseconds in which a relocation phase was completed.

HH:MM:SS.SSS
Time interval spent for relocation or quiesce.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX286, LGR Data Screen – LGRDATA

Performance Toolkit Subcommand: "LGRDATA" on page 212.

The LGR Data screen (FCX286) shows information about the Live Guest Relocations that have occurred on the system:

```
FCX286      Data for 2010/02/23  LGR Data Events    Monitor Scan
      _______ .       .       .       .       .    .    .    .    .    .    .    .    .    .    . .  .  .  . .  .
                                                                                                    <-Reloc-> <-Set>
                                                                                                    <Options> <Opts>
                                                                 <---- Pages moved ---->           <Cleared> SI        O CA S
                                                   <Time, sec>   <----- by Pass... ---->      Actv <--I/Os-> YM MM FFF F AF R
Date  EndTime  Issuer   Userid   Source   Dest     FC Reloc Quisc Pass First Inter   N-1     N VDEV  I/O nonQ QDIO NM QR ADS F FC C
02/23 08:40:28 MAINT    WASAPP1  GDLEST3  GDLESTL1 00 4.800  .995    7  151k  2077   650     0   10    2    0    2 NN NY YNN N NY N
02/23 08:40:38 MAINT    WASAPP2  GDLEST3  GDLESTL1 00 6.590 1.101   10  207k  2360   961     1   11    2    0    2 NN NY YNN N NY N
02/23 08:40:45 MAINT    WASAPP3  GDLEST3  GDLESTL1 00 4.753  .999    6  152k  2295   393     0   10    2    0    2 NN NY YNN N NY N
02/23 08:40:55 MAINT    WASAPP4  GDLEST3  GDLESTL1 00 4.954 1.008    7  151k  2183   359     0   10    2    0    2 NN NY YNN N NY N
02/23 08:44:29 MAINT    WASDB2   GDLEST3  GDLESTL1 00 8.419 1.179    8  261k 17802 13184     1   18    4    0    4 NN NY YNN N NY N
02/23 08:46:08 MAINT    LX01301  GDLEST3  GDLESTL1 **   ...   ...   ..   ...   ...   ...   ...   ..   ..  ...  ... NN NY YNN N .. N


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 179. Layout of LGR Data Screen (FCX286)

The information shown is based on CP monitor USER domain EVENT data.

A Live Guest Relocation process is described on the LGR Data screen by a row containing the data from the LGR start event and LGR end event MONITOR records. The Performance Toolkit displays a row for each started relocation and then updates the row fields with the data from the relocation end event message. The maximum number of the finished LGR events kept on this report is limited by the REDISP value set by the FC MONCOLL REDISP subcommand. The oldest events are permanently removed.

Field Description:

Date Date of LGR start or LGR end.

EndTime
Time of LGR start or LGR end.

Issuer VMRELOCATE command issuer.

Userid
User identifier of relocation target.

Source
Name of the source system.

Dest Name of the destination system.

FC Code indicating reason why the relocation ended:

- **00** Completed successfully.
- **01** Canceled by VMRELOCATE CANCEL command.
- **02** Canceled by CPHX command.
- **03** Canceled due to lost ISFC connection.
- **04** Canceled due to MAXTOTAL time limit exceeded.
- **05** Canceled due to MAXQUIESCE time limit exceeded.
- **06** Canceled due to eligibility violation.

07 Canceled due to virtual machine reset or logoff.

08 Canceled due to internal processing error.

09 Canceled because CP exit rejected this relocation.

11 Canceled because CP exit gave a return code that is not valid.

****** Relocation has been started and still is in progress.

Time, sec:

Reloc Total relocation time.

Quisc Total quiesce time.

Pass Number of memory passes made during the relocation.

Pages moved by Pass...:

First Number of guest pages transferred in the first pass.

Inter Average number of guest pages transferred during pass 2 through pass n-2.

N-1 Number of guest pages transferred in the next to the last (penultimate) pass.

N Number of guest pages transferred in the final pass.

VDEV
Count of transferred virtual devices.

Actv I/O
Count of active I/O operations encountered.

Cleared I/Os:

nonQ Count of non-QDIO type I/O operations cleared.

QDIO Count of QDIO type I/O operations cleared.

Reloc Options:

SYN SYNCHRONOUS option was specified in the VMRELOCATE command (Y-yes, N-no).

IMM IMMEDIATE option was specified in the VMRELOCATE command (Y-yes, N-no).

MQ MAXQUIESCE NOLIMIT option was specified in the VMRELOCATE command (Y-yes, N-no).

MR MAXTOTAL NOLIMIT option was specified in the VMRELOCATE command (Y-yes, N-no).

FA FORCE ARCHITECTURE option was specified in the VMRELOCATE command (Y-yes, N-no).

FD FORCE DOMAIN option was specified in the VMRELOCATE command (Y-yes, N-no).

FS FORCE STORAGE option was specified in the VMRELOCATE command (Y-yes, N-no).

Set Opts:

OFF OFF was specified in the SET VMRELOCATE command (Y-yes, N-no).

CAF CPU affinity suppression (Y-yes, N-no).

AFC CPU affinity was changed (Y-yes, N-no).

SRC The MONITOR record is the source system record (Y-yes, N-no).

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX287, System Topology Machine Organization Screen -- TOPOLOG

Performance Toolkit Subcommand: "TOPOLOG" on page 321.

The System Topology Machine Organization screen (FCX287) displays LPAR topology information.

```
FCX287      CPU nnnn  SER nnnnn        Topology EventLog         Perf. Monitor

Topology configuration for GDLFCFT

Topology-list geometry  (0,0,0,0,4,20) MNest=  2

Date  Time     Location Type   Count    PU List       PP/Entitl. Ded.
02/01 11:40:04 Book   1  ZAAP      1    8             V-medium   ...
02/01 11:40:04           ICF       1    10            V-medium   ...
02/01 11:40:04 Book   3  CP        5    0-4           V-high     No
02/01 11:40:04           IFL       2    11-12         V-high     No
02/01 11:40:04           ZIIP      1    9             V-high     No
02/01 11:40:04 Book   4  CP        1    5             V-medium   ...
02/01 11:40:04           CP       10    6-7,13-20     V-low      ...

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 180. Layout of System Topology Machine Organization Screen (FCX287)

The information shown is based on CP monitor USER domain EVENT data.

Field Descriptions: This screen is available on systems running z/VM V6.2 and later releases. The fields below are also described in "z/Architecture Principles of Operations," SA22-7832, under the name SYSIB 15.1.2-15.1.6 (Configuration Topology).

Topology-list geometry (*mag6,mag5,mag4,mag3,mag2,mag1***) MNest=** *m*
The maximum number of container-type topology entries (*mag2–mag6*, CPU-type entries *mag1*, and maximum nesting level of the topology (*m*).

Geometry Log Details:

Date Date (format *mm/dd*) of the status change .

Time Time (format *hh:mm:ss*) of the status change.

Location
The actual physical location of listed CPUs.

Type The processor type. Possible values are:

- **CP** Central Processor
- **ICF** Internal Coupling Facility Processor
- **IFL** Integrated Facility for Linux Processor
- **ZIIP** IBM System z Integrated Information Processor (zIIP)
- **ZAAP** IBM System z Application Assist Processor (zAAP)

Count The number of listed processors.

PU List
The list of processors of the topology-list entry.

PP/Entitl.
The polarization (PP) and entitlement for the present topology-list entry. Possible values are, for vertical polarization:

V-high

V-medium

V-low

for horizontal polarization:

Horizontal

Ded. The dedication for the present topology-list entry. The field has a sense only for processors with horizontal polarization or vertical polarization with high entitlement; otherwise this field contains dots ("...").

Yes – listed processors are dedicated physical PUs.

No – all processors are shared physical PUs .

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX289, User Paging Menu Screen – UPGMENU

Performance Toolkit Subcommand: "UPGMENU" on page 330.

In the FCX289, User Paging Menu screen (FCX289), shows a list of all the available user paging data displays.

```
FCX289      CPU nnnn  SER nnnnn  UserPage menu            Perf. Monitor

  User paging reports
S Command     Description
_ UPAGE       User paging load
_ UPGACT      User page activity
_ UPGUTL      User page utilization




Select performance screen with cursor and hit ENTER
Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 181. Layout of User Paging Menu Screen (FCX289)

The information on this screen is based on CP monitor USER domain SAMPLE data.

Field Descriptions:

S
Cursor selection field. The field will be highlighted and made cursor-selectable (set as unprotected) only if the corresponding user page performance screen is available.

Command
The screen name, equal to the command that can be selected for display. The field will be highlighted if the corresponding user page performance screen is available.

Description
Description of the performance display.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX290, User Page Activity Screen – UPGACT

Performance Toolkit Subcommand: "UPGACT" on page 328.

The User Page Activity screen (FCX290) displays detailed information on z/VM's management of each virtual machine's memory management activities during the last measuring interval.

```
FCX290      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
________      .     .     .     .     .     .     .     .     .     .     .     .
                <------------------------------ Storage ------------------------------>
                                                  <-------- Movement/s ------->
           Stl <---- Transition/s ---> <-Steal/s->                          <Migrate/s> Nr of
Userid      Wt  Inst Relse Inval Reval Ready NoRdy  PGIN PGOUT Reads Write MWrit  Xrel Users
>>Mean>>   1.0 901.6 979.1  528K  461K  192K    .0    .0    .0  204K  139K    .0    .0    56
User Class Data:
PERF       1.0 983.0 969.4 97662 95874  1516    .0    .0    .0 52511 50927    .0    .0     1
Service    1.0    .0    .0    .0    .0    .0    .0    .0    .0    .0    .0    .0    .0     1

User Data:
APCSCIF      1     0     0     0     0     0     0     0     0     0     0     0     0
BK200001     1     0     0  249K  249K     0     0     0     0     0     0     0     0
BK200007     1     0     0  239K  239K     0     0     0     0     0     0     0     0
BK200008     1  54.6  54.6  244K  244K     0     0     0     0     0     0     0     0
BK300012     1     0     0  309K 1452K 2805K     0     0     0 5285K 1413K     0     0
BK400015     1     0     0 3678K     0 2579K     0     0     0  923K 2799K     0     0
CFT2NDA      1     0     0 35294 34488 532.5     0     0     0 355.0 846.5     0     0
CHG00001     1  9571  9161 54955 53084  1065     0     0     0     0 805.5     0     0
CHG00006     1  6171  6062 58627 56498  13.7     0     0     0  27.3  4410     0     0
CHG00008     1  41.0  41.0  3973  3932 218.5     0     0     0     0 122.9     0     0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 182. Layout of User Page Activity Screen (FCX290)

The information shown is based on CP monitor USER domain SAMPLE data.

Field Descriptions: The following field descriptions apply to both the UPGACT and UPGACTLG *userid* displays, with the exception of the "Userid" field which will be replaced by the "Interval End Time" field on the FCX291 display.

Userid
: User identification.

Interval End Time
: The end time of the monitor interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Stl Wt
: Steal weight factor. Used to determine the level of aggressiveness in reclaiming frames from this user.

Storage Transition/s:

Inst Rate of private storage instantiation, in bytes per second.

Relse Rate of private released storage, in bytes per second.

Inval Rate of private storage invalidation, in bytes per second.

Reval Rate of private IBR storage revalidation, in bytes per second.

Storage Steal/s:

Ready Rate of private IBR storage reclaimed, in bytes per second. At reclaim time, the pages' latest content was already preserved in auxiliary storage.

NoRdy
Rate of private IBR storage reclaimed but only after the contents are preserved in XSTORE or auxiliary storage at reclaim time, in bytes per second.

Storage Movement/s:

PGIN Rate of private storage reads from XSTORE, in bytes per second.

PGOUT
Rate of private storage writes to XSTORE, in bytes per second.

Reads Rate of private storage reads from auxiliary storage, in bytes per second.

Write Rate of private storage writes to auxiliary storage, in bytes per second.

Storage Migrate/s:

MWrit Rate of private storage writes by the migration task from XSTORE to auxiliary storage, in bytes per second.

Xrel Rate of private storage releases from XSTORE blocks by the migration task, without having to back up the contents in auxiliary storage, because the latest content is already in auxiliary storage, in bytes per second.

Nr of Users
The number of users which contributed to the average shown on this line (values are inserted only for lines with averages; the field remains empty for normal user data lines).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all data fields. All of a user's sessions during the selected period contribute to the averages shown. Note also that all of the activity fields (rates) are based on each user's connect time within the overall period, not the total elapsed time for the whole period.

FCX291, User Page Activity Log Screen – UPGACTLG

Performance Toolkit Subcommand: "UPGACTLG" on page 329.

The User Page Activity Log screen (FCX291) displays a log of user page activity.

```
FCX291      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Page Activity Log for User TH200006

               <------------------------------ Storage ------------------------------>
                                                  <------- Movement/s -------->
Interval   Stl <--- Transition/s ----> <-Steal/s->                        <Migrate/s>
End Time    Wt  Inst Relse Inval Reval Ready NoRdy  PGIN PGOUT Reads Write MWrit  Xrel
>>Mean>>   1.0     0     0 4536K 4537K     0     0     0     0     0     0     0     0
06:09:19     1     0     0  109K  109K     0     0     0     0     0     0     0     0
06:14:19     1     0     0 3678K 3677K     0     0     0     0     0     0     0     0
06:19:19     1     0     0 88446 88883     0     0     0     0     0     0     0     0
06:24:19     1     0     0 44128 44128     0     0     0     0     0     0     0     0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 183. Layout of User Page Activity Log Screen (FCX291)

The information shown is based on CP monitor USER domain SAMPLE data.

Field Descriptions: For a description of the fields on this screen, see "FCX290, User Page Activity Screen – UPGACT" on page 802.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX292, User Page Utilization Data Screen – UPGUTL

Performance Toolkit Subcommand: "UPGUTL" on page 331

The User Page Utilization Data screen (FCX292) displays detailed information on each virtual machine's utilization of z/VM paging resources during the last measuring interval.

```
FCX292      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor
________      .    .     .     .     .     .     .     .     .     .     .     .     .     .     .     .     .
              <-------------------------------------------- Storage ---------------------------------------------->
                                  <------------------------- Resident ---------------------------->
          Data                                                <----- Invalid But Resident ------>               Base
         Spaces                   <---- Total ----> <-Locked--> <-- UFO --> <-- PNR --> <-AgeList->              Space Nr of
Userid    Owned   WSS  Inst Resvd T_All  T<2G  T>2G  L<2G  L>2G  U<2G  U>2G  P<2G  P>2G  A<2G  A>2G XSTOR   AUX   Size Users
>>Mean>>   10.6 5645M 6113M  256M 5391M   34M 5356M 585.1 41472    .0 2743K 292.6   46M  73.1 6008K    .0 3305M  6341M    56
User Class Data:
PERF         .0   16M   35M    .0   16M    .0   16M    .0    .0    .0  512K    .0   15M    .0 24576    .0   34M  3072M     1
Service      .0 1972K 5196K 2048K 2048K  4096 2044K    .0 77824    .0 1204K    .0    .0    .0  376K    .0 3640K 32768K     1

User Data:
APCSCIF       0  952K  972K     0    4K     0    4K     0     0     0     0     0     0     0     0     0  968K    64M
BK200001      0 3318M 3074M     0 3072M     0 3072M     0     0     0     0     0     0     0     0     0 2160K  3328M
BK200007      0 3318M 3074M     0 3072M   12M 3060M     0     0     0     0     0     0     0     0     0 3074M  3328M
BK200008      0 3318M 3074M     0 3072M   76K 3072M     0     0     0     0     0     0     0     0     0 3074M  3328M
BK300012      0 4194M   16G     0 6814M  164K 6814M     0     0     0 8728K    4K  265M    4K  273M     0   16G 16640M
BK400015      0  100G  100G     0   86G  760M   85G     0     0     0   47M     0 1085M     0   50M     0   60G   100G

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 184. Layout of User Page Utilization Data Screen (FCX292)

The information shown is based on CP monitor USER domain SAMPLE data.

Field Descriptions: The following field descriptions apply to both the UPGUTL and UPGUTLLG *userid* displays, with the exception of the "Userid" field which will be replaced by the "Interval End Time" field on the FCX293 display.

Userid
User identification.

Interval End Time
The end time of the monitor interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Data Spaces Owned
Number of non-base spaces owned by this user.

Storage:

WSS User's projected working-set size, in bytes.

Inst Instantiated private storage, in bytes.

Resvd Reserved storage setting, in bytes.

Storage Resident Total:

T_All Total resident private storage, in bytes. Individual pages may be valid or in the IBR state.

T<2G Resident private storage below 2G, in bytes.

T>2G Resident private storage above 2G, in bytes.

Storage Resident Locked:

L<2G Locked private storage below 2G, in bytes.

L>2G Locked private storage above 2G, in bytes.

Storage Resident Invalid But Resident UFO:

U<2G Invalid but resident private storage on the User Frame Owned List that is backed by frames below 2G, in bytes.

U>2G Invalid but resident private storage on the User Frame Owned List that is backed by frames above 2G, in bytes.

Storage Resident Invalid But Resident PNR:

P<2G Invalid but resident private storage that has not been referenced since it was read-in by a block read and is backed by frames below 2G, in bytes.

P>2G Invalid but resident private storage that has not been referenced since it was read-in by a block read and is backed by frames above 2G, in bytes.

Storage Resident Invalid But Resident Age List:

A<2G Invalid but resident private storage on the Age List that is backed by frames below 2G, in bytes.

A>2G Invalid but resident private storage on the Age List that is backed by frames above 2G, in bytes.

Storage:

XSTOR
Amount of XSTORE occupied by pages belonging to this user, in bytes.

AUX Amount of auxiliary storage occupied by pages belonging to this user, in bytes.

Base Space Size
Size of the user's base address space, in bytes.

Nr of Users
The number of users which contributed to the average shown on this line (values are inserted only for lines with averages; the field remains empty for normal user data lines).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all data fields. All of a user's sessions during the selected period contribute to the averages shown. Note also that all of the activity fields (rates) are based on each user's connect time within the overall period, not the total elapsed time for the whole period.

FCX293, User Page Utilization Data Log Screen – UPGUTLLG

Performance Toolkit Subcommand: "UPGUTLLG" on page 332.

The User Page Utilization Data Log screen (FCX293) displays a log of user page utilization data.

```
FCX293      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Page Utilization Log for User TH200006

               <---------------------------------------------- Storage ----------------------------------------------->
                                  <------------------------- Resident ----------------------------->
          Data                                                 <----- Invalid But Resident ------>                Base
Interval Spaces                   <---- Total ----> <-Locked--> <-- UFO --> <-- PNR --> <-AgeList->               Space
End Time  Owned   WSS  Inst Resvd T_All  T<2G  T>2G  L<2G  L>2G  U<2G  U>2G  P<2G  P>2G  A<2G  A>2G XSTOR   AUX   Size
>>Mean>>     .0 3072M 3072M 2048M 3072M   20K 3072M     0     0     0 3168K     0    8K     0     0     0 1762M  3072M
06:09:19      0 3072M 3072M 2048M 3072M   20K 3072M     0     0     0     0     0     0     0     0     0 1762M  3072M
06:14:19      0 3072M 3072M 2048M 3072M   20K 3072M     0     0     0  512K     0  128K     0     0     0 1762M  3072M
06:19:19      0 3072M 3072M 2048M 3072M   20K 3072M     0     0     0     0     0     0     0     0     0 1762M  3072M
06:24:19      0 3072M 3072M 2048M 3072M   20K 3072M     0     0     0     0     0     0     0     0     0 1762M  3072M

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 185. Layout of User Page Utilization Data Log Screen (FCX293)

The information shown is based on CP monitor USER domain SAMPLE data.

Field Descriptions: For a description of the fields on this screen, see "FCX292, User Page Utilization Data Screen – UPGUTL" on page 805.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX294, Available List Data Below 2G Screen – AVLB2GLG

Performance Toolkit Subcommand: "AVLB2GLG" on page 139.

The Available List Data Below 2G screen (FCX294) displays 'by time' information on the real memory below 2G Available List.

```
FCX294      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <------------ Storage -------------> <--Times--> <Frame Thresh>
Interval  <Available> <Requests/s> <Returns/s> <-Empty/s-> <- Singles -->
End Time   Sing  Cont  Sing   Cont  Sing  Cont  Sing  Cont   Low     Prot
>>Mean>>     8K  149K 350.0  343.5 271.6 322.6    .0    .0    15       15
04:39:19      0   88K 204.8     .0    .0    .0    .0    .0    15       15
04:44:19     4K  148K  2772   4096  2895  3919    .0    .0    15       15
04:49:19     4K  196K    .0     .0  81.9  81.9    .0    .0    15       15
04:54:19    88K  156K 136.5  122.9 341.3  68.3    .0    .0    15       15
04:59:19    24K  224K 368.6   68.3 245.8 191.1    .0    .0    15       15
05:04:19      0  276K 382.3  273.1 300.4 368.6    .0    .0    15       15
05:09:19      0  120K 245.8  314.0    .0    .0    .0    .0    15       15
05:14:19      0  108K 614.4  163.8  81.9 150.2    .0    .0    15       15
05:19:19      0  120K 273.1  191.1 204.8 218.5    .0    .0    15       15
05:24:19     8K  228K 245.8  109.2 300.4 273.1    .0    .0    15       15
05:29:19     4K  244K    .0     .0  13.7  27.3    .0    .0    15       15
05:34:19     4K  252K    .0     .0    .0  27.3    .0    .0    15       15
05:39:19      0  120K 245.8  286.7    .0  41.0    .0    .0    15       15

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 186. Layout of Available List Data Below 2G Screen (FCX294)

The information shown is based on CP monitor SYSTEM and STORAGE domains SAMPLE data.

Field Descriptions: The following field descriptions apply to both the AVLB2GLG and AVLA2GLG displays.

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Storage:

Available Sing
Amount of storage on the singles available list, in bytes.

Available Cont
Amount of storage on the contig available list, in bytes. The frames comprising the list are in groups of two or more contiguous frames.

Requests/s Sing
Amount of storage obtained from the singles list, in bytes per second.

Requests/s Cont
Amount of storage obtained from the contig list, in bytes per second.

Returns/s Sing
Amount of storage returned to the singles list, in bytes per second.

Returns/s Cont
Amount of storage returned to the singles list, in bytes per second.

Times:

Empty/s Sing
Count of times singles available list was empty, per second.

Empty/s Cont
Count of times contig list was empty, per second.

Frame Thresh:

Singles Low
Low threshold for singles available list, in frames.

Singles Prot
Protect threshold for < 2G singles available list, in frames.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX295, Available List Data Above 2G Screen – AVLA2GLG

Performance Toolkit Subcommand: "AVLA2GLG" on page 138.

The Available List Data Above 2G screen (FCX295) displays 'by time' information on the real memory above 2G Available List.

```
FCX295      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

          <------------ Storage -------------> <--Times--> <-Frame Thresh-->
Interval  <Available> <Requests/s> <Returns/s> <--Empty-->  Sing <-Contigs->
End Time   Sing  Cont  Sing   Cont  Sing  Cont  Sing  Cont   Low   Low  Prot
>>Mean>>    52M  203M 6333K  5532K 6466K 5355K    .0    .0    16    15    15
04:39:19    53M  240M   14M    10M   15M 9852K    .0    .0    16    15    15
04:44:19   231M  241M   23M    20M   24M   20M    .0    .0    17    15    15
04:49:19      0 3308K 7058K  5570K 6416K 4613K    .0    .0    21    15    15
04:54:19   114M  515M 3296K  2119K 3878K 3673K    .0    .0    19    15    15
04:59:19   495M  836M 3242K  4261K 4844K 5056K    .0    .0    15    15    15
05:04:19  7416K  244M 5155K  4255K 3345K 2380K    .0    .0    15    15    15
05:09:19      0   24M 6297K  5585K 6338K 4766K    .0    .0    15    15    15
05:14:19      0  239M 9749K  7655K 9993K 8148K    .0    .0    15    15    15
05:19:19      0   44M 7429K  7280K 7551K 6490K    .0    .0    17    15    15
05:24:19      0  205M 5807K  4930K 5963K 5325K    .0    .0    15    15    15
05:29:19      0  211M 2993K  3067K 3070K 3007K    .0    .0    15    15    15
05:34:19    664K 247M 2289K  2220K 2396K 2237K    .0    .0    15    15    15
05:39:19      0  242M 2573K  2186K 2615K 2126K    .0    .0    15    15    15


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 187. Layout of Available List Data Above 2G Screen (FCX295)

The information shown is based on CP monitor SYSTEM domain and STORAGE domain SAMPLE data.

Field Descriptions: For a description of the fields on this screen, see "FCX294, Available List Data Below 2G Screen – AVLB2GLG" on page 808.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX296, Steal Statistics Screen – STEALLOG

Performance Toolkit Subcommand: "STEALLOG" on page 293.

The Steal Statistics screen (FCX296) displays 'by time' information on z/VM's memory management stealing statistics.

```
FCX296      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

           Pct <-------------------- Storage/s --------------------> <-Completions/s>                  <-- Age List --->
Interval  Time Total Write <--User---> <-Shared--> <Pvt Vdisk>  AgeL  Need  Time   Sys Travs <-Users/s-> <--Stor Skip/s-->
End Time  Actv Stoln OnDmd Inval Reval Inval Reval Inval Reval Reval   Met Limit   Req    /s Visit  Skip   Pin   Ser  Resv
>>Mean>>   4.2   11M    .0   67M   42M    .0    .0 15859  6713   22M    .6   1.9    .0    .4   9.5   1.9    .0    .0    .0
04:39:19  16.2   23M    .0  416M  269M    .0    .0 23866  8219  144M    .7  10.5    .0   1.6  34.3   7.4    .0    .0    .0
04:44:19  13.4   43M    .0  264M  129M    .0    .0 19770  6526  134M   1.0   8.7    .0   2.0  40.6   9.3    .0    .0    .0
04:49:19   8.6 9756K    .0  227M  149M    .0    .0 24358  6185   76M    .0   5.8    .0    .9  19.7   3.9    .0    .0    .0
04:54:19   1.6 5746K    .0   35M   22M    .0    .0 11401  2840 9553K    .0    .9    .0    .2   4.4    .8    .0    .0    .0
04:59:19   2.3 9197K    .0   31M   22M    .0    .0  8411  4683 6212K    .1    .8    .0    .2   3.6    .6    .0    .0    .0
05:04:19   1.6 4755K    .0   18M   14M    .0    .0  9243  4028 4629K    .0    .6    .0    .2   4.1    .7    .0    .0    .0
05:09:19   2.5 9578K    .0   15M 7938K    .0    .0 29368  7987 1732K    .6    .7    .0    .3   7.2   1.3    .0    .0    .0
05:14:19   4.4   17M    .0   42M   30M    .0    .0 21723  3400 7576K   2.3   1.1    .0    .5  11.5   2.1    .0    .0    .0
05:19:19   3.9   12M    .0   34M   24M    .0    .0 10172  4137 8524K    .8    .9    .0    .3   6.6   1.3    .0    .0    .0
05:24:19   5.0   11M    .0   28M   20M    .0    .0 65700 54272 4361K    .9    .8    .0    .3   6.5   1.3    .0    .0    .0
05:29:19   1.2 5923K    .0 6831K 5284K    .0    .0  2976  1475  992K    .0    .3    .0    .1   1.9    .3    .0    .0    .0
05:34:19   2.2 4462K    .0 5996K 3546K    .0    .0  5734  2908  567K    .0    .4    .0    .1   2.6    .4    .0    .0    .0
05:39:19   1.3 4592K    .0 3935K 3142K    .0    .0  4560  2089   98K    .1    .2    .0    .1   1.8    .3    .0    .0    .0
05:44:19    .7 2549K    .0 3358K 2303K    .0    .0  7892  6485 1245K    .0    .2    .0    .0   1.3    .2    .0    .0    .0
05:49:19   2.1 6525K    .0 8039K 5330K    .0    .0 19442  6881  358K    .6    .3    .0    .2   4.2    .8    .0    .0    .0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 188. Layout of Steal Statistics Screen (FCX296)

The information shown is based on CP monitor STORAGE domain SAMPLE data.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Pct Time Actv
The percentage of the interval in which demand scan was active.

Storage/s:

Total Stoln
The total amount of storage reclaimed, in bytes per second. Includes storage taken via write-on demand.

Write OnDmd
The total amount of storage reclaimed immediately after being written to auxiliary, in bytes per second.

User Inval
The amount of storage invalidated (page-table entries invalidated, with pages left resident) on all User Frame Owned lists, in bytes per second. Pages in this invalid-but-resident state are referred to as IBR. Pages are made IBR prior to frame reclaim. Non-faulted pages read in by a block read are added to the User Frame Owned list in the IBR state. Those pages are not included in this count.

User Reval
The amount of storage revalidated (because of guest access) on all User

Frame Owned lists, in bytes per second. Revalidations of non-faulted pages read in by a block read are included in this count.

Shared Inval
The amount of storage invalidated (page-table entries invalidated, with pages left resident) on the Shared Frame Owned list, in bytes per second. Non-faulted pages read in by a block read are added to the Shared Frame Owned list in the IBR state. Those pages are not included in this count.

Shared Reval
The amount of storage revalidated (because of guest access) on the Shared Frame Owned list, in bytes per second. Revalidations of non-faulted pages read in by a block read are included in this count.

Pvt VDisk Inval
The amount of storage invalidated (page-table entries invalidated, with pages left resident) on the Private VDisk Frame list, in bytes per second. Non-faulted pages read in by a block read are added to the Private VDisk Frame list in the IBR state. Those pages are not included in this count.

Pvt VDisk Reval
The amount of storage revalidated (because of guest access) on the Private VDisk Frame List, in bytes per second. Revalidations of non-faulted pages read in by a block read are included in this count.

AgeL Reval
The amount of storage revalidated (because of guest access) on the age list, in bytes per second. Revalidations of non-faulted pages read in by a block read are included in this count.

Completions/s:

Need Met
Number of times demand scan stopped because the need was met, per second.

Time Limit
Number of times demand scan stopped because it was running for too long, per second.

Sys Req
Number of times demand scan was told to stop because of "external" factors such as a paging overrun or because it was running on an inappropriate CPU, per second.

Travs/s
The number of full traversals through all UFOs, the VUFO, and the SUFO, per second.

User/s:

Visit Number of UFO lists from which pages were made invalid but resident (IBR), per second.

Skip Number of UFO lists that could not be processed because (PTIL, UFO, or Shadow Table) serialization could not be obtained, or because of the guests' reserved setting, per second.

Age List: A staging area for reclaiming frames containing pageable content.

Stor Skip/s Pin
The amount of storage skipped from reclaim at the bottom of the age list because the frames were pinned, in bytes per second.

Stor Skip/s Ser
The amount of storage skipped because serialization could not be obtained, in bytes per second.

Stor Skip/s Resv
The amount of storage requeued from bottom of age list to UFO list, in bytes per second.

Note: The count of revalidations can exceed the count of invalidations because revalidations include non-faulted pages read in by a block read that were added to the frame-owned list as IBR pages; the invalidation count includes only those active pages that were invalidated (made IBR) by demand scan.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX297, Age List Log Screen – AGELLOG

Performance Toolkit Subcommand: "AGELLOG" on page 134.

The Age List Log screen (FCX297) displays 'by time' information on z/VM's management of the Age List in real memory.

```
FCX297      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

                    <---------------------- Storage ----------------------->       <----- Revalidation ------>
                                          <-- Steal Ready ---> <--- Not Ready ---->   %Of <------- Storage/s ------->
Interval  Size S E <-List Size--> <--RefOnly--> <--Changed--> <-Evaluating> Pages <--RefOnly--> <--Changed-->
End Time  %DPA Z W Target Current  NoWrt  Write  Write PndWrt   Refd Change  Eval  NoWrt  Write  NoWrt  Write
>>Mean>>   2.0 . .   810M  97596K      0    32K 10104K 87396K      0      0    10     .0     .0     .0     .0
02:55:25   2.0 F Y   810M  97596K      0    32K 10104K 87396K      0      0    10     .0     .0     .0     .0
03:00:25   2.0 . Y   810M  97596K      0    32K 10104K 87396K      0      0    10     .0     .0     .0     .0
03:05:25   2.0 V Y   810M  97596K      0    32K 10104K 87396K      0      0    10     .0     .0     .0     .0
03:10:25   2.0 V .   810M  97596K      0    32K 10104K 87396K      0      0    10     .0     .0     .0     .0
03:15:25   2.0 V N   810M  97596K      0    32K 10104K 87396K      0      0    10     .0     .0     .0     .0
03:20:25   2.0 V .   810M  97596K      0    32K 10104K 87396K      0      0    10     .0     .0     .0     .0
03:25:25   2.0 . Y   810M  97596K      0    32K 10104K 87396K      0      0    10     .0     .0     .0     .0
03:27:25   2.0 F Y   810M  97596K      0    32K 10104K 87396K      0      0    10     .0     .0     .0     .0

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 189. Layout of Age List Log Screen (FCX297)

The information shown is based on CP monitor STORAGE domain SAMPLE data.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the >>Mean>> entry, you can find the relevant interval in the header line.

Size %DPA
The target age list size as a percentage of current DPA.

The global age list flags:

SZ The global age list is a fixed ("F") or variable ("V") size.

EW The flag indicating whether the early writes are enabled ("Y") or disabled ("N").

A dot (".") means that the flag setting has changed during the observed interval.

Storage List Size:

Target The target storage size of the age list, in bytes.

Current
The current storage size of the age list, in bytes.

Storage Steal Ready:

RefOnly NoWrt
Referenced-only storage that can be reclaimed immediately, in bytes. The page content was not rewritten to auxiliary.

RefOnly Write
Referenced-only storage that can be reclaimed immediately, in bytes. The page content has been rewritten to auxiliary for load balancing.

Changed Write
Changed storage that can be reclaimed immediately, in bytes. The page content has been backed in auxiliary storage.

Changed PndWrt
Changed storage that cannot be reclaimed until its page content is backed up on auxiliary storage, in bytes.

Storage Not Ready:

Evaluating Refd
Referenced-only storage that is not yet reclaimable because changed pages in the same paging block are queued for a write to auxiliary, in bytes.

Evaluating Change
Changed storage that is not yet reclaimable because the changed page content is queued for a write to auxiliary, in bytes.

%Of Pages Eval
The percentage of storage in the age list that has been evaluated for write processing.

Revalidation Storage/s:

RefOnly NoWrt
Referenced-only storage on the age list that was revalidated, in bytes per second. The page content was not written to auxiliary before it was revalidated.

RefOnly Write
Referenced-only storage on the age list that was revalidated, in bytes per second. The page content was written to auxiliary for load balancing before it was revalidated.

Changed NoWrt
Changed storage on the age list that was revalidated, in bytes per second. The changed content was not written to auxiliary before it was revalidated.

Changed Write
Changed storage on the age list that was revalidated, in bytes per second. The changed content was written to auxiliary before it was revalidated.

Note: The Steal Ready and Not Ready counts may not add up to the current size of the Age List. This is because there might be referenced-only pages in the Not Ready section of the Age List.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX298, Logical PU Organization Log – PUORGLOG

Performance Toolkit Subcommand: "PUORGLOG" on page 254.

The Logical PU Organization Log screen (FCX298) shows PU organization information for a partition.

```
FCX298      CPU nnnn  SER nnnnn        Log. PU  Config.         Perf. Monitor

Logical PU organization for FCFT     (GDLFCFT )

Date  Time     CPU Type PPD Ent. Location
04/16 13:07:50   0 CP   Vh   100 3:2
04/16 13:07:50   1 CP   Vh   100 3:2
04/16 13:07:50   2 CP   Vh   100 3:2
04/16 13:07:50   3 CP   Vh   100 3:2
04/16 13:07:50   4 CP   Vh   100 3:2
04/16 13:07:50   5 CP   Vm  71.4 3:4
04/16 13:07:50   6 CP   Vl    .0 3:4
04/16 13:07:50   7 CP   Vl    .0 3:4
04/16 13:07:50   8 ZAAP Vm  72.7 3:4
04/16 13:07:50   9 ZIIP Vm  92.3 3:2
04/16 13:07:50  10 ICF  Vm  50.0 3:4
04/16 13:07:50  11 IFL  Vh   100 3:2
04/16 13:07:50  12 IFL  Vh   100 3:4
04/16 13:07:50  13 CP   Vl    .0 3:2
04/16 13:07:50  14 CP   Vl    .0 3:2
04/16 13:07:50  15 CP   Vl    .0 3:2
04/16 13:07:50  16 CP   Vl    .0 3:2
04/16 13:07:50  17 CP   Vl    .0 3:2
04/16 13:07:50  18 CP   Vl    .0 3:2
04/16 13:07:50  19 CP   Vl    .0 3:2

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 190. Layout of Logical PU Organization Log Screen (FCX298)

The information shown is based on CP monitor MONITOR domain and PROCESSOR domain SAMPLE data.

Field Descriptions:

Logical PU Organization for Partition
The name of the partition which collected the PU organization data.

Date Date (format *mm/dd*) of the status change.

Time Time (format *hh:mm:ss*) of the status change.

CPU The Logical Processor number.

Type The processor type. Possible values are:

- **CP** Central Processor
- **ICF** Internal Coupling Facility Processor
- **IFL** Integrated Facility for Linux Processor
- **ZIIP** IBM System z Integrated Information Processor (zIIP)
- **ZAAP** IBM System z Application Assist Processor (zAAP)

PPD The polarization and entitlement for the present topology-list entry. Possible values are:

- **Vh** Polarization is vertical, with high entitlement.

VhD Polarization is vertical, with high entitlement, and the partition is a dedicated partition.

Vm Polarization is vertical, with medium entitlement.

Vl Polarization is vertical, with low entitlement.

Hz Polarization is horizontal.

HzD Polarization is horizontal, and the partition is a dedicated partition.

Ent. The average processor entitlement for the listed CPU as a percentage, where 100% represents one whole physical CPU's worth of processing capacity.

Location
The actual physical location of listed CPU as it is defined by the architecture. The format depends on the current CEC hardware model. Possible values are:

m CEC's book ID.

m:n CEC's book ID (*m*) and chip number (*n*) inside this book.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX299, Logical PU Configuration Log – PUCFGLOG

Performance Toolkit Subcommand: "PUCFGLOG" on page 253.

The Processor Unit Configuration Log screen (FCX299) logs the calculations and decisions z/VM makes regarding how many logical processor units of each type are (and are not) actively doing work.

```
FCX299      CPU nnnn  SER nnnnn        DSV Conf EventLog         Perf. Monitor

                                Type          <--------- Last ---------> <-------------- Next -------------->
Date  Time     Type OnL Entitl    Cap CPUPAD EX   Load     XP    XPF   T/V   LCei    XPF   T/V   N NotVh  UpCap LPU Unparked mask
02/21 16:09:42 ICF    1   80.0    ...  100.0 70     .0   17.9   17.9 256.0     .0   17.3 256.0   1  97.3   97.3 00200000_00000000
02/21 16:09:42 ZIIP   1  120.0    ...  100.0 70     .3  179.8  179.8 256.0     .6  178.9 256.0   1    .0  100.0 00400000_00000000

02/21 16:09:43 * Processor  0 varied offline
02/21 16:09:43 * System Topology changed. Check/Change count is 10472/6
02/21 16:09:43 * CPU Park/Unpark State changed

02/21 16:09:43 CP    15  571.4    ...  100.0 70  150.4 2149.3 2149.3 2.365  267.5 2107.9 9.966   5    .0  500.0 78000000_00000000
02/21 16:09:43 ZAAP   1   80.0    ...  100.0 70     .0  120.0  120.0 256.0     .3  119.9 256.0   1 100.0  100.0 00800000_00000000
02/21 16:09:43 IFL    2  251.0    ...  100.0 70     .0  974.4  974.4 256.0    2.0  965.1 256.0   2    .0  200.0 00180000_00000000
02/21 16:09:43 ICF    1   80.0    ...  100.0 70     .0   17.8   17.8 256.0     .1   17.4 256.0   1  97.4   97.4 00200000_00000000
02/21 16:09:43 ZIIP   1  120.0    ...  100.0 70     .1  179.9  179.9 256.0     .2  179.4 256.0   1    .0  100.0 00400000_00000000

02/21 16:09:45 * CPU Park/Unpark State changed

02/21 16:09:45 CP    15  571.4    ...  100.0 70  184.1 2078.9 2078.9 1.711  261.2 2008.5 9.981   5    .0  500.0 7C000000_00000000
02/21 16:09:45 ZAAP   1   80.0    ...  100.0 70     .0  120.0  120.0 256.0     .3  119.9 256.0   1 100.0  100.0 00400000_00000000
02/21 16:09:45 IFL    2  251.0    ...  100.0 70     .0  968.9  968.9 256.0    1.9  963.3 256.0   2    .0  200.0 00180000_00000000
02/21 16:09:45 ICF    1   80.0    ...  100.0 70     .0   17.7   17.7 256.0     .0   17.4 256.0   1  97.4   97.4 00200000_00000000
02/21 16:09:45 ZIIP   1  120.0    ...  100.0 70     .0  180.0  180.0 256.0     .2  179.9 256.0   1    .0  100.0 00400000_00000000

02/21 16:10:03 CP    15  571.4    ...  100.0 70  234.7 2126.7 2126.7 2.019  257.0 2108.5 9.808   5    .0  500.0 7C000000_00000000
02/21 16:10:03 ZAAP   1   80.0    ...  100.0 70     .0  120.0  120.0 256.0     .0  120.0 256.0   1 100.0  100.0 00400000_00000000
02/21 16:10:03 IFL    2  251.0    ...  100.0 70    1.6  969.9  969.9 256.0    3.1  964.7 256.0   2    .0  200.0 00180000_00000000
02/21 16:10:03 ICF    1   80.0    ...  100.0 70     .0   17.8   17.8 256.0     .0   17.2 256.0   1  97.2   97.2 00200000_00000000
02/21 16:10:03 ZIIP   1  120.0    ...  100.0 70     .0  180.0  180.0 256.0     .0  180.0 256.0   1    .0  100.0 00400000_00000000

02/21 16:10:05 * System Topology changed. Check/Change count is 10483/7
02/21 16:10:05 * Processor  0 varied online
02/21 16:10:05 * CPU Park/Unpark State changed

02/21 16:10:05 CP    16  571.4    ...  100.0 70  227.9 2168.0 2168.0 2.146  261.7 2128.5 9.798   5    .0  500.0 FC000000_00000000
02/21 16:10:05 ZAAP   1   80.0    ...  100.0 70     .0  120.0  120.0 256.0     .0  120.0 256.0   1 100.0  100.0 00800000_00000000
02/21 16:10:05 IFL    2  251.0    ...  100.0 70    2.6  979.8  979.8 256.0    3.6  965.0 256.0   2    .0  200.0 00180000_00000000
02/21 16:10:05 ICF    1   80.0    ...  100.0 70     .0   17.7   17.7 256.0     .0   17.2 256.0   1  97.2   97.2 00200000_00000000
02/21 16:10:05 ZIIP   1  120.0    ...  100.0 70     .0  180.0  180.0 256.0     .0  180.0 256.0   1    .0  100.0 00400000_00000000

...


Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 191. Logical PU Configuration Log Screen (FCX299)

The information shown is based on CP monitor PROCESSOR domain EVENT data.

Field Descriptions:

Date Date (format *mm/dd*) of the status change.

Time Time (format *hh:mm:ss*) of the status change.

Note: Every record (group of lines, by type, if applicable) always appears in a two-second interval. If FC SET BYTIME sets to any nonzero value, the Performance Toolkit keeps only specified timestamps, rounded to the nearest next sample interval, plus one before and one after the significant external event. (See the note in the Type field).

Type The processor type. Possible values are:

CP Central Processor

ICF Internal Coupling Facility Processor

IFL Integrated Facility for Linux Processor

ZIIP IBM System z Integrated Information Processor (zIIP)

ZAAP IBM System z Application Assist Processor (zAAP)

Note: When the Type field contains an asterisk ('*'), the line denotes a significant external event:

* CPU Park/Unpark State changed
* Processor XX varied online
* Processor XX varied offline
* System Topology changed. Check/Change count is XX/YY

OnL The number of logical processors online.

Entitl The current entitlement for the listed CPU type as a percentage, where 100% represents one whole physical CPU's worth of processing capacity.

This field is available in an environment which provides the information needed to make excess capacity predictions. Otherwise dots (...) will be displayed.

Type Cap
Maximum amount of CPU capacity which the current partition is permitted to use, as a percentage, where 100% represents one whole physical CPU's worth of processing capacity.

CPUPAD
The CPUPAD value set by the administrator using the SET SRM CPUPAD command.

EX Confidence percentage used to make floor projection of unentitled capacity. The value is driven by SET SRM EXCESSUSE command for this processor type.

Last Load
Last actual load measurement in our partition, as a percentage, where 100% represents one whole physical CPU's worth of processing capacity.

Last XP
Calculated amount of excess processor capacity available on shared physical CPUs in the CEC over the interval; amount of physical CPU capacity of this type which is available to all shared LPARs which are competing for CPU capacity beyond their entitlement (includes both processor capacity above entitlement used and unused capacity).

Shown as a percentage, where 100% represents one whole physical CPU's worth of processing capacity.

The field is available in an environment which provides the information needed to make excess capacity predictions. Otherwise dots (...) will be displayed.

Last XPF
Calculated share of extra capacity in interval: amount of XP that this partition could have used, had it wanted to use it.

Shown as a percentage, where 100% represents one whole physical CPU's worth of processing capacity.

The field is available in an environment which provides the information needed to make excess capacity predictions. Otherwise dots (...) will be displayed.

Last T/V
Calculated T/V ratio in the interval. The field contains dots (...) when T/V was not calculated for the most recent interval.

Next LCei
Ceiling prediction of CPU utilization for next interval, as a percentage, where 100% represents one whole physical CPU's worth of processing capacity.

Next XPF
Unentitled capacity floor projection for the next interval, as a percentage, where 100% represents one whole physical CPU's worth of processing capacity.

Next T/V
Ceiling projection for T/V ratio for the next interval. The field contains dots (...) when a prediction was not made for the next interval.

Next N
The count of logical CPUs that will be in unparked state for the next interval.

Next NotVh
Displays how much power a non-Vh processor is bringing to the partition in the next interval.

Next UpCap
Displays what the partition's unparked capacity will be in the next interval.

LPU Unparked mask
Bitmask of logical processors that will be in unparked state, shown as hexadecimal digits, where the leftmost bit corresponds to logical processor with ID=0.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX300, Dispatch Vector Configuration Log – DSVCLOG

Performance Toolkit Subcommand: "DSVCLOG" on page 174.

The Dispatch Vector Configuration screen (FCX300) shows each dispatch vector (DV) and the LPUs assigned to the DV. Each LPU is identified by its ID and then annotated with information about its topological location and about the LPUs assigned to it.

```
FCX300      CPU nnnn  SER nnnnn        DVector  Config.          Perf. Monitor

Dispatch Vector Configuration Change log

Date  Time     DVID Type Location   Count Pz <-- LPU mask --->
04/22 09:32:42 0000 CP   2              1 Vh 40000000_00000000
04/22 09:32:42 0001 CP   2              1 Vh 20000000_00000000
04/22 09:32:42 0002 CP   2              1 Vh 10000000_00000000
04/22 09:32:42 0003 CP   2              1 Vh 08000000_00000000
04/22 09:32:42 0004 CP   2              1 Vh 04000000_00000000
04/22 09:32:42 0005 CP   2              1 Vm 02000000_00000000
04/22 09:32:42 0006 CP   2              1 Vl 01000000_00000000
04/22 09:32:42 0007 CP   2              1 Vl 00800000_00000000
04/22 09:32:42 0008 ZAAP 4              1 Vm 00400000_00000000
04/22 09:32:42 000A ICF  4              1 Vm 00100000_00000000
04/22 09:32:42 000B IFL  2              1 Vh 00080000_00000000
04/22 09:32:42 000C IFL  2              1 Vh 00040000_00000000
04/22 09:32:42 000D CP   2              1 Vl 00020000_00000000
04/22 09:32:42 000E CP   2              1 Vl 00010000_00000000
04/22 09:32:42 000F CP   2              1 Vl 00008000_00000000
04/22 09:32:42 0010 CP   2              1 Vl 00004000_00000000
04/22 09:32:42 0011 CP   2              1 Vl 00002000_00000000
04/22 09:32:42 0012 CP   2              1 Vl 00001000_00000000
04/22 09:32:42 0013 CP   2              1 Vl 00000800_00000000
04/22 09:32:42 0014 CP   4              1 Vl 00000400_00000000

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 192. Dispatch Vector Configuration Log Screen (FCX300)

The information shown is based on CP monitor PROCESSOR domain EVENT data.

Field Descriptions:

Date Date (format *mm/dd*) of the status change.

Time Time (format *hh:mm:ss*) of the status change.

DVID
The dispatch vector ID.

Type The processor type. Possible values are:

- **CP** Central Processor
- **ICF** Internal Coupling Facility Processor
- **IFL** Integrated Facility for Linux Processor
- **ZIIP** IBM System z Integrated Information Processor (zIIP)
- **ZAAP** IBM System z Application Assist Processor (zAAP)

Location
The actual physical location of listed CPU as it is defined by the architecture. The format depends on the current CEC hardware model. Possible values are:

m CEC's book ID.

m:n CEC's book ID (*m*) and chip number (*n*) inside this book.

Count The total number of CPUs associated with the dispatch vector at the moment the sample was snapped.

Pz The polarization and entitlement for the present topology-list entry. Possible values are, for Vertical polarization:

Vh High entitlement.

Vm Medium entitlement.

Vl Low entitlement;

for Horizontal polarization:

Hz Horizontal.

LPU mask
List of LPUs assigned to this DV with specified type, polarization and location. It has a bitmask value with hexadecimal digits separated by 4-byte groups where the leftmost bit corresponds to logical processor with ID=0.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX301, Dispatch Vector Activity – DSVBKACT

Performance Toolkit Subcommand: "DSVBKACT" on page 173.

The Dispatch Vector Activity Screen (FCX301) shows the activity of the DSVBKs.

```
FCX301      CPU nnnn  SER nnnnn  Interval 10:39:00 - 10:40:00        Perf. Monitor

Total reassignments:      29           Life Time: Max=  1754
Maximum users per DSV:    14                      Min=  1754
                                                  Avg=  1754


_____ .     .       .     .     .     .
                <-- LPU -->   Pct  Mean <-------- LPU List mask ---------->
Epoch DVID  Type Assoc Unprk Empty  Non0 <- Associated --> <-- Unparked --->
   29 0000  CP       1     1 100.0   ... 80000000_00000000 80000000_00000000
   29 0001  CP       1     1 100.0   ... 40000000_00000000 40000000_00000000
   29 0002  CP       1     0 100.0   ... 20000000_00000000 00000000_00000000
   29 0003  CP       1     0 100.0   ... 10000000_00000000 00000000_00000000
   29 0004  CP       1     0 100.0   ... 08000000_00000000 00000000_00000000
   29 0005  CP       1     0 100.0   ... 04000000_00000000 00000000_00000000
   29 0006  CP       1     0 100.0   ... 02000000_00000000 00000000_00000000
   29 0007  CP       1     0 100.0   ... 01000000_00000000 00000000_00000000
   29 0008  ZAAP     1     1 100.0   ... 00800000_00000000 00800000_00000000
   29 0009  ZIIP     1     1 100.0   ... 00400000_00000000 00400000_00000000
   29 000A  ICF      1     1 100.0   ... 00200000_00000000 00200000_00000000
   29 000B  IFL      1     1 100.0   ... 00100000_00000000 00100000_00000000
   29 000C  IFL      1     1 100.0   ... 00080000_00000000 00080000_00000000
   29 000D  CP       1     0 100.0   ... 00040000_00000000 00000000_00000000
   29 000E  CP       1     0 100.0   ... 00020000_00000000 00000000_00000000
   29 000F  CP       1     0 100.0   ... 00010000_00000000 00000000_00000000
   29 0010  CP       1     0 100.0   ... 00008000_00000000 00000000_00000000
   29 0011  CP       1     0 100.0   ... 00004000_00000000 00000000_00000000
   29 0012  CP       1     0 100.0   ... 00002000_00000000 00000000_00000000
   29 0013  CP       1     0 100.0   ... 00001000_00000000 00000000_00000000
   29 0014  CP       1     0 100.0   ... 00000800_00000000 00000000_00000000
   29 FFFF  CP     ...   ... 100.0   ... ........_........ ........_........

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 193. Dispatch Vector Activity Screen (FCX301)

The information shown is based on CP monitor PROCESSOR domain EVENT and SAMPLE data.

Field Descriptions:

Total reassignments
Count of times CPU-to-DSVBK assignments have changed since last IPL.

Life Time
The lifetime for displayed dispatch vectors, in seconds. When the value exceeds 86400 seconds, an approximate value will be displayed in days, as "*NNNN*d". The field shows maximum, minimal and average times.

Maximum users per DSV
Maximum number of users allowed in one dispatch vector.

Epoch
The counter of reassignments for this dispatch vector.

DVID
The dispatch vector ID. The special ID x'FFFF' shows master-only dispatch vector.

Type The processor type. Possible values are:

CP Central Processor

ICF Internal Coupling Facility Processor

IFL Integrated Facility for Linux Processor

ZIIP IBM System z Integrated Information Processor (zIIP)

ZAAP IBM System z Application Assist Processor (zAAP)

LPU Assoc
The total number of CPUs associated with the dispatch vector at the moment the sample was snapped.

LPU Unprk
The number of unparked CPUs associated with the dispatch vector at the moment the sample was snapped.

Pct Empty
The percentage of high-frequency samples that showed that the dispatch vector had no VMDBKs in it.

Mean Non0
The mean number of elements (VMDBKs) in the dispatch vector for those samples that showed a nonzero number of VMDBKs.

LPU List mask Associated and LPU List mask Unparked
Two bitmasks, one showing logical PUs associated with the dispatch vector, and the second showing which of those associated logical PUs are unparked. Each bitmask value is 16 hexadecimal digits separated by two groups where the leftmost bit corresponds to the logical processor with ID=0.

The master-only dispatch vector has no associated CPUs, and all masks for it contain dots (........_........).

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all data fields.

FCX302, Real CPU Utilization Log – PHYSLOG

Performance Toolkit Subcommand: "PHYSLOG" on page 241.

The Real CPU Utilization Log screen (FCX302) shows real CPU utilization by time.

```
FCX302      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

Interval      <PU Num>   Total
End Time Type Conf Ded  Weight %LgclP %Ovrhd LpuT/L %LPmgt %Total TypeT/L
>>Mean>> CP     42  12     210 1125.2  4.967  1.004 12.264 1142.5   1.015
>>Mean>> ZAAP    2   0     110   .041   .008  1.195   .020   .069   1.682
>>Mean>> IFL    16   0     255 602.36  2.197  1.003  3.961 608.52   1.010
>>Mean>> ICF     1   0      80   .026   .020  1.769  2.080  2.126  81.769
>>Mean>> ZIIP    3   0     130   .033   .011  1.333  1.486  1.530  46.363
>>Mean>> >Sum   64  12     785 1727.7  7.203  1.004 19.810 1754.7   1.015

01:21:35 CP     42  12     210 1147.7  4.816  1.004 11.642 1164.2   1.014
01:21:35 ZAAP    2   0     110   .066   .012  1.181   .032   .110   1.666
01:21:35 IFL    16   0     255 623.11  1.561  1.002  3.079 627.75   1.007
01:21:35 ICF     1   0      80   .039   .031  1.794  2.103  2.173  55.717
01:21:35 ZIIP    3   0     130   .047   .016  1.340  1.916  1.979  42.106
01:21:35 >Sum   64  12     785 1771.0  6.436  1.003 18.771 1796.2   1.014

01:22:35 CP     42  12     210 1102.8  5.118  1.004 12.885 1120.8   1.016
01:22:35 ZAAP    2   0     110   .016   .004  1.250   .008   .028   1.750
01:22:35 IFL    16   0     255 581.60  2.834  1.004  4.842 589.27   1.013
01:22:35 ICF     1   0      80   .012   .010  1.833  2.056  2.078  173.17
01:22:35 ZIIP    3   0     130   .019   .005  1.263  1.056  1.080  56.842
01:22:35 >Sum   64  12     785 1684.4  7.970  1.004 20.848 1713.2   1.017

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 194. Real CPU Utilization Log Screen (FCX302)

The information shown is based on CP monitor PROCESSOR domain EVENT and SAMPLE data.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. The `>>Mean>>` line shows the overall average values per processor type.

Type The CPU type of this type-pool of physical processors, as follows:

CP Central Processor

ICF Internal Coupling Facility Processor

IFL Integrated Facility for Linux Processor

ZIIP IBM System z Integrated Information Processor (zIIP)

ZAAP IBM System z Application Assist Processor (zAAP)

A line with `'>Sum'` in the Type field shows the sum over all processor types.

PU Num Conf
The number of configured physical processors of this type.

PU Num Ded
The number of dedicated physical processors of this type.

Total Weight
For this type, the sum of the partition weights.

%LgclP
For this physical processor type, the physical capacity used by actually running logical processors of the corresponding type.

The value ranges from 0% to *n**100%, where *n* is the number of physical processors of this type.

%Ovrhd
For this physical processor type, the physical capacity used doing LPAR management activities that are directly chargeable or attributable to the actions of specific logical processors of the corresponding type.

The value ranges from 0% to *n**100%, where *n* is the number of physical processors of this type.

LpuT/L
For this physical processor type, the calculated value `(%LgclP + %Ovrhd) / %Lgclp`.

%LPmgt
For this physical processor type, the physical capacity used doing LPAR management activities that are not directly chargeable or attributable to any specific logical processors of any type.

The value ranges from 0% to *n**100%, where *n* is the number of physical processors of the corresponding type.

%Total
For this physical processor type, the calculated value `%LgclP + %Ovrhd + %LPmgt`.

TypeT/L
For this physical processor type, the calculated value `%Total / %LgclP`.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX303, DSVBK Steals per Processor Log – DSVSLOG

Performance Toolkit Subcommand: "DSVSLOG" on page 175.

The DSVBK Steals per Processor Log (FCX303) displays information about DSVBK steal rates. It should be used in conjunction with "FCX304, Processor Log – PRCLOG" on page 829.

```
FCX303      CPU nnnn  SER nnnnn        Interval HH:MM:SS - HH:MM:SS      Perf. Monitor

          C                    Pct
Interval  P                   Park <----- DSVBK Steal /s ------------------>
End Time  U Type PPD Ent. DVID Time Lvl-00 Lvl-01 Lvl-02 Lvl-03 Lvl-04 Lvl-05
>>Mean>>  0 CP   Vh   100 0000    0  5.050   .000   ....   ....   ....   ....
>>Mean>>  1 CP   Vh   100 0001    0  4.283   .000   ....   ....   ....   ....
>>Mean>>  2 CP   Vh   100 0002   67  2.417   .000   ....   ....   ....   ....
>>Mean>>  3 CP   Vh   100 0003  100   .000   .000   ....   ....   ....   ....
>>Mean>>  4 CP   Vh   100 0004  100   .000   .000   ....   ....   ....   ....
>>Mean>>  5 CP   Vm    71 0005  100   .000   .000   ....   ....   ....   ....
>>Mean>>  6 CP   Vl     0 0006  100   .000   .000   ....   ....   ....   ....
>>Mean>>  7 CP   Vl     0 0007  100   .000   .000   ....   ....   ....   ....
>>Mean>>  8 ZAAP Vm    73 0008    0   .000   .000   ....   ....   ....   ....
>>Mean>>  9 ZIIP Vm    92 0009    0   .000   .000   ....   ....   ....   ....
>>Mean>> 10 ICF  Vm    50 000A    0   .000   .000   ....   ....   ....   ....
>>Mean>> 11 IFL  Vh   100 000B    0  2.517   .000   ....   ....   ....   ....
>>Mean>> 12 IFL  Vh   100 000C    0  1.433   .000   ....   ....   ....   ....
>>Mean>> 13 CP   Vl     0 000D  100   .000   .000   ....   ....   ....   ....
>>Mean>> 14 CP   Vl     0 000E  100   .000   .000   ....   ....   ....   ....
>>Mean>> 15 CP   Vl     0 000F  100   .000   .000   ....   ....   ....   ....
>>Mean>> 16 CP   Vl     0 0010  100   .000   .000   ....   ....   ....   ....
>>Mean>> 17 CP   Vl     0 0011  100   .000   .000   ....   ....   ....   ....
>>Mean>> 18 CP   Vl     0 0012  100   .000   .000   ....   ....   ....   ....
>>Mean>> 19 CP   Vl     0 0013  100   .000   .000   ....   ....   ....   ....
>>Mean>> 20 CP   Vl     0 0014  100   .000   .000   ....   ....   ....   ....
>>Total> 16 CP   MIX  571  MIX 1367 11.750   .000   ....   ....   ....   ....
>>Total>  1 ZAAP Vm    73 0008    0   .000   .000   ....   ....   ....   ....
>>Total>  2 IFL  Vh   200  MIX    0  3.950   .000   ....   ....   ....   ....
>>Total>  1 ZIIP Vm    92 0009    0   .000   .000   ....   ....   ....   ....
>>Total>  1 ICF  Vm    50 000A    0   .000   .000   ....   ....   ....   ....

09:23:52  0 CP   Vh   100 0000    0  5.050   .000   ....   ....   ....   ....
09:23:52  1 CP   Vh   100 0001    0  4.283   .000   ....   ....   ....   ....
09:23:52  2 CP   Vh   100 0002   67  2.417   .000   ....   ....   ....   ....
09:23:52  3 CP   Vh   100 0003  100   .000   .000   ....   ....   ....   ....

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 195. DSVBK Steals per Processor Log (FCX303)

The information shown is based on CP monitor SYSTEM domain and PROCESSOR domain SAMPLE data.

The descriptions of the fields on this screen can be found in "FCX304, Processor Log – PRCLOG" on page 829, with the exception of the following:

Field Descriptions:

DSVBK Steal /s
The average rate of user block steals for the current processor or group of processors (for Total part). The main group of columns is a set of VMDBK Steal values, grouped by a topological distance of migration.

The count of these columns depends on the Maximum Nest value (MNest).

Lvl-00 Rate of steals from dispatch vectors (DSVBKs) with topologically equivalent CPUs.

Lvl-01..Lvl-05
Rate of steals from DSVBKs with CPUs that are a corresponding topology level away, if it is applicable by current machine architecture.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX304, Processor Log – PRCLOG

Performance Toolkit Subcommand: "PRCLOG" on page 242.

The Processor Log (FCX304) displays monitor data from z/VM release 6.3.0 and later releases. This report should be used in conjunction with "FCX303, DSVBK Steals per Processor Log – DSVSLOG" on page 827.

```
FCX304      CPU nnnn  SER nnnnn  Interval HH:MM:SS - HH:MM:SS     Perf. Monitor

                                <--- Percent Busy ----> <-- Rates per Sec. ---> <----- Paging -------> <Co> < Di>
          C                      Pct                                                        Fast  Page <mm> < ag>
 Interval P                      Park                          Inst                  <2GB  PGIN Path  Read Msgs X'9C'
 End Time  U Type PPD Ent. DVID Time Total  User  Syst  Emul  Siml  DIAG  SIGP  SSCH   /s    /s    %   /s   /s    /s
 >>Mean>>  0 CP   Vh   100 0000    0   5.4   2.8   2.6    .6 368.1 761.4 988.7  96.7   .0    .0 ....   .0  1.2    .0
 >>Mean>>  1 CP   Vh   100 0001    0   2.0    .8   1.3    .6  64.6 632.7 940.4   1.2   .0    .0  100   .0  3.2    .0
 >>Mean>>  2 CP   Vh   100 0002   67    .3    .1    .2    .1   1.0 120.4  78.9    .2   .0    .0 ....   .0   .2    .0
 >>Mean>>  3 CP   Vh   100 0003  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>>  4 CP   Vh   100 0004  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>>  5 CP   Vm    71 0005  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>>  6 CP   Vl     0 0006  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>>  7 CP   Vl     0 0007  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>>  8 ZAAP Vm    73 0008    0    .1    .0    .1    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>>  9 ZIIP Vm    92 0009    0    .1    .0    .1    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>> 10 ICF  Vm    50 000A    0    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>> 11 IFL  Vh   100 000B    0   2.3   1.3   1.0    .8    .8    .5 171.3   .3   .0    .0 ....   .0   .0    .0
 >>Mean>> 12 IFL  Vh   100 000C    0   1.6   1.1    .4    .7    .4    .3 210.4   .3   .0    .0 ....   .0   .1    .0
 >>Mean>> 13 CP   Vl     0 000D  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>> 14 CP   Vl     0 000E  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>> 15 CP   Vl     0 000F  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>> 16 CP   Vl     0 0010  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>> 17 CP   Vl     0 0011  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>> 18 CP   Vl     0 0012  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>> 19 CP   Vl     0 0013  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Mean>> 20 CP   Vl     0 0014  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Total> 16 CP   MIX  571  MIX 1367   7.7   3.7   4.0   1.3 433.7  1515  2008  98.0   .0    .0  100   .0  4.6    .1
 >>Total>  1 ZAAP Vm    73 0008    0    .1    .0    .1    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Total>  2 IFL  Vh   200  MIX    0   3.9   2.5   1.4   1.5   1.2    .7 381.7   .6   .0    .0 ....   .0   .1    .0
 >>Total>  1 ZIIP Vm    92 0009    0    .1    .0    .1    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 >>Total>  1 ICF  Vm    50 000A    0    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0

 09:23:52  0 CP   Vh   100 0000    0   5.4   2.8   2.6    .6 368.1 761.4 988.7  96.7   .0    .0 ....   .0  1.2    .0
 09:23:52  1 CP   Vh   100 0001    0   2.0    .8   1.3    .6  64.6 632.7 940.4   1.2   .0    .0  100   .0  3.2    .0
 09:23:52  2 CP   Vh   100 0002   67    .3    .1    .2    .1   1.0 120.4  78.9    .2   .0    .0 ....   .0   .2    .0
 09:23:52  3 CP   Vh   100 0003  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 09:23:52  4 CP   Vh   100 0004  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0
 09:23:52  5 CP   Vm    71 0005  100    .0    .0    .0    .0    .0    .0    .0    .0   .0    .0 ....   .0   .0    .0

 Command ===> _
 F1=Help  F4=Top  F5=Bot  F10=Left  F11=Right  F12=Return
```

Figure 196. Layout of Processor Log (FCX304)

The information shown is based on CP monitor SYSTEM domain and PROCESSOR domain SAMPLE data.

Field Descriptions:

Interval End Time
The end time of the monitor interval or the BYTIME interval for which the values were calculated. In the case of the `>>Mean>>` and `>>Total>` entries, you can find the relevant interval in the header line. The `>>Mean>>` line shows the overall average values per processor number. The `>>Total>` line shows the overall average values per processor type when the count of active processors in overall interval is more than one.

CPU The processor number to which the following figures apply.

For the `>>Total>` line only, it is the number of logical CPUs of this type in the partition.

Type The processor type. The values are:

CP Central processor

ICF Internal Coupling Facility Processor

IFL Integrated Facility for Linux processor

ZIIP IBM System z Integrated Information processor (zIIP)

ZAAP IBM System z Application Assist processor (zAAP)

PPD The logical processor polarization. Possible values are:

Hz Horizontal

Vl Vertical low

Vm Vertical medium

Vh Vertical high

MIX A mix polarization; can be displayed in the Mean and Total lines if multiple distinct polarization values were encountered during measured interval (average, from last reset). Can also be displayed if a set of processors (on the Total line only) has distinct polarization values.

Ent. The average processor entitlement for the listed CPU as a percentage, where 100% represents one whole physical CPU's worth of processing capacity.

DVID A dispatch vector ID which serves the current processor, with hex representation or a special word MIX on the Mean and Total lines if distinct DSVs served the CPU. For other lines, the field contains an ID of the latest DSV.

Pct Park Time
The percentage of the time that the CPU was in Parked state.

Percent Busy:

Total The percentage of total elapsed time that the processor was busy.

User The percentage of total elapsed time that the processor time was attributed to specific users (includes emulation time and CP time).

Syst The percentage of total elapsed time that the processor was charged to the system (CP time not attributed to specific users).

Emul The percentage of total elapsed time that the processor was in emulation mode, doing work for users.

Note that all of the above percentages are based on *elapsed time*. For a system running in an LPAR this could mean that it is running at maximum capacity even though none of the values have reached 100%. See "FCX100, CPU Load and Transactions Screen – CPU" on page 357 for `%busy` values which are based on the sum of `busy` and voluntary wait time, instead of on elapsed time.

Rates per Sec.:

Inst Siml
Number of instructions simulated per second.

DIAG
Number of diagnose instructions executed per second.

SIGP Rate at which this CPU is the target of SIGP External Call instructions.

SSCH
Number of start subchannel and resume subchannel executions per second.

Paging:

Below 2GB/s
The number of pages moved below the 2GB line for translation, per second. The field is available only for z/VM systems running in 64-bit mode.

PGIN/s
The number of PGINs per second (page moves from expanded to central storage).

Fast Path %
The percentage of PGINs which could be handled by fastpath logic.

Page Reads/s
The number of pages read from auxiliary storage, including directory, nucleus and warmstart I/O but no spool I/O.

Msgs/s:

Comm Msgs/s
The number of IUCV and VMCF data transfers per second (successful and unsuccessful) for this processor.

Diag:

Diag X'9C'/s
The number of times Diagnose X'9C' was issued by CP per second for this processor.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX305, Logical Partition Activity Menu – LPARMENU

Performance Toolkit Subcommand: "LPARMENU" on page 222.

The Logical Partition Activity Menu (FCX305) displays a selection menu of LPAR reports.

```
FCX305      CPU nnnn  SER nnnnn         LPAR act menu              Perf. Monitor

  Logical Partition Activity
S Command     Description
_ LPAR        Common Logical Partition state
_ LSHARACT    The partitions entitlement state

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 197. Logical Partition Activity Menu (FCX305)

The information shown is based on CP monitor MONITOR domain SAMPLE data.

Field Descriptions:

S
Cursor selection field. The field will be highlighted and made cursor-selectable (set as "unprotected'") only if the corresponding LPAR activity data screen is available.

Command
The screen name, equal to the command that can be selected for display. The field will be highlighted if the corresponding LPAR activity data screen is available.

Description
Description of the performance display.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

FCX306, Logical Partition Share Screen – LSHARACT

Performance Toolkit Subcommand: "LSHARACT" on page 223.

The Logical Partition Share Screen (FCX306) displays a summary report of LPAR weights.

```
FCX306      Data for yyyy/mm/dd  Interval HH:MM:SS - HH:MM:SS    Perf. Monitor

LPAR Data, Collected in Partition FCFT

Physical PUs, Shared: CP- 30  ZAAP-  2  IFL- 16  ICF-  1  ZIIP-  3
           Dedicated: CP- 12  ZAAP-  0  IFL-  0  ICF-  0  ZIIP-  0


____ .             .      .        .       .       .      . .
Proc Partition   LPU   LPAR                 <LPU Total,%> LPU
Type Name      Count Weight Entlment TypeCap   Busy Excess Conf
CP   ECT2          4     10    142.9     ...     .0     .0 o
CP   EEXT1         4     10    142.9     ...    1.0     .0 o
CP   EEXT2         2     10    142.9     ...    1.6     .0 -
CP   EPLX1         8     60    857.1     ...  795.3     .0 u
CP   EPRF1         4    DED      ...     ...    ...    ... .
CP   EPRF2         4    DED      ...     ...    ...    ... .
CP   EPS1          4    DED      ...     ...    ...    ... .
CP   EST1          8     10    142.9     ...    1.7     .0 o
CP   EST2          6     10    142.9     ...   19.6     .0 o
CP   EST3          6     30    428.6     ...    1.7     .0 o
CP   EVIC          2     10    142.9     ...     .6     .0 -
CP   FCFT         16     40    571.4     ...  285.1     .0 o
CP   K4            6     10    142.9     ...    6.7     .0 o
CP   PHOS          5     10    142.9     ...     .9     .0 o
ICF  EST1          1     10     12.5     ...     .0     .0 -
ICF  EST3          1     30     37.5     ...     .0     .0 -
ICF  FCFT          1     40     50.0     ...     .0     .0 -
IFL  EPLX1         2     50    313.7     ...     .1     .0 u
IFL  EPLX2         8     45    282.4     ...  777.1  494.7 o
IFL  EPLX3         6     45    282.4     ...  590.4  308.0 o
IFL  ESTL1         7     50    313.7     ...    2.1     .0 o
IFL  EST3          4     25    156.9     ...     .4     .0 o
IFL  FCFT          2     40    251.0     ...     .9     .0 u
ZAAP ECT2          1     10     18.2     ...     .0     .0 -
ZAAP EPLX1         1     50     90.9     ...     .5     .0 -
ZAAP EST3          1     10     18.2     ...     .0     .0 -
ZAAP FCFT          1     40     72.7     ...     .0     .0 -
ZIIP ECT2          1     10     23.1     ...     .0     .0 -
ZIIP EPLX1         1     50    115.4     ...     .1     .0 u
ZIIP EST3          1     30     69.2     ...     .0     .0 -
ZIIP FCFT          1     40     92.3     ...     .1     .0 -

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 198. Logical Partition Share Screen (FCX306)

The information shown is based on CP monitor PROCESSOR domain EVENT data.

Field Descriptions:

Physical PUs
A count of physical PUs in the CEC that are online, by type. PUs that are shared and dedicated to LPARs are displayed separately.

Main table columns:

Proc Type
The physical processor type. For partitions with no assigned PUs, dots (...) will be displayed.

Partition Name
The name given to the logical partition. It will be highlighted if the partition is active, i.e. if at least one logical processor is assigned to the partition.

LPU Count
The number of defined logical processors of the specified type for the current LPAR.

LPAR Weight
The weight defined for this CPU type in the partition. Weight values range from 1 to 999, with a default of 10. The string "DED" will be inserted when the partition is dedicated. A value of zero means that the current partition was activated without any PU.

Entlment
The partition's entitlement, expressed as a percentage, where 100% represents one whole physical CPU's worth of processing capacity. It is the amount of CPU power a shared partition is guaranteed that PR/SM will let it consume, according to its weight compared to the weights of the other shared partitions, and according to the number of nondedicated physical PUs of that type.

TypeCap
The maximum amount of CPU power of this type the partition is permitted to use, where a value of 100 represents one whole physical CPU's worth of CPU power.

When running on z/VM systems earlier than V6.3, you will see dashes ("---") in this field.

LPU Total Busy
The partition's actual consumption of CPU power.

LPU Total Excess
The partition's CPU consumption beyond its entitlement.

LPU Conf
A flag indicating whether the partition's number of logical PUs is too few, too many, or just right, with respect to its entitlement. Possible values are:

o A possible overconfiguration error. The error is that the partition has too many logical processors defined for it, compared to its entitlement. This partition's ability to run all of its logical PUs to 100% busy absolutely depends on other partitions underconsuming their PU type entitlements.

u A definite underconfiguration error. The error is that the partition has too few logical PUs defined for it, compared to its entitlement.

- The LPAR configuration for that PU type looks correct.

. The LPAR has dedicated processors for the specified PU type, or the current partition was activated without PUs.

Effect of 'AVERAGE' and 'INTERIM' subcommands: Overall or interim period averages will be shown for all load fields.

FCX307, Logical Partition Logs Menu – LPARLOGM

Performance Toolkit Subcommand: "LPARLOGM" on page 221.

The Logical Partition Logs Menu Screen (FCX307) displays a selection menu of LPAR logs by time.

```
FCX307      CPU nnnn  SER nnnnn         LPAR log menu          Perf. Monitor

  Logical Partition by Time Logs
S Command     Description
_ LPARLOG     Logical part. load
_ PHYSLOG     Real CPU Utilization by time

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 199. Logical Partition Logs Menu (FCX307)

The information shown is based on CP monitor MONITOR domain SAMPLE data.

Field Descriptions:

S
Cursor selection field. The field will be highlighted and made cursor-selectable (set as "unprotected") only if the corresponding LPAR log is available.

Command
The screen name, equal to the command that can be selected for display. The field will be highlighted if the corresponding LPAR log screen is available.

Description
Description of the performance display.

Effect of 'AVERAGE' and 'INTERIM' subcommands: None.

Chapter 3. Performance Toolkit Messages

Performance Toolkit messages are displayed, in general, in the special message area just above the command line. Exceptions are made with:

- 'A'-type messages generated by the performance monitoring function which indicate that an operator action is required (e.g. high system load). These message lines are inserted into the general output area where they will automatically receive the action message prefix '+' which makes them non-scrollable. They can also be processed via the 'FCONTROL PROCESS' function to automatically initiate some action.
- 'M'-type messages which are generated by PERFKIT's performance monitoring routines primarily for informational purposes. These message lines are also inserted into the general output area so that they can be viewed in redisplay mode and processed via the 'FCONTROL PROCESS' function.
- additional messages which are generated while the normal message area is already in use. Such messages will also be inserted into the general output area, but additional processing by the 'FCONTROL PROCESS' function is not possible.

In basic mode and in redisplay mode, the messages shown in the special message area will remain on the screen until the next command is entered, even if the screen is updated because new output is received. Messages will be removed immediately, or replaced by new messages, whenever the screen is updated in performance monitor mode.

The line type to be specified for Performance Toolkit messages in the 'FCONTROL COLOR' and 'FCONTROL PROCESS' commands is 'ERRMSG'.

FCXxxx005E This is not a supported 3270 type display

Explanation: The terminal that has been used as console when starting the Performance Toolkit does not appear to the program as one of the valid display models.

Valid Performance Toolkit for VM terminals are all display terminals which are supported as a VM LOGON console and for full-screen operation.

Calling the Performance Toolkit for VM from non-display type terminals or from unsupported display types or models will lead to the above message.

System action: The Performance Toolkit for VM initialization ends.

User response: Call the Performance Toolkit for VM from one of the supported terminal models.

FCXxxx010E Insufficient storage for initialization

Explanation: The Performance Toolkit for VM requires some virtual storage for the program itself, and may require a considerable amount more to hold its data tables when performance monitoring is activated. The required storage is not available.

System action: The Performance Toolkit for VM initialization ends.

User response: Increase the storage size of your virtual machine, re-IPL CMS and then restart the Performance Toolkit for VM.

FCXxxx012E PERFKIT called recursively - not supported

Explanation: A command has been entered to start PERFKIT from within an PERFKIT session. This operating mode is not allowed.

System action: PERFKIT initialization is aborted.

User response: None.

FCXxxx015E Invalid parms - enter 'PERFKIT ?' for help

Explanation: An invalid argument has been passed to PERFKIT.

System action: PERFKIT initialization ends.

User response: Refer to "General System Operation" in the *z/VM: Performance Toolkit Guide* for the correct command format.

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FCXxxx030E Error *nn* reading 'FCONX $PROFILE *'

Explanation: Performance Toolkit found an error condition when it tried to read the initialization profile from disk. The error code *'nn'* is the return code of the CMS 'FSREAD'-macro.

System action: Performance Toolkit initialization ends.

User response: See the description of the FSREAD macro, and of its return codes, in the corresponding CMS manual and take the appropriate action.

FCXxxx040E Master file name missing

Explanation: The program was invoked in batch mode but no master file name has been specified. The master file controls operation in batch mode and is required for further processing.

System action: Batch processing ends.

User response: See "Operation in Batch Mode" in the *z/VM: Performance Toolkit Guide* for a description of the command format and of the required control files.

FCXxxx041E Master file '*fn ft fm*' not found

Explanation: The master file '*fn ft fm*' specified when invoking the program in batch mode was not found.

System action: Batch processing ends.

User response: Make sure a master file exists and invoke the program again, specifying the correct master file ID.

FCXxxx042E Monitor data file specification missing

Explanation: The program was invoked in batch mode without specifying the monitor data file that should have been processed.

System action: Batch processing ends.

User response: Invoke the program again and include the argument(s) for specifying the monitor data file.

FCXxxx043E Monitor file '*fn ft fm*' not found

Explanation: The monitor data file '*fn ft fm*' specified when invoking the program in batch mode was not found.

System action: Batch processing ends.

User response: Invoke the program again, specifying a valid monitor data file.

FCXxxx044E Tape unit '*xxxx*' not found

Explanation: The tape unit '*xxxx*' specified as monitor data input device when invoking the program in batch mode was not found.

System action: Batch processing ends.

User response: Invoke the program again, specifying the correct tape device number.

FCXxxx045E Invalid argument '*cccccccc*' in command string

Explanation: The argument '*cccccccc* entered when invoking the program in batch mode is not valid, or not valid in that position.

System action: Batch processing ends.

User response: See "Batch Mode Invocation" in the *z/VM: Performance Toolkit Guide* for a description of the required syntax and reenter the command.

FCXxxx046E Input file specification errror - cannot continue

Explanation: The program has been invoked in batch mode, but a severe specification error has been found in an input file. This message will usually be followed by message 047E.

System action: Batch processing ends.

User response: Follow the actions recommended for message 047E.

FCXxxx047E See RUNFILE for detailed error description

Explanation: This message is preceeded by message 046E. The RUNFILE contains a log of all prior batch mode actions and will list the previous error messages that have led to this message.

System action: Batch processing ends.

User response: See the error message(s) in the RUNFILE and correct the problem(s) before invoking batch mode again.

FCXxxx050E Error *nn* in FSSTATE for '*mmddy* CONLOG'

Explanation: The Performance Toolkit found an error condition when it tried to access the console log file with file name '*mmddyy*'. The error code *'nn'* is the return code of the CMS 'FSSTATE'-macro.

System action: The Performance Toolkit initialization ends.

User response: See the description of the FSSTATE macro, and of its return codes, in the corresponding CMS manual and take the appropriate action.

FCXxxx060E Error *nn* during *xxxxxx xxxxxx* - cannot continue

Explanation: The Performance Toolkit could not properly establish the connection to the CP *MSG service. The error code *'nn'* is the return code of the

'HNDIUCV SET' or 'CMSIUCV CONNECT' function as defined by *'xxxxxx xxxxxx'*.

System action: The Performance Toolkit initialization ends.

User response: The problem is probably caused by an other CMS program which has already used these macros for establishing its own IUCV environment and then has not reset it. Re-IPL CMS and then restart the Performance Toolkit.

FCXxxx061E Invalid IUCV interrupt buffer received

Explanation: PERFKIT received control from CMS for handling an IUCV *MSG service interrupt, but the IUCV interrupt buffer contains old invalid data. Probably another CMS program has been activated under PERFKIT and this program also established an IUCV connection, but it used the 'DECLARE BUFFER' function instead of the 'HNDIUCV SET' and 'CMSIUCV CONNECT' macros and so disabled PERFKIT's interface.

System action: PERFKIT will exit after issuing this message.

User response: Refrain from using the CMS program that activated the IUCV connection (PERFKIT restriction, see "Restrictions for Operation in Basic Command Mode" in the *z/VM: Performance Toolkit Guide*). Re-IPL CMS, if necessary, and then restart PERFKIT.

FCXxxx062E Error *nn* during IUCV receive

Explanation: The Performance Toolkit found an error while receiving data via IUCV. The error code *'nn'* is the return code (IPRCODE field in IPARML) for the RECEIVE function.

System action: The Performance Toolkit will exit after issuing this message.

User response: See the description of the IUCV protocol, and of IUCV return codes, in the appropriate manual of your system reference library.

FCXxxx070E Performance Toolkit not supported by this VM level

Explanation: PERFKIT has detected that one of the prerequisites for successful initialization is missing.

System action: The Performance Toolkit will exit after issuing this message.

User response: Inform your systems programmer if this message is generated during initialization under one of the supported VM releases.

FCXxxx091I This system has not been authorized for using the program

Explanation: An attempt was made to start Performance Toolkit on a system where Performance Toolkit has not been licensed or where Systems Management API (SMAPI) is not monitoring system performance.

System action: The command terminates.

User response: Follow the instructions in the Performance Toolkit Program Directory to obtain a license for the product or follow the directions in *z/VM: Systems Management Application Programming* to enable SMAPI monitoring of system performance.

FCXxxx110E Error *nn* writing file '*xxxxxx yyyyyy z*'

Explanation: The Performance Toolkit for VM found an error while writing the file *'xxxxxx yyyyyy z'*. The error code *'nn'* is the return code of the CMS 'FSWRITE'-macro.

System action: Performance Toolkit will stop writing to the z disk after finding the first writing error (no console log to be re-displayed).

User response: See the description of the FSWRITE macro, and of its return codes, in the corresponding CMS manual and take the appropriate action.

Likely candidates are:

- rc 12: disk z is read-only
- rc 13: disk z is full

Re-initialize the Performance Toolkit for VM after correcting the problem.

FCXxxx111I Critical exception message(s) issued

Explanation: The Performance Toolkit encountered a severe internal processing problem and issued one of the following exception messages: FCXxxx199A, FCXxxx327A, FCXxxx431E, FCXxxx440E, FCXxxx441E, FCXxxx443E, FCXxxx444E, FCXxxx445E, FCXxxx446E, FCXxxx447E, FCXxxx458A, FCXxxx801A.

These messages usually indicate that the collected and calculated data for some of the Performance Toolkit reports may be inaccurate, incorrect, or missing.

System action: Operation continues.

User response: If possible, correct the problem as described in the explanation text for these exception messages and re-initialize Performance Toolkit. For message FCXxxx458A, Performance Toolkit will attempt to automatically recover from the encountered error by reestablishing the connection to the *MONITOR system service.

This notification message FCXxxx111I will stay displayed until the exception messages are explicitly viewed either by entering EXCEPT or BASMODE

commands, or just by returning to the basic mode screen. In batch mode of operation, this message will be the last one written to CONLOG and RUNFILE.

FCXxxx112I Cannot write to disk - correct problem and re-initialize PERFKIT

Explanation: When running realtime:

The Performance Toolkit for VM could no longer write its log and PROCESS files to disk because of an error condition found previously when trying to write to the disk. This message is preceded by message 'FCXxxx110E' which also indicates the reason for the original problem.

When running in batch mode:

This could indicate that a disk pointed to by the FCONX MASTER file output is either read-only or full. If the RUNFILE is available, the 'FCXxxx110E' message should give an indication for the original problem.

System action: The Performance Toolkit for VM will keep displaying this message until the problem has been solved.

User response: Quit the Performance Toolkit, take the appropriate action as indicated by the return code of message FCXxxx110E and then re-initialize the Toolkit. If you do not remember the return code in message FCXxxx110E, just quit and re-initialize the Performance Toolkit for VM first: it will then re-issue this message so that you know what action to take.

FCXxxx113E System configuration missing|changed - processing terminated

Explanation: During TRNDSCAN/MONSCAN/BATCH processing the Performance Toolkit detected an error in the system configuration record, monitor domain 1 record 4 (D1R4). This record contains the vital system counters required for correct monitor data handling and reports creation. The system configuration record either has information missing or the system configuration was changed:

- Missing: at startup, the Performance Toolkit determined that the D1R4 record could not be found in the initial monitor sample. (For example, the MONWRITE utility program with the NOCONFIG option produced mondata files where only the first data chunk had the D1R4 record in it, so in order to process these data files they had to be merged with the first one containing the system configuration data).
- Changed: while performing calculations, the Performance Toolkit received a new D1R4 record indicating a z/VM IPL occurred that made further data processing impossible. (The Performance Toolkit does not support a single mondata file spanning the system IPL).

System action: Operation terminates.

User response: Make sure that the monitor data file contains the D1R4 record and does not span the z/VM IPL.

FCXxxx115I Non-standard filename '*cccccccc*' cannot switch logs

Explanation: The user tried to scroll beyond the bounds of the console log file being viewed. Since the log's file name *cccccccc* no longer has the original standard file name format *mmddyy*, the file name of the next or previous day's log cannot be determined, and automatic log switching is not possible.

System action: The scrolling request is ignored.

User response: Determine the file identification of the console log file and select it explicitly by entering the REDISP command with the file name, file type and file mode of the file to be viewed (see "REDISP" on page 117 for the command description).

FCXxxx116I No default console log found with filename '*mmddyy*'

Explanation: The user tried to scroll beyond the bounds of the console log file being viewed. The Performance Toolkit for VM tried to display the next or previous day's console log, with an expected file name of *mmddyy* and a file type of `CONLOG` *n* but did not find such a file on any of the accessed disks.

System action: The scrolling request is ignored.

User response: If the console log exists, but was renamed to a non-standard file name, select the log explicitly by entering the REDISP command with the file name, file type and file mode of the file to be viewed (see "REDISP" on page 117 for the command description).

FCXxxx120E Error *nn* reading file *'xxxxxx yyyyyy m'*

Explanation: The Performance Toolkit for VM found an error while reading the file *'xxxxxx yyyyyy'*. The error code *'nn'* is the return code of the CMS 'FSREAD'-macro.

System action: Depends on file being read.

User response: See the description of the FSREAD macro, and of its return codes, in the corresponding CMS manual and take the appropriate action.

FCXxxx121E Return code *nn* reading tape *xxxx*:*cccccc*

Explanation: An error was detected while trying to read the tape on unit *xxxx*. The code *nn* is the return code of the CMS 'RDTAPE' macro. The string *cccccc* provides an explanation for some of the more common return codes.

System action: No monitor sample could be read.

User response: See the description of the RDTAPE macro, and of its return codes, in the corresponding CMS manual and take the appropriate action.

FCXxxx122I Node-ID not found in SYSTEM NETID file

Explanation: An 'FC MONCOLL SYSTEMID NODEID' command has been entered, but the Performance Toolkit for VM could not find an entry in the SYSTEM NETID file which matched the system's CPU-ID. The node-ID cannot be inserted in the performance monitor header line.

System action: Operation continues.

User response: None required. If desired, provide a correct SYSTEM NETID file, with an entry for the CPU you are working on, and then re-issue the command.

FCXxxx125E Error *nn* for FSSTATE of file *xxxxxx yyyyyy m*

Explanation: The Performance Toolkit for VM found an error while looking for file *'xxxxxx yyyyyy'* . This error can occur when trying to read a console log in redisplay mode. The error code *'nn'* is the return code of the CMS 'FSSTATE'-macro.

System action: The file cannot be read and the command will not be executed.

User response: See the description of the FSSTATE macro, and of its return codes, in the corresponding CMS manual and take the appropriate action.

FCXxxx126E HELP file '*xxxxxx yyyyyy m*' not found

Explanation: While trying to locate the requested HELP information, the Performance Toolkit for VM found that the required HELP file *xxxxxx yyyyyy m* is not available, so no HELP information can be displayed.

System action: Operation continues.

User response: Access the minidisk which contains the HELP files before trying to display HELP information again.

FCXxxx127E No context help available for this display

Explanation: The HELP function PF-key was pressed to display context help text for the field pointed to by the cursor, but the selected display has not been prepared for showing context help information. This message can be generated when trying to select context help for user defined displays.

System action: Operation continues.

User response: Refer to the description of the original data fields.

FCXxxx128E Error while building window

Explanation: An internal software error occurred while the server machine tried to build a window for the requestor in an APPC/VM connection.

System action: Operation continues, but the window is not built.

User response: Contact IBM Service.

FCXxxx130E Invalid FCONTROL subcommand *'xxxxxxxx'* entered

Explanation: The string *'xxxxxxxx'* is not recognized as a valid FCONTROL subcommand.

System action: The command is ignored.

User response: See "General Subcommands" on page 3 for valid FCONTROL subcommands and re-enter the correct command.

FCXxxx132E Command / PF-key not valid for current mode

Explanation: The command entered, either directly or by pressing a PF-key, is not supported in the current operating mode of the Performance Toolkit.

System action: The command is ignored.

User response: See Chapter 1, "Performance Toolkit Subcommands," on page 1 for valid command formats in the different operating modes of PERFKIT, then re-enter the command.

FCXxxx133E Selected performance display not available for *xxx*

Explanation: The selected performance display cannot be retrieved from a VM system of the type *xxx*, where *xxx* is the system type which you have defined in the FCONRMT SYSTEMS file for the remote system.

System action: The command is ignored.

User response: See "Remote Performance Data Retrieval and Display" in the *z/VM: Performance Toolkit Guide* for the retrieval commands valid for different systems.

FCXxxx140E PF-key undefined for current mode

Explanation: The PF-key you just pressed has either not been set at all or for a different mode only.

System action: The PF-key interrupt is ignored and operation continues.

User response: See the command description "FCONTROL PFKEY" on page 66 which explains how to display the current PF-key settings, and how to change them.

FCXxxx151E MSG/ACTMSG number missing

Explanation: A 'DELETE' or 'REPLY' command has been entered without a message line number.

System action: The command is ignored.

User response: See description of the DELETE or REPLY command in "Basic Mode Subcommands" on page 103 and re-enter it with correct format.

FCXxxx152E No pending MSG/ACTMSG with number *'xx'* on screen

Explanation: A DELETE or REPLY command has been entered for message number *'xx'*. The number does not correspond to the message number of one of the message, warning or action message lines that are currently being displayed on the screen.

System action: The command is ignored.

User response: Re-enter the command with a valid message number.

FCXxxx153E No CP/CMS command entered with reply

Explanation: The REPLY command expects a CP/CMS command to be entered following the message line number(s). No such command has been found.

System action: The command is ignored.

User response: Use the DELETE command for deleting messages which do not require any additional action.

FCXxxx154E Command is valid only when entered from within FCONX $PROFILE

Explanation: The command can be executed only during the Performance Toolkit initialization step and is treated as invalid after this initialization has completed.

System action: The command is ignored.

User response: If you want to issue this command, make sure it is included in the Performance Toolkit initialization file, FCONX $PROFILE.

FCXxxx155E Invalid parameter entered

Explanation: One of the parameters entered with the last Performance Toolkit for VM subcommand is not valid (e.g. too long).

System action: The command is ignored.

User response: See Chapter 1, "Performance Toolkit Subcommands," on page 1 for valid command formats or enter HELP mode and look up the correct command format, then re-enter the command.

FCXxxx156E Parameter too short

Explanation: One of the parameters entered with the last Performance Toolkit for VM subcommand is shorter than the minimum abbreviation.

System action: The command is ignored.

User response: See command description in Chapter 1, "Performance Toolkit Subcommands," on page 1 and re-enter the command.

FCXxxx157E Value specified is below minimum

Explanation: A numeric value entered with the last subcommand is lower than the accepted minimum.

System action: The command is ignored.

User response: See command description in Chapter 1, "Performance Toolkit Subcommands," on page 1 and re-enter the command.

FCXxxx158E Value specified exceeds maximum

Explanation: A numeric value entered with the last subcommand is higher than the accepted maximum.

System action: The command is ignored.

User response: See command description in Chapter 1, "Performance Toolkit Subcommands," on page 1 and re-enter the command.

FCXxxx170E Invalid CP/CMS command entered

Explanation: A command has been entered which was not a valid Performance Toolkit for VM sub-command, and which could not be executed as a CP or CMS command. This may be due to incorrect spelling of a subcommand (the command will then be executed as a CP or CMS command, following the Performance Toolkit's standard search order).

System action: The command is ignored.

User response: Re-enter correct command.

FCXxxx175E More than *xx* arguments/options for CMS command *'xxxxxxxx'*

Explanation: A command *'xxxxxxxx'* has been entered with more than *'nn'* arguments and/or options (including parentheses) which was interpreted as being a CMS command. The maximum number of arguments and options allowed by the Performance Toolkit for VM for CMS commands is *'nn'*.

System action: The command is ignored.

User response: Re-enter shorter version of command or enter command from native CMS.

FCXxxx180A Performance Toolkit abending ... {MONDCSS overlay}

Explanation: PERFKIT encountered an error which made further operation impossible. It will attempt to reset its interfaces and spool a dump to your virtual reader. The 'MONDCSS overlay' in the message text indicates that the monitor segment was overlayed with a new set of data before PERFKIT completed processing of the previous one. This message will usually be accompanied by one of these messages: FCXxxx181, FCXxxx182, or FCXxxx183.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: PERFKIT will exit after creating a dump of user storage.

User response: Pass the dump on to your systems programmer, together with any other supporting data such as the CP console log or additional information on actions that immediately preceded the ABEND. In the case of the MONDCSS overlay, refer to the explanation in the message FCXxxx456E.

FCXxxx181A ABEND AT FCX*ccc* +*dddd* : Program check X'*pppp*'

Explanation: PERFKIT encountered a program interrupt in the program FCX*ccc* at hex displacement *dddd* with the code X'*pppp*' which made further operation impossible. This message should be preceded by the message FCXxxx180.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: PERFKIT will exit to CMS after resetting its interfaces and creating a dump of user storage.

User response: Refer to the explanation in message FCXxxxx180.

FCXxxx182A ABEND AT *xxxxxxxx*: Program check X'*pppp*'

Explanation: PERFKIT encountered a program interrupt at address *xxxxxxxx* with the code X'*pppp*' which made further operation impossible. The address points to some location out of the PERFKIT module. (*xxxxxxxx* refers to either the CMS nucleus code or the user program that is running under PERFKIT.) This message should be preceded by the message FCXxxx180.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: PERFKIT will exit to the CMS abend recovery routine after resetting its interfaces and creating a dump of user storage.

User response: Refer to the explanation in message FCXxxxx180.

FCXxxx183A ABEND AT *xxxxxxxx*: CMS abend code X'*cccc*', reason X'*rrrrrrrr*'

Explanation: PERFKIT encountered a CMS abend at address *xxxxxxxx* with the abend code X'*cccc*' and reason code X'*rrrrrrrr*' which made further operation impossible. The address points to some location out of the PERFKIT module. (*xxxxxxxx* refers to either the CMS nucleus code or the user program that is running under PERFKIT.) This message should be preceded by the message FCXxxx180.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: PERFKIT will exit to the CMS abend recovery routine after resetting its interfaces and creating a dump of user storage.

User response: Refer to the explanation in message FCXxxxx180.

FCXxxx190I String *'xxxxxxxx'* not found

Explanation: The string *'xxxxxxxx'* specified with the 'locate' command could not be found in the remainder of the console log (search starts at current line + 1 for forward search or current line - 1 for backward search). Only the first eight characters of the string will be inserted into the error message.

System action: None.

User response: None.

FCXxxx192I Permanent perf. data collection active - re-enter "QUIT" to exit

Explanation: A 'QUIT' command has been entered in basic mode, requesting exit from the Performance Toolkit for VM back to native CMS. Since permanent performance data collection is currently active, and because all data collected so far in the re-display buffer will be lost after quitting, you are asked to enter a second 'QUIT' command to effectively end Toolkit operation.

System action: Operation continues.

User response: Re-enter the QUIT command (or press PF3) to exit the Toolkit, or enter any other command if Performance Toolkit for VM operation should not be ended.

FCXxxx198A GPR *rr-rr* : *XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX*

Explanation: The Performance Toolkit encountered an internal processing error (such as a divide exception) and displayed the contents of the general purpose registers at that point. This diagnostic information may

be needed for further problem analysis. Four FCXxxx198 messages are written to show all 16 registers. These messages should be preceded by the message FCXxxx199, or a similar message, with the explanation of the actual reason for this problem.

System action: Operation continues.

User response: Contact IBM Service.

FCXxxx199A Divide exception at FCX*ccc*+*dddd*: *XXXXXXXX XXXXXXXX / YYYYYYYY*

Explanation: The program FCX*ccc* at hex displacement *dddd* tried to perform a divide operation against dividend *XXXXXXXX XXXXXXXX* and divisor *YYYYYYYY*, but failed: either the divisor was zero or the quotient was too large to fit into one register. Possible reasons for this error are: unusual I/O device conditions (possible hardware failure or device reset), extremely large data counters due to increased CPU or I/O activity, or an abnormality in the software data processing algorithms. This message will be accompanied by the messages FCXxxx198 with the contents of the general purpose registers at the divide exception time.

This message is also sent to the maintenance user ID defined with the FC MAINTID command. Please note that only the first occurrence per day of this message will be sent to that user ID.

System action: Operation continues, but some data fields calculated by the program FCX*ccc* might be incorrect.

User response: Contact IBM Service.

FCXxxx200E Command valid on 3278-5 screens only

Explanation: The 'MODEL' argument of the FCONTROL subcommand is valid on a 3278-5 screen only or on another display terminal that can emulate a 3278-5 (e.g. 3290). The terminal you are working on appears as a different terminal type to the Performance Toolkit.

System action: The command is ignored.

User response: Use a 3278-5 display terminal for entering the FCONTROL MODEL command.

FCXxxx203E Invalid screen mode *'nn'* specified

Explanation: You specified an invalid screen model number *'nn'* for the FCONTROL MODEL command.

System action: The command is ignored.

User response: See command description in "FCONTROL MODEL" on page 49 an re-enter the correct command.

FCXxxx210E Invalid PF-key number entered

Explanation: Command text cannot be assigned to the PF-key number entered with the FCONTROL PFKEY command, because the number specified is not within the accepted range of 1 - 24.

System action: The command is ignored.

User response: See command description in "FCONTROL PFKEY" on page 66 and re-enter the correct command.

FCXxxx211E Invalid PF-key function *'xxxxxxxx'* specified

Explanation: A 'FC PFKEY SET nn FUNCTION *xxxxxxxx*' command has been entered, but the specified function *xxxxxxxx* is invalid.

System action: The command is ignored.

User response: See the command description in "FCONTROL PFKEY" on page 66 for valid functions which can be assigned, and re-enter the command.

FCXxxx216E Parameter *xxxx* contains non-numeric characters

Explanation: The parameter *'xxxx'* for a Performance Toolkit for VM subcommand is expected to be all numeric, but has been found to contain non-numeric characters.

System action: The command is ignored.

User response: See Chapter 1, "Performance Toolkit Subcommands," on page 1 for correct format of the subcommand and re-enter it.

FCXxxx218E Missing parameter

Explanation: The Performance Toolkit for VM subcommand has a mandatory argument which has not been entered with the command.

System action: The command is ignored.

User response: See Chapter 1, "Performance Toolkit Subcommands," on page 1 for correct format of the subcommand and re-enter it.

FCXxxx220E Command exceeds buffer length of *nn*

Explanation: The PFKEY command allows only command strings which fit into the corresponding buffer. The maximum length of *'nn'* has been exceeded.

System action: The command is ignored.

User response: Assign a shorter form of the command to the PF-key (use abbreviations).

FCXxxx230E Invalid field name *'xxxxxxxx'* entered

Explanation: The first argument passed must be the designation of a system output message line type or of a Performance Toolkit for VM field, but the string *'xxxxxxxx'* is neither.

System action: The command is ignored.

User response: See "General Subcommands" on page 3 for correct format of the subcommand and re-enter it.

FCXxxx231E Invalid color/highlighting *'xxxxxxxx'* - set to default

Explanation: The color or highlighting definition *'xxxxxxxx'* is not valid.

System action: Color and highlighting of the respective field are set to the default values.

User response: See command description "FCONTROL COLOR" on page 17 for valid color and highlighting specifications.

FCXxxx240E Number *nnnn* below minimum of *mmmm*, set to *qqqq*

Explanation: The number *'nnnn'* entered with a Performance Toolkit for VM subcommand is smaller than the minimum number *'mmmm'* that is allowed.

System action: The value *'qqqq'* is set.

User response: Check whether value *'mmmm'* is acceptable. If not, see command description in Chapter 1, "Performance Toolkit Subcommands," on page 1 for the valid range of numbers and re-enter the command.

FCXxxx241E Number *nnnn* exceeds maximum of *mmmm*, set to *qqqq*

Explanation: The number *'nnnn'* entered with a Performance Tool for VM subcommand is higher than the maximum number *'mmmm'* that is allowed.

System action: The value *'qqqq'* is set.

User response: Check whether value *'mmmm'* is acceptable. If not, see command description in Chapter 1, "Performance Toolkit Subcommands," on page 1 for the valid range of numbers and re-enter the command.

FCXxxx242E Number *nnnn* exceeds screen size-1 of *mmmm*, set to *mmmm*

Explanation: The number *'nnnn'* entered with a Performance Toolkit for VM subcommand exceeds the number *'mmmm'* of lines available in the scrollable output area minus 1 and is invalid. The number *'mmmm'* (which is also the maximum number allowed) has been used instead.

System action: The maximum value *'mmmm'* is set.

User response: Check whether value *'mmmm'* is acceptable. If not, see command description in Chapter 1, "Performance Toolkit Subcommands," on page 1 for the valid range of numbers and re-enter the command.

FCXxxx243E Number '*nnnn*' below minimum of '*mmmm*'

Explanation: The number '*nnnn*' entered with a Performance Toolkit for VM subcommand is smaller than the minimum number '*mmmm* 'that is allowed.

System action: The command is ignored.

User response: See command description in Chapter 1, "Performance Toolkit Subcommands," on page 1 for the valid range of numbers and re-enter the command.

FCXxxx244E Number *nnnn* exceeds maximum of *mmmm*

Explanation: The number *'nnnn'* entered with a Performance Toolkit for VM subcommand is higher than the maximum number *'mmmm'* that is allowed.

System action: The command is ignored.

User response: See command description in Chapter 1, "Performance Toolkit Subcommands," on page 1 for the valid range of numbers and re-enter the command.

FCXxxx250E Displacement *nnnn* exceeds maximum of 160

Explanation: The displacement *'nnnn'* entered with the FCONTROL PROCESS subcommand is higher than the maximum displacement of 160 that is allowed.

System action: The command is ignored.

User response: See command description "FCONTROL PROCESS" on page 70 for correct format of the command.

FCXxxx251E Length of string exceeds maximum of 20

Explanation: A character string entered with the FCONTROL PROCESS subcommand is longer than the maximum length of 20 that is accepted.

System action: The command is ignored.

User response: See command description "FCONTROL PROCESS" on page 70 for correct format of the command. Re-enter the command with a shorter character string, use 'AND' operator for checking for strings with a length of up to 40 characters (2 x 20).

FCXxxx252E Starting quote missing for character string

Explanation: A character string (or an asterisk) must be entered with the FCONTROL PROCESS subcommand (positional parameter) and it must be enclosed in single quotes. The expected starting quote could not be found.

System action: The command is ignored.

User response: See command description "FCONTROL PROCESS" on page 70"FCONTROL PROCESS" in the Performance Toolkit for correct format and re-enter it.

FCXxxx253E Ending quote missing after character string

Explanation: The character string entered with the FCONTROL PROCESS subcommand must be enclosed in single quotes. The expected ending quote could not be found.

System action: The command is ignored.

User response: See command description "FCONTROL PROCESS" on page 70 for correct format and re-enter the command.

FCXxxx254E Invalid line type *xxxxxxxx* entered

Explanation: The line type *'xxxxxxxx'* is not recognized.

System action: The command is ignored.

User response: See command description "FCONTROL PROCESS" on page 70 for correct format and re-enter the command.

FCXxxx255E Invalid message type *xxxxxxxx* specified

Explanation: The message type *'xxxxxxxx'* is not valid for re-routing message lines.

System action: The command is ignored.

User response: See command description "FCONTROL PROCESS" on page 70 for valid message line type and re-enter the command.

FCXxxx256E File '*xxxxxxxx* EXEC *' not found

Explanation: The EXEC procedure you specified in the FCONTROL PROCESS or FCONTROL EMERGENC command could not be found and the complete command will be ignored.

System action: The command is ignored.

User response: Create file '*xxxxxxxx* EXEC' on any accessed disk before re-entering the command or, if an EXEC already exists, re-enter the FCONTROL PROCESS or FCONTROL EMERGENC command with the correct file name.

FCXxxx257E Second string required for INSERT argument

Explanation: The second data string is mandatory when using the 'INSERT' argument of the FCONTROL PROCESS subcommand, otherwise it does not make sense.

System action: The command is ignored.

User response: See command description "FCONTROL PROCESS" on page 70 for correct format and re-enter the command.

FCXxxx260E Invalid parameter *xxxxxxxx* specified

Explanation: The parameter *'xxxxxxxx'* entered with the last Performance Toolkit for VM subcommand is not valid for the command or in that position.

System action: The command is ignored.

User response: See command description in Chapter 1, "Performance Toolkit Subcommands," on page 1 for correct format of the command.

FCXxxx262E PROCESS block *nnnn* not found on *ccccc* chain

Explanation: An attempt was made to delete block number *nnnn* from the *ccccc* chain of PROCESS blocks, but no block with that number could be found in that chain.

System action: The command is ignored.

User response: Verify the block number using the 'Query' argument of the FC PROCESS command and reenter the command with the correct block number.

FCXxxx263E SETEVENT block *nnnn* not found

Explanation: An attempt was made to delete block number *nnnn* from the SETEVENT block chain, but no block with that number could be found.

System action: The command is ignored.

User response: Verify the block number using the "Query' argument of the FC SETEVENT command and reenter the command with the correct block number.

FCXxxx265E Invalid reset specification '*cccc...cccc*

Explanation: An FC MONCOLL RESET command has been entered with an invalid argument *cccc...cccc*.

System action: The command is ignored.

User response: See the command description and re-issue the FC MONCOLL RESET command with a correct argument.

FCXxxx266I Unexpected processor *xx* counters reset detected Unexpected processor *xx* counters reset detected at *hh:mm:ss*

Explanation: The Performance Toolkit found a situation where a performance counter for a specified real processor was rolled back and started from zero. In monitor file scan and trend file scan modes, the original time of detection was appended.

System action: The Performance Toolkit will handle the reset operation for the specified real processor performance counters. Operation continues.

User response: Enable EVENT PROCESSOR monitor domain if permanent data collection is active, or ignore it otherwise.

FCXxxx267I *YYYYYYYY* monitor data lost for *XXXXXXXX* between *hh:mm:ss* and *hh:mm:ss*

Explanation: The Performance Toolkit found a situation where a performance counter for a specified monitor domain *YYYYYYYY* for object *XXXXXXXX* was rolled back or started from zero, and the original time interval of detection was appended.

System action: Operation continues.

User response: Enable EVENT and SAMPLE data for the named monitor domain if permanent data collection is active; otherwise ignore the message.

FCXxxx300I Message(s) pending for over *nn* min.

Explanation: One or more messages on the screen have been left pending for more than the number *'nn'* of minutes specified with the FCONTROL MSGWAIT command.

System action: Operation continues.

User response: Perform the actions required by the messages and then delete them.

FCXxxx301I File *xxxxxxxx yyyyyyyy* saved on your A-disk

Explanation: A command has been entered which resulted in a file being written to your A-disk, with a file name of *xxxxxxxx* and a file type of *yyyyyyyy*.

System action: Operation continues.

User response: None: this is an informational message only.

FCXxxx305I Destination ID *xxxxxxxx* is not logged on

Explanation: The virtual machine that should receive re-routed output lines is not logged on and will not be able to see the lines.

System action: Operation continues.

User response: See that machine *'xxxxxxxx'* is logged on if it is an important part of the operating environment.

FCXxxx306E *xxxxxxxx* is your own ID - cannot re-route to it!

Explanation: Re-routing to your own ID could produce a loop and is forbidden.

System action: The command is ignored.

User response: Re-enter correct format of the FCONTROL PROCESS command.

FCXxxx310I Monitor data collection not activated

Explanation: A 'MONITOR' command has been entered to switch into performance monitor mode, but CP monitor data collection has not previously been activated. This means that none of the automatically updated general performance data screens will be available as they all depend on CP monitor data collection.

System action: Operation continues.

User response: Activate collection of CP monitor data, using the appropriate 'FC MONCOLL ... ' command.

FCXxxx311E Command valid for users with priv. classes C/E only

Explanation: DIAGNOSE instruction codes X'04' and X'90' are needed to allow performance data collection, and this requires CP command privilege class E on a standard z/VM system. Performance monitoring cannot be activated before your machine has been authorized for the necessary command privilege class.

System action: The command is ignored.

User response: Have your machine authorized for executing DIAGNOSEs X'04' / X'90' by adding the required CP command privilege class (usually class 'E') to the directory entry of your machine. LOGOFF / LOGON, re-start PERFKIT and then re-issue the command.

Caution: This authorization should be considered a security exposure if the use of the machine is not restricted to operating or system support personnel that already have similar privileges.

FCXxxx312E Invalid limit *'nnnn'* specified

Explanation: The value entered with an 'FC LIMIT' command was higher than the acceptable maximum.

System action: The command is ignored.

User response: Re-enter the FCONTROL LIMIT command with a valid threshold.

FCXxxx313E Argument *'xxxxxxxx'* not valid for this CP level

Explanation: The argument *xxxxxxxx* entered with the last comma is meaningful only for specific CP levels. Your system is not on one of these levels. See the command description for the actual level required.

System action: The command is ignored.

User response: None.

FCXxxx314E Argument '*xxxx*' valid for users with priv. class B only

Explanation: The argument *xxxx* entered is accepted only when a certain CP command can be executed (e.g. 'Q TDISK'), which requires privilege class 'B' on a standard VM system. See the command description for the actual CP command required.

System action: The argument is ignored.

User response: Let your machine be authorized for the use of the CP command in question.

FCXxxx315A *xxxx xxxx nn eeeeee* LIMIT *mm* (Q1=*q1* QX=*qx*)

Explanation: The current value of performance variable *xxxx xxxx* is *nn*, and this value has been higher (if *eeeeee* is 'exceeds') or lower (if *eeeeee* is 'lower') than the defined threshold *mm* for at least the number of minutes defined with the 'FCONTROL LIMIT' command. In parenthesis you will find either the average number of users in queues 1 and in queues 0/2/3 (values *'q1'* and *'qx'*), or the user with the highest CPU, I/O or paging load, or with the highest number of resident pages, depending on the threshold variable. If there is no highest entry then a string of ''''''''''''s will be shown.

System action: Operation continues.

User response: Determine the reason for the uncharacteristic load and take the appropriate action.

FCXxxx317A User *xxxxxxxx vvvv nn.n* exceeded threshold *mm.m* for *tt* min.

Explanation: The current value of performance variable *vvvv* of user *xxxxxxxx* is *nn.n*, and this value has been higher than the defined threshold *mm.m* for about *tt* minutes (the *tt* value represents actually the number of measuring intervals during which the threshold has been exceeded, but this usually corresponds closely to the number of minutes unless frequent re-calculations have been forced in shorter intervals).

System action: Operation continues.

User response: Check whether this user's high load impairs other users' performance. If so, and if this particular user's work does not have a high priority, you could lower the virtual machine's relative share in order to reduce its impact on general system performance.

FCXxxx318A Channel *xx*: *nn*% busy exceeds limit of *mm*%

Explanation: The measured channel busy value of *nn*% on CHPID *xx* exceeds the threshold of *mm*%.

System action: Operation continues.

User response: Determine the reason for the high channel load. Try to distribute part of the I/O equipment connected to this channel to another one if the load is consistently high.

FCXxxx319A Device *xxxx*: queue length *.nn* exceeds limit of *.mm*

Explanation: The average I/O request queue length during the last monitor sample interval was *.nn* for the I/O device *xxxx*; it exceeds the limit *.mm* set for this value. This indicates an I/O bottleneck which should be investigated.

System action: Operation continues.

User response: Determine the reason for the high device contention. If the problem occurs frequently, inform your systems programmer so that corrective action can be taken, such as re-organizing minidisks or system SPOOL/PAGE area allocation.

FCXxxx320A Device *xxxx*: resp. time *nnn*ms exceeds limit *mmm*ms (*lll* IO/s)

Explanation: The response time *nnn*ms of device *xxxx* has exceeded the threshold *mmm*ms set with the FC LIMIT command for longer than the specified initial period, and the I/O rate was *lll* during the last monitor interval (the message will be generated only if there were at least 5 I/Os per second to that disk). Bad device response times can cause more general response time problems for the whole system and should be investigated. Among the possible causes are high device contention (as indicated by message 319), or high channel load leading to long disconnect times.

System action: Operation continues.

User response: Determine the reason for the high response time. If the problem occurs frequently, inform your systems programmer so that corrective action can be taken.

FCXxxx321A Less than *nn* paths to device(s) *xxxx-yyyy*

Explanation: The number of active channel paths to device *xxxx*, or to the range of I/O devices with the device numbers *xxxx* to *yyyy*, is lower than the required minimum of *nn* paths.

Assuming that the threshold number *nn* has been correctly defined with the command 'FC MINPATHS ...', the message indicates that one or more of the normally available channel paths are currently offline. Possible causes are hardware malfunction, or a configuration change. This can lead to performance degradation for all I/O activity to the affected I/O devices.

System action: Operation continues.

User response: Use the DEVCONF display to determine which channel paths have gone offline and try to fix the problem. Inform your customer engineer about the situation if it looks like a hardware problem.

FCXxxx323A More than 1/16 of generated storage not available (size = *nn.nnn*kB)

Explanation: The real storage size available on the system is over 1/16 less than the storage size generated in HCPSYS. One reason could be that some of the installed storage is not online due to a hardware problem. The storage size currently in use is *nn.nnn*kB.

System action: Operation continues. The message will be repeated whenever you enter performance monitor mode.

User response: Check whether some storage is missing due to a hardware problem. Adapt the specification in HCPSYS if necessary.

FCXxxx326A Cache status '*cfd*' not matching '*xyz*' for *xxxx-yyyy*

Explanation: Cache status monitoring has been activated for disk(s) with device number(s) *xxxx*(-*yyyy*), with an expected cache status of *xyz* for general caching, DASD fast write and dual copy respectively. The current status information, in the same sequence, is *cfd* and does not match the expected status.

System action: Operation continues. The message will be repeated if the unexpected status persists.

User response: Issue the required CP commands to bring the current cache status back to the expected one. (Or, if the current status is found to be correct, issue an 'FC MONCACHE' command to update the expected status to the new required setting in order to prevent further misleading messages.)

FCXxxx327A Insufficient storage: *ccccccc* data may be incomplete

Explanation: The program tried to obtain free storage as a work buffer for building the *ccccccc* display, but no more free storage was available.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: Operation continues, if possible, but data will be incomplete.

User response: Increase the virtual storage size of the PERFSVM machine.

FCXxxx330E User diagnose code '*nnn*' not available

Explanation: The user diagnose code '*nnn*' entered cannot be used in your virtual machine, probably because it has not been installed on your z/VM system.

System action: The command is ignored.

User response: Let your systems programmer install the user diagnose code that has been supplied with the program.

Since the CP console log can also be updated if your machine is allowed to issue the 'MSGNOH' command, you might also see that your virtual machine receives the necessary privilege class. The special user diagnose code is then not required for generating a complete CP console log.

FCXxxx332E Data length *nn* exceeds maximum data length *mm*

Explanation: This message can be shown in response to an 'FC USERHDR' or 'FC USERBOTL' command. The length *'nn'* of the data entered is longer than the available space *'mm'* in PERFKIT's header or bottom line, so the supplied string cannot be used in this form.

System action: The input will be truncated to the maximum length.

User response: Re-enter a shorter version of user data or accept the truncated version.

FCXxxx335E Exclude table full, user *xxxxxxxx* not added

Explanation: The exclude table has already been filled with user-IDs, and the userid *xxxxxxxx* could not be added to the table.

System action: User *xxxxxxxx* and any others following it will not be added to the exclude table.

User response: Re-define the exclude table size, using the command 'FC FORCEUSR EXCLMAX nn', and specify a number which is sufficient to hold the user-IDs of all machines which are to be excluded from FORCE processing.

FCXxxx336I Caution: No exclude list defined, ALL users will be forced

Explanation: Since no user-IDs have been excluded from FORCE processing, the activation of loop/idle user monitoring will equally affect all virtual machines on the system, including service machines.

System action: The command is accepted, and operation continues.

User response: Make sure whether forcing all machines is acceptable, or specify the FORCE interval as '0' to disable forcing. Otherwise, enter the required 'FC FORCEUSR EXCLUDE' command(s) for inserting the machines which are not to be forced into the 'exclude' table.

FCXxxx337E Required privilege class not available for command *xxxxx xxxxx*

Explanation: User monitoring has been enabled (command FC FORCEUSR and/or FC USRLIMIT), and PERFKIT tried to execute a FORCE or SET SHARE command, as indicated by *xxxx xxxx*. However, the virtual machine where PERFKIT is running does not have the necessary CP command privilege class for executing that command.

System action:

- If FORCE command could not be executed: Machines will not be forced, and all looping/idle user monitoring is disabled.
- If SET SHARE command could not be executed: Users' relative SHARE will not be automatically adapted when they exceed their resource consumption thresholds, but alert messages will still be generated.

User response: Authorize the machine for the required CP command privilege class (usually class A, requires a directory change). The machine will then be able to execute the command after the next LOGON.

FCXxxx338A User *xxxxxxxx* **in** *yyyy yyyy* **during last** *nn* **minutes**

Explanation: User *xxxxxxxx* has been found to be in the state indicated by *yyyy yyyy* for at least *nn* minutes by the user state monitoring logic. The state *yyyy yyyy* can be 'CPU loop', 'I/O loop', 'WSS loop' or 'IDLE wait', and the value *nn* is equal to, or larger than the 'warning' limit specified with the 'FC FORCEUSR' command.

System action: Operation continues.

User response: Check whether the machine's status represents a problem, and take the appropriate action.

FCXxxx339M User *xxxxxxxx* **forced after** *nn* **minutes** *yyyy yyyy*

Explanation: User *xxxxxxxx* has been found to be in the state indicated by *yyyy yyyy* for at least *nn* minutes by the user state monitoring logic. The state *yyyy yyyy* can be 'CPU loop', 'I/O loop', 'WSS loop' or 'IDLE wait'. The value *nn* is equal to, or larger than the 'FORCE' limit specified with the 'FC FORCEUSR' command, so the machine has been forced.

System action: The user is forced, and operation continues.

User response: None.

FCXxxx340S More than *nn* **words in VMTAPE message**

Explanation: Analysis of VMTAPE messages starts with tokenization of the messages to be analyzed. The routine has been written for tokenizing up to *nn* words only, and this limit has been exceeded.

System action: Further analysis of the message is skipped and operation continues.

User response: Inform systems programmer. If you use the original VMTAPE message format, inform IBM Service.

FCXxxx343S Error while analyzing message VMTXXX*nnn*

Explanation: The format of message VMTXXX*nnn* is not as expected by the the Performance Toolkit for VM sub-routine that tried to analyze it, probably because a different VMTAPE release is being used.

System action: Further analysis of the message is skipped and operation continues.

User response: Inform systems programmer. If you use the original VMTAPE message format, inform IBM Service.

FCXxxx344S No more MSGQBLOKs available

Explanation: The Performance Toolkit for VM VMTAPE message analysis routines have been written for handling up to 16 concurrently active tape units. More than 16 tape units are now active, or cleanup of some previously used control blocks is not complete.

System action: Further processing of the VMTAPE message is skipped and operation continues.

User response: Inform systems programmer. You may also re-initialize the Performance Toolkit for VM if the actual number of active tape units is lower than 16.

FCXxxx350E User *'xxxxxxxx'* **not logged on**

Explanation: The user-identification specified with the 'USER xxxxxxxx' or with the 'STORAGE DISPLAY xxxxxxxx' command cannot be found, i.e. it is not currently logged on, or it is in LOGON or LOGOFF processing so that no valid storage data can be extracted.

System action: Monitoring switches to the initial 'CPU'-screen.

User response: Re-enter the 'USER' sub-command with a valid user-ID.

FCXxxx351E Device *'xxxx'* not found

Explanation: No real device has been generated with the device number *'xxxx'* specified with the 'DEVICE xxxx' or 'I/O xxxx' command.

System action: Monitoring switches to the initial 'CPU'-screen.

User response: Re-enter the command with a valid real device number.

FCXxxx353M Insufficient storage for work area

Explanation: Some Performance Toolkit for VM functions require additional storage for work areas. The amount of storage needed may be very large, especially for performance monitoring on large systems (depends on the actual configuration and the number of users on the system being monitored). Not all of the requested storage has been obtained.

System action: Depends on the block that was not received. Performance monitoring may not be possible at all, or only part of the monitoring may be active.

User response: Increase the size of your virtual machine, re-IPL CMS and re-initialize the Performance Toolkit.

FCXxxx354A Device *'xxxx'* waiting for interrupt

Explanation: The disk with real device number *'xxxx'* has been waiting for an interrupt for at least one measuring interval. This may indicate a problem.

System action: Operation continues.

User response: Check whether there is really a problem with the disk. (The logic used checks whether an IORBK remained queued even though there was no I/O activity to the disk. This can happen also if suspend/resume logic is used by the channel programs.)

FCXxxx355M Interrupt(s) missing for device(s) of user *xxxxxxxx*

Explanation: One or more virtual devices of user *xxxxxxxx* have been waiting for an interrupt for at least one measuring interval. This probably indicates a problem in the case of DASD or GRAF-type devices. It may happen occasionally during normal operation on tape units, and on a CTC may just indicate that the other side is not active.

System action: Operation continues.

User response: Force re-calculation of performance data by pressing the 'ENTER'-key to see whether the problem persists. Use your judgement to determine whether there really is a problem and where the problem is (e.g. other end of a CTC connection.

FCXxxx356A RESERVE pending for device '*xxxx*' and no I/O activity

Explanation: Device *xxxx* was found to have remained in a 'reserved' state during the last measuring interval, without any I/O activity on the device. This usually indicates a failure in the application which issued the RESERVE command, and it will prevent applications on other systems to access the shared DASD.

System action: Operation continues.

User response: Check why the RESERVE remained pending (probably the application which issued it just ABENDed). Re-start the application, if necessary, to clear the RESERVED state.

FCXxxx357I No measurement block data available for device

Explanation: The detailed I/O device display has been selected for an I/O device. The pointer to the measurement block in the RDEV control block was found to be zero.

System action: Data based on measurement block data cannot be shown. This includes the I/O rate and device service time data, and also some other information (e.g. device response time) which is partially based on such data.

User response: None.

FCXxxx358E Command valid only if permanent data collection is active

Explanation: A command has been entered which cannot be executed unless permanent data collection has previously been activated by entering the command 'FC MONCOLL ON'.

System action: Operation continues.

User response: Enter the command 'FC MONCOLL ON' to start permanent performance data collection, then re-enter the command(s) which caused the error message.

FCXxxx359E Persistent data collect error for user *cccccccc*

Explanation: The 'User performance details' display was selected for user *cccccccc*, but a persistent error was found while trying to collect data for the user. Performance data is collected using diagnose X'04' for copying data from CP control blocks. Since this requires many such diagnose calls, they cannot all be executed at the same time, and it is possible that the contents of the original CP control blocks change while collecting data, because the virtual I/O configuration of the monitored machine changed. The Performance Toolkit for VM will detect some such changes, and will try to recover by restarting the data collection. It will give up trying after the third unsuccessful attempt.

System action: The selected user's data cannot be shown.

User response: Find out what happened to the monitored machine (e.g. I/O configuration change?) and retry monitoring it when its configuration should again be stable.

FCXxxx360E *'xxxxxxxx'* is not a valid monitor sub-command

Explanation: The command *xxxxxxxx* entered is not recognized as a valid Toolkit performance monitor subcommand, nor is it one of the 'general' Performance Toolkit for VM subcommands. No other commands are accepted while in performance monitoring mode.

System action: Operation continues.

User response: Enter a valid command. See "Performance Monitor Mode Subcommands" on page 133 for a description of all performance monitor sub-commands.

FCXxxx361E Selection not valid for Monitor Scan mode

Explanation: A performance monitor screen was selected which is based on data obtained from the system's control blocks. While in monitor scan mode, you are viewing (old) performance data for another period, and possible even for another system, so it makes no sense to retrieve and display *current* performance data for *this* system: the information would not correlate with the CP monitor data being scanned.

System action: The selection is ignored.

User response: None.

FCXxxx362I Storage utilization monitoring stopped - 255 samples taken

Explanation: The Performance Toolkit for VM storage utilization monitoring can only handle up to 255 samples. This limit has been reached, and no further samples will be taken for this user.

System action: Data collection for user storage analysis is stopped.

User response: If you want to continue monitoring the same user, you may force a reset the accumulated data by starting data collection for an other user. You can then restart monitoring for the original user; any user switch causes the data collected so far to be reset.

FCXxxx364E *'xxxxxxxx'* is not a valid sub-command for this display

Explanation: The command *xxxxxxxx* entered is a performance monitor subcommand which is intended for use with another monitor display only.

System action: The command is ignored and operation continues.

User response: Enter a valid command.

FCXxxx365E Error while converting PERFLOG data '*xxxx* (field '*cccc*')

Explanation: The Performance Toolkit for VM found an unexpected data format '*xxxx*' when trying to convert the field *cccc* EBCDIC to binary format. This is a toolkit error, unless you have modified the *mmddyy* PERFLOG file yourself which Performance Toolkit tried to convert.

System action: A value of 0 is assumed for the field, and operation continues.

User response: Rename the PERFLOG file to some other filetype to prevent its further use by the Performance Toolkit for VM and inform the author of the program.

FCXxxx366I User storage exceeds *nn* MB, remainder cannot be mapped

Explanation: The Performance Toolkit for VM storage utilization monitoring code is set up for analyzing up to *nn*MB. Page residency for user storage above this limit cannot be analyzed and displayed.

System action: Operation continues.

User response: None.

FCXxxx367E No mapping possible: storage is much larger than *nn* MB

Explanation: The Performance Toolkit for VM storage utilization monitoring code is set up for analyzing up to *nn*MB. The virtual machine's storage is much larger than this limit and displaying just the first *nn* MB does not make sense.

System action: User storage monitoring is stopped.

User response: None.

FCXxxx368I Insufficient storage, data may be incomplete

Explanation: The Performance Toolkit for VM performance monitoring code can require a amount of working storage, especially on systems with many logged-on users. It will try to continue operating even when not all its storage demands have been met, but some of the data may be incomplete (e.g. data not collected for all users on the system).

System action: Operation continues.

User response: Increase the machine's storage size in the directory and then restart the program.

FCXxxx369E 64-bit address found: can only handle 31-bit addresses

Explanation: The current implementation of storage utilization monitoring is based on both segment and page tables residing below the 2GB line. However, one of the pointers found in storage appears to be a 64-bit address above 2GB and the code cannot yet handle it.

System action: User storage monitoring is stopped.

User response: Contact IBM Service.

FCXxxx371I AVERAGE data shown temporarily due to print request

Explanation: An automatic data reset and print request is being executed (defined by 'FC MONCOLL RESET' command). This type of print request implies 'average' data, and the performance monitor has therefore been switched temporarily to calculate average data before being reset. It will automatically be set to display 'current' data again after the reset.

System action: Operation continues.

User response: None.

FCXxxx372E *rrrr* **cannot be shown - not available on this level of VM**

Explanation: The last command requested a screen *rrrr* with data which is not available with the current VM level. This particular type of data might be available only for a later VM release.

System action: Operation continues.

User response: See the description of the screen *rrrr* requested. It should state any special pre-requisites.

FCXxxx373E Invalid report name *rrrrrrrr* **specified**

Explanation: The requested report *rrrrrrrr* was not recognized.

System action: Operation continues.

User response: See the documentation for a description of available performance reports, and of the commands to be used for selecting them.

FCXxxx374E INTERIM period not available for *cccccccc cccccccc*

Explanation: The specification *cccccccc cccccccc* in the REPORTS control file calls for an 'interim' period report. However, this type of report is not available with the current level of the program.

System action: Operation continues.

User response: See Appendix C, “Printed Reports,” on page 913 for a list of the available performance reports, and the commands to be used for selecting them.

FCXxxx375E No data found for current selection

Explanation: The history data to be analyzed does not contain records which meet the criteria specified with the last command.

System action: Operation continues.

User response: Check the time span covered by the available history data and adapt the command accordingly.

FCXxxx376E File *fn ft fm***: Invalid format for performance log file**

Explanation: File *fn ft fm* was selected as input for creating graphics, but the file format is not correct (record length does not match the length expected for a detailed or summary performance log file.

System action: The command is aborted.

User response: Check the file identification entered. Make sure the original record length of PERFLOG, RMONLOG and PERFHIST files is not changed when copying the data to an archive disk.

FCXxxx377E Return code *rc* **for** *cccccccc* **with UNPACK option**

Explanation: As the result of a previous command, the Performance Toolkit for VM attempted to unpack a packed performance data log file which was needed as input. However, calling *cccccccc* for unpacking the file resulted in a return code of *rc*.

System action: The command is aborted.

User response: See the documentation of program *cccccccc* for the meaning of the return code and try to fix the problem before re-executing the command.

FCXxxx378E TERSE MODULE not found, cannot unpack file

Explanation: A command required data from a packed performance data log file as input. The program determined that the performance data log file had been packed using the TERSE module, but cannot find this module which it needs for unpacking.

System action: The command is aborted.

User response: Execute the necessary LINK and ACCESS commands in the server machine to give it access to the TERSE module, then re-execute the command.

FCXxxx380I Entry point '*cccccccc***' at address** *X'xxxxxxxx***'**

Explanation: This is the reply to a 'LOCATE' command in performance monitor mode. It indicates

the address *X'xxxxxxxx'* in real storage at which entry point *cccccccc* is located.

System action: Operation coninues.

User response: None.

FCXxxx381I Entry point '*cccccccc*' not found

Explanation: The entry point *cccccccc* could not be located by diagnose X'90'. The message will be shown either when an entry point specified with a 'LOCATE' command could not be found, or during initialization if one of the CP entry points needed for performance monitoring could not be located.

System action: Operation continues. If the message was generated during initialization, a flag will be set to disable monitoring for the remainder of the current session in order to avoid ABENDs.

User response: For 'LOCATE' command: Check that the string *xxxxxxxx* was correctly entered. If the message was generated during initialization, the probable cause is a CP change (e.g. module split) which re-named an entry point. Inform IBM Service.

FCXxxx382I Monitoring disabled (CP entry point missing)

Explanation: This message is usually preceeded by message 381 during initialization: a CP entry point which is required for the monitor's data collection process could not be located. All monitoring has been disabled to avoid ABENDs.

System action: Operation continues.

User response: Resolve the problem indicated by message 381.

FCXxxx383E Invalid HEX specification *'xx'* found

Explanation: The CHAR argument of the PLOT or PLOTSUM command has been entered with an apostrophe (') in the string specification. This indicates that all characters up to the next apostrophe are to be interpreted as character pairs with the hexadecimal representation of one of the desired plotting characters, but the pair *xx* either contains non-hex characters, or a value lower than X'40' has been defined (not valid as display character).

System action: The invalid hexadecimal specification and any other characters following it are ignored, and the default plotting characters are used instead.

User response: Re-enter the command with a valid specification.

FCXxxx384E Time stamp *hh:mm* not found

Explanation: A PLOTxxx or a GRAPHxxx command has been entered with the 'FROM hh:mm' argument The starting time *hh:mm* specified could not be found in any of the available data records.

System action: The oldest values will be plotted (first few entries in redisplay buffer).

User response: Re-enter the command with a valid start time.

FCXxxx385E Entry point '*cccccccc*' not resident

Explanation: The entry point *cccccccc* was found to be not resident. The message will be shown either when an entry point specified with a 'LOCATE' command is not resident, or during initialization if one of the CP entry points needed for performance monitoring is found to be not resident. The latter case indicates a logic error: a CP module was probably made pageable in a new VM release, and your copy of the Performance Toolkit for VM is not yet adapted to that change.

System action: Operation continues.

User response: Obtain a new PERFKIT module, adapted to your VM level, if the message was generated during initialization.

FCXxxx386E Error *nnnn* for 'GLOBAL TXTLIB ADMNLIB ADMGLIB ADMHLIB' command

Explanation: The command GLOBAL TXTLIB ADMNLIB ADMGLIB ADMHLIB is executed before loading the graphics interface modules for preparing GDDM output. The error code *nnnn* is the return code received while executing this command.

System action: The CPU display will be shown and operation continues.

User response: Determine the reason why the command GLOBAL TXTLIB ADMNLIB ADMGLIB ADMHLIB could not be executed (for example, GDDM not installed or disk not accessed). Try selecting the graphics screen again when the problem has been resolved.

FCXxxx387E Error *nnnn* loading 'FCXPGD TEXT'

Explanation: The command 'LOAD FCXPGD' is executed while preparing the graphics display. The FCXPGD TEXT file, or another TEXT file that was to be loaded with FCXPGD, could not be loaded properly. The error code *nnnn* is the return code received while executing this command.

System action: The CPU display will be shown and operation continues.

User response: Determine the reason why this command could not be executed (e.g. FCXPGD and/or FCXPGU TEXT file not on any of the accessed disks). Switch back to basic mode (press PF-key 3) and look for CMS error messages generated while trying to load FCXPGD/FCXPGU. Try selecting the graphics display again when the problem has been resolved.

FCXxxx388E Error code *nnnn* from *xxxxxxxx*

Explanation: Module FCXPGD or FCXPGU which prepare and execute GDDM graphics output by calling the appropriate GDDM routines has received an unexpected error code of *nnnn* from GDDM routine *xxxx*.

System action: The CPU display will be shown and operation continues.

User response: Refer to the GDDM messages manual for the meaning of the GDDM error code The code *nnnn* corresponds to the GDDM message number. Look also for GDDM messages which may have been generated (leave performance monitor mode, you can only see the messages while the Performance Toolkit for VM is in basic mode).

FCXxxx391E CP MONITOR data analysis not activated, data not available

Explanation: A performance monitor subcommand was entered which called for data which be supplied only when the CP MONITOR interface of the Performance Toolkit for VM has been activated, by means of the 'FC MONCOLL CPMON ...' command. This interface is not currently active, and the selected data cannot be shown.

System action: None.

User response: Activate data extraction from CP MONITOR data by means of the 'FC MONCOLL CPMON ...' command, then retry the command which resulted in the error message.

FCXxxx392E No control unit cache data available

Explanation: A 'CACHDBSE' command has been entered and, although CP MONITOR data extraction has been activated, no cache data are available for display. Possible reasons are:

- The CACHDBSE command was entered too soon after starting CPMON data collection, i.e. before the end of the next CP MONITOR data collect interval.
- The I/O domain is not enabled for the cached disks
- No control unit with cache exists in the system's I/O configuration

System action: CACHE data cannot be shown, and the general CPU overview screen is shown instead.

User response: Make sure the I/O domain has been enabled for all cached disks, and MONITOR SAMPLE is active. Wait, if necessary, for the next CP MONITOR data collect interval.

FCXxxx396E No shared file system data available

Explanation: An 'SFS' command has been entered and, although CP MONITOR data extraction has been activated, no shared file system data are available for display. Possible reasons are:

- The SFS command was entered too soon after starting CPMON data collection, i.e. before the end of the next CP MONITOR data collect interval.
- The APPLDATA domain is not enabled for the shared file system servers
- No shared file system servers are logged on to the system

System action: SFS data cannot be shown, and the general CPU overview screen is displayed instead.

User response: Make sure the APPLDATA domain is enabled for all shared file system servers, and MONITOR SAMPLE is active. Wait, if necessary, for the next CP MONITOR data collect interval.

FCXxxx397E No shared file system data available for user *xxxxxxxx*

Explanation: An 'SFS *userid*' command has been entered and, although CP MONITOR data extraction has been activated, and shared file system data found, no shared file system data are available for the user-ID which you selected. Possible reasons are:

- The APPLDATA domain has been enabled only for some SFS servers, but not all of them
- The selected virtual machine is not working as an SFS server

System action: SFS data for the selected user cannot be shown, and the general CPU screen is displayed instead.

User response: Check whether the selected virtual machine is currently working as an SFS server and, if so, make sure the APPLDATA domain is enabled to collect data for this server.

FCXxxx398E No matching performance history files found

Explanation: A HISTDATA command was entered, but no files matched the specifications of the command or the default ones.

System action: The selection is ignored.

User response: None.

FCXxxx399E No LPAR data available

Explanation: An 'LPAR' command has been entered, but no CP monitor data have been collected so far with LPAR information. Possible reasons are:

- The system is running second level under control of another z/VM system
- No new SAMPLE interval has elapsed since activating the Performance Toolkit performance monitoring function

System action: LPAR data cannot be shown, and the initial menu will be displayed instead.

User response: Make sure that CP MONITOR data collection is active, and the Performance Toolkit is running in the appropriate system environment.

FCXxxx400E '*fn ft fm*' not found - request cancelled

Explanation: A command has been issued that requires a control file with the file identification *fn ft fm* as input, but the required file could not be found or contained only comments.

System action: The request is cancelled.

User response: Ask the owner of the machine to create the control file.

FCXxxx401E You have not been authorized for retrieving data

Explanation: Your address (RSCS node-ID and user-ID) could not be found in file 'FCONRMT AUTHORIZ' in the machine where you sent the remote performance data retrieval request. Requests will be executed only when you have been authorized by your address in this file.

System action: The request is cancelled, no performance data will be returned.

User response: Contact the owner of the machine and let yourself be authorized for remote performance data retrieval, then re-issue the retrieval request.

FCXxxx402E No perm. perf. data collection - retrieval not possible

Explanation: Remote performance data retrieval is possible only from machines where PERFKIT has been set up for permanent performance data collection. The machine where you sent your retrieval request is not set up for this.

System action: The request is cancelled, no performance data will be returned.

User response: Ask the owner of the machine to let performance data be collected permanently (command 'FC MONCOLL ON, see “FCONTROL MONCOLL” on page 52), then re-issue the request.

FCXxxx403E You have not been authorized for executing commands

Explanation: Your address (RSCS node-ID and user-ID) has not been included in file 'FCONRMT AUTHORIZ' with the 'CMD' argument in the machine where you sent the CP or CMS command. CP and CMS commands will be executed only when you have received special authorization for executing commands.

System action: The request is cancelled, the command will not be executed.

User response: Contact the owner of the machine and let yourself be authorized for executing commands, then re-issue the retrieval request.

FCXxxx404E You have not been authorized for submitting user exceptions

Explanation: Your address (RSCS node-ID and user-ID) has not been included in file 'FCONRMT AUTHORIZ' with the 'EXCPMSG' argument in the machine where you sent the exception message 'FCONRMU ....'. User-generated exception information will be accepted, and included in the consolidated exception log file, only once you have received the required authorization.

System action: The data sent are not treated as 'user exception' information, but just displayed as ordinary CP message.

User response: Contact the owner of the machine and let yourself be authorized for submitting user-generated exception data.

FCXxxx405E Authorization type missing for user '*uuuu*' at '*nnnn*'

Explanation: The entry for the user with userid *uuuu* on system *nnnn* in the authorization file 'FCONRMT AUTHORIZ' does not contain the mandatory specification of the authorization type to be given.

System action: The invalid record is ignored, and processing continues with the next record in the FCONRMT AUTHORIZ file.

User response: Adapt the corresponding record in file FCONRMT AUTHORIZ and then re-initialize See "Implementing Remote Performance" in the *z/VM: Performance Toolkit Guide* for a complete description of the record layout.

FCXxxx406E Invalid authorization '*xxxx*' for user *uuuu* at *nnnn*

Explanation: The authorization type *xxxx* specified for the user with userid *uuuu* on system *nnnn* in the authorization file 'FCONRMT AUTHORIZ' is not valid.

System action: The invalid record is ignored, and processing continues with the next record in the

FCONRMT AUTHORIZ file.

User response: Adapt the corresponding record in file FCONRMT AUTHORIZ and then re-initialize. See "Implementing Remote Performance" in the *z/VM: Performance Toolkit Guide* for a complete description of the record layout.

FCXxxx407E Missing Node-ID and/or User-ID

Explanation: No node-ID and/or user-ID specification has been found in one of the records of the authorization file 'FCONRMT AUTHORIZ'. Both the node-ID and user-ID specifications, and a specification of the authorization type, are mandatory.

System action: The invalid record is ignored, and processing continues with the next record in the FCONRMT AUTHORIZ file.

User response: Adapt the corresponding record in file FCONRMT AUTHORIZ and then re-initialize. See "Implementing Remote Performance" in the *z/VM: Performance Toolkit Guide* for a complete description of the record layout.

FCXxxx408E Invalid Node-ID or User-ID '*xxxxxxxx*'

Explanation: The node-ID or user-ID name beginning with the characters *xxxxxxxx* is invalid (contains invalid characters or is more than eight characters long), and cannot be accepted.

System action: The invalid record is ignored, and processing continues with the next record in the file FCONRMT AUTHORIZ or FCONRMT SYSTEMS.

User response: Adapt the corresponding record in the file FCONRMT AUTHORIZ or FCONRMT SYSTEMS and then re-initialize. See "Implementing Remote Performance" in the *z/VM: Performance Toolkit Guide* for a complete description of the record layout.

FCXxxx409E Intermediate server not authorized for S&F operation

Explanation: An attempt was detected to establish an APPC/VM connection, posing as an intermediate store and forward server, but the virtual machine has not been defined as an S&F server in the FCONRMT AUTHORIZ file.

System action: Store and forward requests are not allowed.

User response: Adapt the FCONRMT AUTHORIZ file and include the required `S&FSERV` definition if the virtual machine is to be set up as a store and forward server for APPC/VM remote data retrieval.

FCXxxx410A Unauth. *cccccccc* request by *uuuu* at *nnnn*

Explanation: User *uuuu* on VM system *nnnn* entered a remote command, but is not authorized for *cccccccc* requests.

System action: The command is not executed.

User response: Refrain from using unauthorized requests, or contact the administrator to have your entry in the FCONRMT AUTHORIZ file updated and the *cccccccc* authorization added.

FCXxxx411E CP/CMS commands not accepted via Internet interface

Explanation: Current HTTP protocol is based on stateless transactions where a user's connection is maintained only for the duration of a single interaction. Some logic has been implemented in the Performance Toolkit for VM to allow maintaining something similar to an ongoing session, but it is not reliable enough to really guarantee that the requestor is still the same one which originally provided a logon password. Allowing execution of CP or CMS commands by users whose identity cannot be guaranteed would introduce a severe security exposure, so we inhibit use of such commands.

System action: None.

User response: None.

FCXxxx412E Invalid selection(s)

Explanation: An invalid selection character has been entered.

System action: The selection is ignored.

User response: Enter the correct selection character. See explanation in the message line above the command line for valid selections.

FCXxxx413I Screen definition not found - backlevel module

Explanation: While processing remote performance data from another system the program that it could not locate the screen definition which describes the display layout for the remote data in its internal table, probably because performance data were retrieved from a remote Performance Toolkit for VM module which is on a higher maintenance level.

System action: The remote data are displayed, but scrolling operations and HELP calls may yield unexpected results.

User response: Have the PERFKIT module on the local system upgraded to the same level as on the remote system(s).

FCXxxx414E Command chaining via #-character not allowed in remote mode

Explanation: Logical line end characters are usually processed within the requesting the Performance Toolkit for VM module, which then passes the logical command on separately for validation/execution. A command string was submitted with an imbedded '#' logical line end character, indicating either a logic error in the requesting Performance Toolkit for VM module or an attempt to submit such a string from another program, posing as a Performance Toolkit for VM client.

System action: The command is not executed.

User response: Inform the Performance Toolkit for VM support team if the command string was entered from within a Toolkit client, or refrain from using command chaining if another client program was involved.

FCXxxx415E You have not been authorized for executing CP queries

Explanation: A CP 'QUERY' or 'INDICATE' command has been entered in a remote performance data retrieval session, but the user is not authorized for executing such commands, and/or the user is connected via the WWW interface and the WWW has not been given the CPQRY authorization.

System action: The command is not executed and the connection to the system is severed.

User response: Contact the system administrator and ask for CPQRY authorization if you have a business need for it. Be aware, however, that a policy may be in place that does not allow WWW clients to be given such an authorization, due to the nature of the connection and/or user validation.

FCXxxx416E Invalid ':*systemid*:' specification found

Explanation: An entry was found in the file that looked like an attempt at a :*systemid*: specification, with a leading ':', but it cannot be valid valid because either the trailing ':' is missing, or because the 'systemid' is not 1-8 characters long.

System action: The record is ignored.

User response: Check the control file with the incorrect statement and fix the invalid entry.

FCXxxx417E ':EXCL:' argument out of sequence

Explanation: An :EXCL: argument was found, but was not the first argument in a new 'group' of systems. ***All or none*** of the systems in a group must be excluded, a mix is not possible.

System action: The record is ignored.

User response: Check the control file with the incorrect statement and fix the invalid entry.

FCXxxx419E Intermediate server not authorized for S&F operation

Explanation: An attempt to establish an APPC/VM connection posing as an intermediate store and forward server was detected, but the virtual machine has not been defined as an S&F server in the FCONRMT AUTHORIZ file.

System action: Store and forward requests are not allowed.

User response: Update the FCONRMT AUTHORIZ file on the client machine to include the required S&FSERV definition.

FCXxxx420E No history data available for node *xxxxxxxx*

Explanation: An 'h' selection has been entered for system *xxxxxxxx* on the general system overview display in remote monitoring mode, but no performance history data has been found for the selected system. History data will be collected only if the 'append' flag for the system has been set to 'Y'.

System action: The selection is ignored.

User response: Change the 'append' flag for the system to 'Y' if you want history data to be collected, or enter the 'h' selection for another system where history data is available.

FCXxxx421E No exception data available for node *xxxxxxxx*

Explanation: An 'e' selection has been entered for system *xxxxxxxx* on the general system overview display in remote monitoring mode, but no exception data has been received today for the selected system.

System action: The selection is ignored.

User response: None.

FCXxxx422E No exceptions logged

Explanation: The exception log screen was selected for display, but no exception messages have been saved yet for the current day.

System action: The selection is ignored.

User response: None.

FCXxxx423E Cannot show SYSLOAD: Remote data collection not active

Explanation: A request has been entered to display the system load overview. This display can be shown only on systems that have been set up as central

collectors for remote data from other VM systems.

System action: The selection is ignored.

User response: None.

FCXxxx430E Error *nn* reading remote data from card reader

Explanation: An error has occurred while reading data sent from another machine. *nn* is the return code given by the CMS RDCARD macro.

System action: The reader file is not read.

User response: See the appropriate CMS manual for the meaning of the indicated return code.

FCXxxx431E Error *nn* for *xxxx* of target disk

Explanation: A command ('FCONRMT ...' or 'FC MONCOLL CPMON DISK ...') has been entered which will automatically try to LINK and ACCESS the selected target disk. An error has occurred while trying to LINK or ACCESS the disk, as indicated by the string *xxxx*. *nn* is the return code received when trying to execute the LINK or ACCESS command.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: Data on the disk are not accessed.

User response: See the appropriate CP or CMS documentation, and the error message generated on the basic mode screen, to determine the cause of the error (e.g. not authorized to LINK to the disk).

FCXxxx432E Command not executed, remote data collection active

Explanation: An FCONRMT command has been entered for accessing a central data collector machine's A-disk, but the machine where the command has been entered is already acting as a central data collector itself. The two modes exclude each other

System action: Operation continues.

User response: None.

FCXxxx433E Command not executed, linked to central monitoring disk

Explanation: An 'FC MONCOLL REMCOLL ..' command has been entered to start operation as central data collector machine, but the machine where the command has been entered is already linked to a central data collector itself. The two modes exclude each other.

System action: Operation continues.

User response: None.

FCXxxx434E GRAPHDET command supported only from REDISP mode while in FCONRMT

Explanation: A 'GRAPHDET ...' command has been entered in remote monitoring mode. This command is supported only when working with performance redisplay data *in storage*, i.e. REDISP data must be displayed when entering the command in remote monitoring mode.

System action: Operation continues.

User response: Select REDISP data for display, then re-enter the GRAPHDET command.

FCXxxx435E 'FILE' spec. needed unless in REDISP mode or RMONLOG file available

Explanation: A 'GRAPHxxx ...' command has been entered in remote monitoring mode. The GRAPHSUM and GRAPHVAR commands will use, by default, performance REDISP data if you are viewing a REDISP screen, or the '*node-ID* RMONLOG' file for the current system if this file can be found, but neither is available.

System action: The command is not executed, and operation continues.

User response: Use the 'FILE' argument of the GRAPHSUM or GRAPHVAR commands to specify the complete file-ID of the RMONLOG*n*, PERFLOG*n* of PERFHIST file which contains the performance source data.

FCXxxx436E RSCS user-ID for this system not found

Explanation: A command has been entered which requires data transfer to a remote system, but the Performance Toolkit for VM could not determine the user-ID of the RSCS machine.

System action: The command is not executed, and operation continues.

User response: Make sure that an RSCS machine has been set up and that it has been defined in a SYSTEM NETID file to which the Toolkit has access.

FCXxxx437E No data in storage, input file specification required

Explanation: You tried to create graphical output based on REDISP data in storage, but there are no such data, probably because you are working in a virtual machine where the Performance Toolkit for VM has not been set up for permanent data collection.

System action: The selection is ignored.

User response: Specify a valid input data file.

FCXxxx438E Variable '*vvvvvvvv*' not valid for *iiiiiiii* input

Explanation: You tried to create graphical output based on *iiiiiiii* input, but *vvvvvvvv* is not a valid variable name for that case.

System action: The selection is ignored.

User response: Specify a valid variable name.

FCXxxx439E Insufficient number of perf. variables specified

Explanation: At least one variable must be specified for 'by time' graphics, and at least two variables are required for variable correlation type graphics. The number of variables found was lower. Defaults will be set when displaying HISTLOG/HISTSUM data, but not for any other type of input file.

System action: The selection is ignored.

User response: Specify at least the minimum number of variables.

FCXxxx440E Error *nnnn* loading MONITOR segment *cccccc*

Explanation: An error was found when trying to load the MONITOR segment *cccccc*. The value *nnnn* is the return code from the SEGMENT LOAD macro.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: The CPMON interface could not be activated.

User response: See the description of the SEGMENT LOAD macro and check the meaning of the return code received, then take the appropriate action and try to activate the interface again.

FCXxxx441E Error *nnnn* during *cccc cccc* for *MONITOR service

Explanation: An error was found while trying to establish the connection to the *MONITOR IUCV service. The value *nnnn* is the return code from the IUCV function *cccc cccc*.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: The CPMON interface could not be activated.

User response: See the description of the appropriate IUCV macro and check the meaning of the return code received. Take the appropriate action and try to activate the interface again.

FCXxxx442E CP MONITOR data collection already active - command ignored

Explanation: You have tried to activate the Performance Toolkit's interface for extraction of CP MONITOR data. However, this interface is already active, and no further action is necessary.

System action: None.

User response: None.

FCXxxx443E IUCV connection severed by *MONITOR, rc = *nnnn*

Explanation: The IUCV connection to the *MONITOR system service has been severed. The value *nnnn* is the reason code for this action.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: The MONITOR interface is completely reset.

User response: Check the meaning of the code given, and look also for informational messages from CP which could explain why the connection was severed. Restart the interface when the problem has been solved.

FCXxxx444E IUCV reply failed with reason code *nnnn*

Explanation: An IUCV REPLY which the Toolkit attempted upon receiving data from the *MONITOR service failed. The value *nnnn* is the reason code given by the IUCV REPLY macro.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: Depending on the exact nature of the problem, the interface may have been completely reset.

User response: See the description of the IUCV REPLY macro and check the meaning of the reason code given. Look also for messages from CP which could explain why the REPLY action failed. Restart the interface when the problem has been solved.

FCXxxx445E Return code *nnnn* for MONITOR START command

Explanation: The Performance Toolkit for VM will attempt to issue a MONITOR START command after establishing an IUCV connection to the *MONITOR service (after a 'FC MONCOLL CPMON DCSS ON ...' command). The value *nnnn* is the return code from the command 'MONITOR START'.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: The MONITOR interface is completely reset.

User response: Check the meaning of the return code received, and look also for informational messages from CP which could explain why the command did not work. Restart the interface when the problem has been solved.

FCXxxx446E Incomplete monitor data: *nnnnn* **too small**

Explanation: Data from the CP monitor indicates that the information received is incomplete because either the DCSS is too small or the SAMPLE CONFIG size in the DCSS is too small. (Accordingly, *nnnnn* will be either 'DCSS' or 'SAMPLE CONFIG'.)

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: Data will be shown as far as possible, but the information is likely to be incomplete. Incorrect data may be shown, and the Performance Toolkit for z/VM could even abend.

User response: Inform the responsible systems programmer that either a larger monitor segment needs to be defined for the CP monitor data, or that the SAMPLE CONFIG area size in the monitor segment needs to be increased. You might also consider disabling some of the monitor domains, users or devices that are not needed, or enabling only the domains, users or devices that are needed. (Refer to the MONITOR SAMPLE command in *z/VM: CP Commands and Utilities Reference*.)

FCXxxx447E Incomplete monitor data: abnormal termination

Explanation: Data from the CP monitor indicate that the information received is incomplete because data notification has been terminated.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: Data will be shown as far as possible, but the information may be incomplete.

User response: None.

FCXxxx448I Not authorized for MONITOR START: Start from other machine!

Explanation: The Performance Toolkit for VM tries to execute a MONITOR START command when data collection from the monitor shared segment is invoked. The return code received suggests that your virtual machine has not been authorized to execute this command, hence there is no guarantee that the CP monitor is started now.

System action: Operation continues, but performance data will be collected only if CP monitor data collection is active too.

User response: Make sure CP monitor data collection has already been activated by some other virtual machine, or do so now.

FCXxxx449I End of data reached

Explanation: An 'end-of-file' condition has been reached while scanning a disk file. No further data records are available for scanning.

System action: The command which resulted in coming up against the end of the disk file cannot be executed.

User response: None.

FCXxxx450E CP MONITOR collection already active from *cccc*

Explanation: You have tried to activate the Toolkit's interface for extraction of CP MONITOR data. However, this interface has already been activated from *cccc* and cannot be started again.

System action: The command is ignored.

User response: Stop the currently active interface first before you try to activate another one.

FCXxxx451I SEEKS EVENT data collection started for device *xxxx*

Explanation: A 'SEEKDET *xxxx*' command was entered to display detailed seeks data for device *xxxx*. SEEKS data collection for that disk was not previously active and has automatically been started now to allow further analysis.

System action: Operation continues.

User response: Remember to disable SEEKS data collection for that device again when you have finished your analysis. SEEKS data collection will *not* be deactivated automatically by the Performance Toolkit.

FCXxxx452E Return code *nnnn* **for MONITOR EVENT ENA SEEKS cmd**

Explanation: A 'SEEKDET *xxxx*' command was entered to display detailed seeks data for device *xxxx*. The Performance Toolkit for VM received return code *nnnn* when it tried to enable SEEKS data collection for device *xxxx*. Unless SEEKS data collection had previously been enabled for the selected device from another machine, you will not see seeks information for the disk.

System action: Operation continues.

User response: Check the return code and give the Toolkit machine the privilege class required for activating SEEKS data collection, or enable SEEKS data

collection from another (authorized) machine.

FCXxxx453E Not authorized for 'LOCATE', user limit checking disabled

Explanation: The CP LOCATE command is used for USER LIMIT checking. This requires CP command privilege class C or E on a standard z/VM system. User limit checking cannot be activated before your machine has been authorized for the necessary command privilege class.

System action: Operation continues.

User response: Have your machine authorized for executing the LOCATE command by adding the required CP command privilege class (usually class 'C' or 'E') to the directory entry of your machine. LOGOFF/LOGON, re-start PERFKIT and then re-issue the command.

Caution: This authorization should be considered a security exposure if the use of the machine is not restricted to operating or system support personnel that does already have similar privileges anyway.

FCXxxx454E Internal Performance Toolkit for VM error, user limit checking disabled

Explanation: An internal error has been found which does not allow user limit checking to function properly. User limit checking has, therefore, been disabled.

System action: Operation continues.

User response: Contact IBM service.

FCXxxx455E *cccccc* **process started before end of** *dddddd*

Explanation: Process *cccccc* should normally start after completing process *dddddd*, so this message indicates an internal problem which is probably linked to excessive system load. This message will usually be accompanied by message FCXxxx459.

System action: Operation continues, but data tables may be cleared as indicated by message FCXxxx459.

User response: Refer to messages FCXxxx456, FCXxxx457, and FCXxxx458. The data collector machine probably needs a higher priority.

FCXxxx456E Monitor segment overlaid before completion of data collection

Explanation: The data collector machine could not complete processing of all monitor data presented in the monitor segment before the segment was overlaid with a new set of data. This problem was probably caused by excessive system load and/or insufficient priority for the data collector machine. The message will usually by accompanied by message FCXxxxx459. This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: Operation continues, but data tables may be cleared as indicated by message FCXxxxx459.

User response: Look also for messages FCXxxxx457 or FCXxxxx458. The data collector machine probably needs a higher priority.

FCXxxx457A *uuuuuuuu nn*% **active;** *cccccccc* **higher priority**

Explanation: The data collector machine *uuuuuuuu* was found to have been more than 50% active during the last monitor sample interval, where *nn* indicates the actual value. Since the machine must be able to process all of the available monitor data before CP overlays the segment with a new set of data, high activity values indicate a risk that the machine might no longer be able to do that if the situation deteriorates further. This is indicated by the text in string *cccccccc*, which will say 'may need' or 'requires' depending on the urgency of the problem, as indicated by the current activity level.

This problem may be caused by either the user running additional resource intensive tasks in the data collector machine or by excessive system load and/or insufficient priority for the data collector machine.

System action: Operation continues.

User response: Do not run resource intensive tasks in the data collector machine. If the message was generated without such additional tasks being run, verify that the machine is being run with absolute share. Increasing the machine's priority may also help eliminate this message.

FCXxxx458A Insufficient resources for reliable data collection

Explanation: A data collect error was found which is thought to be due to a lack of sufficient resources for the data collector machine so that it could not keep up processing monitor data. The message will usually be preceded by another message giving more details about the actual problem.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: Operation continues. Data tables may be cleared as indicated by message FCXxxxx459.

User response: Do not run resource intensive tasks in the data collector machine. Increase the machine's priority if the message was generated without such additional tasks being run.

FCXxxx459I Data not reliable: all tables cleared

Explanation: A data collect error was found which may have led to an inconsistent set of data being loaded. To prevent display of incorrect information all internal data tables have been cleared, causing partial loss of monitor data so far collected.

This message should be preceded by one or more of the messages to FCXxxxx458, indicating what caused the problem.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: Operation continues.

User response: Be aware that no averages can be calculated for periods preceding the table clear.

FCXxxx460E Incorrect perf. variable definition in formula

Explanation: An apparent performance variable definition has been found in a USERVAR formula (with leading single quote '), but either the variable name or the ending quote were found to be missing.

System action: The command is ignored.

User response: Check the formula for correct specification of all performance variables and retry the command.

FCXxxx461E Non-matching parentheses in formula

Explanation: Opening and closing parentheses in a formula must always appear in pairs, but the number of right parentheses in your formula is not equal to the number of left parentheses, i.e. the format is not valid.

System action: The command is ignored.

User response: Correct the parentheses in the USERVAR formula and then retry the command.

FCXxxx462E Incorrect argument *cccc* in formula

Explanation: An expression *cccc* has been detected in your formula which is neither a mathematical operator, a fixed number, nor a valid performance variable name.

System action: The command is ignored.

User response: Correct the invalid expression and retry the command.

FCXxxx463E Format ... *cccc cccc cccc* ... is incorrect

Explanation: While analyzing the formula a sequence of its elements was found which appears invalid. Examples: two variable names without intervening mathematical operator, or two operators without a variable name between.

System action: The command is ignored.

User response: Fix the offending part of the formula and retry the command.

FCXxxx464E More than *nnnn* elements in formula

Explanation: The routine for analyzing the formula can only handle up to *nnnn* elements (variable names, mathematical operators, parentheses), but the formula contains more elements than this number.

System action: The command is ignored.

User response: Try to devise a method for obtaining the desired results using a formula with less elements.

FCXxxx465E User variable *cccc* not defined

Explanation: An 'FC USERVAR QUERY *cccc*' command, or a command for setting the description or the units of user variable *cccc* has been entered, but no user variable with this name has been found.

System action: None.

User response: Correct the variable name and re-issue the command, or define the variable first by specifying the formula to be used before you attempt to enter its description.

FCXxxx466E No user variables defined

Explanation: An 'FC USERVAR QUERY' command has been entered but no user variables have been defined, so none can be displayed.

System action: None.

User response: Define some user variables before you try to display them.

FCXxxx467E *nnn* zero-divide(s) avoided, *mmm* times maximum exceeded

Explanation: While executing the formula for a user variable, the Performance Toolkit VM found *nnn* cases where a division by zero was attempted, but was changed to a division by one, and *mmm* cases where the result of the formula exceeded 20'000'000, but was set to this number.

System action: Operation continues, and graphic output is created regardless of the potential errors which may have been introduced.

User response: The resulting graph may or may not be meaningful, depending on the number of evasive actions taken, and on the impact such an action has on the desired result. Verify the impact, or, even better, try to avoid such actions by adapting your formula.

FCXxxx470E Specification '*c*' not valid for '*function*'

Explanation: The cache status definition character '*c*' entered with an 'FC MONCACHE ...' command is not valid for defining the expected of cache function '*function*', where *function* can be `DEVICE` (for general caching), `DASD-FW` (for DASD fast write), or `DUALCOPY` (for the dual copy function).

System action: The command is ignored.

User response: Refer to the command description (see "FCONTROL MONCACHE" on page 50) and correct the command syntax, then reenter the command.

See the FC MONCACHE command for syntax information. Then reenter the command.

FCXxxx471E Device *xxxx* is not a DASD and cannot be cached

Explanation: The device number *xxxx* entered with an 'FC MONCACHE ...' command refers to an I/O device which is not a disk, and which cannot be cached.

System action: The command is ignored.

User response: Correct the device number, then re-enter the command.

FCXxxx475I Packed file, being unpacked now. Re-execute cmd. in a few seconds

Explanation: A command has been entered which needs a performance data log file for input. The file on disk was found to be in packed format and is now being unpacked automatically (into a work file `FCONWORK CMSUT1 A`, i.e. the original file remains unchanged). The program may need a few seconds for unpacking, the command can then be entered again.

System action: The file is unpacked.

User response: Re-enter the original command after a few seconds. Do *not* change its format to use the file name and file type of the temporary work file.

FCXxxx476E File cannot be unpacked now, CMS command active

Explanation: A command has been entered which needs a performance data log file for input The file on disk was found to be in packed format, but it cannot be unpacked at the moment because another CMS command is already active in the server machine.

System action: The command is aborted.

User response: Wait some time to give the CMS command time to complete, then re-enter the command.

FCXxxx479E Hash {SEARCH|INSERT} detected zero key

Explanation: An internal error was found during a hash SEARCH or INSERT operation. The error was probably caused by a monitor segment overlay. It is also possible that the MONDCSS size needs to be increased. This message is usually accompanied by message FCXxxx456.

System action: Operation continues.

User response: Refer to messages FCXxxx456 to FCXxxx458. The data collector machine probably needs a higher priority. Also check whether the MONDCSS size should be increased.

FCXxxx480I No SPOOL files found

Explanation: A SPOOL data display has been selected, but no SPOOL files could be found on the system.

System action: The selected screen cannot be shown.

User response: None.

FCXxxx481I No SPOOL files found for user *cccccccc*

Explanation: A 'SPOOL *userid*' command has been entered to display all the SPOOL files of user *cccccccc*, but none were found.

System action: The selected screen cannot be shown.

User response: None.

FCXxxx482E No VDISKs defined on this system

Explanation: A 'VDISKS' command has been entered to display the 'Virtual Disks in Storage' screen, but no monitor data have been collected for VDISKs even though the STORAGE sample domain appears to be enabled. The probable reason is that no virtual disks have been defined.

System action: The selected screen cannot be shown and the initial menu is displayed instead.

User response: None.

FCXxxx484E No Byte File System data found

Explanation: One of the Byte File System logs was selected to be displayed or printed, but no Byte File data had been collected.

System action: The selected screen cannot be shown and the initial menu is displayed instead.

User response: Select another display.

FCXxxx485I I/O Priority Queueing Facility not active

Explanation: The I/O priority queueing users screen was selected for display or for printing. I/O priority queueing consists of two parts: priority queueing of virtual I/O requests by CP and, where available, priority queueing of real I/O requests by the corresponding hardware facility. The hardware facility is not active.

System action: None.

User response: None.

FCXxxx486E No I/O Priority Queueing Facility users found

Explanation: The I/O priority queueing users screen was selected for display or for printing, but none of the virtual machines on this system are currently using the facility.

System action: The selected screen cannot be shown and the initial menu is displayed.

User response: None.

FCXxxx487E No users with any QDIO activity found

Explanation: No users were found with any QDIO activity when the UQDIO command was entered.

System action: The current screen continues to be displayed.

User response: None.

FCXxxx488E No QEBSM devices found

Explanation: No QEBSM devices were found when the QEBSM command was entered.

System action: The current screen continues to be displayed.

User response: None.

FCXxxx490I Return code *nnn* received for VMCF *cccccccc* function

Explanation: An error occurred while executing a VMCF diagnose function (used for the VMCF data retrieval interface). *nnn* is the return code received, and *cccccccc* the function being executed.

System action: The function is not executed.

User response: See the documentation of the VMCF facility in your VM library for the message of the return code.

FCXxxx491I Screen incomplete: partial *cccccccc* data

Explanation: An attempt was made to select a performance screen for displaying or printing, but the display could not be prepared completely because not all data has been collected. The string *cccccccc* indicates the kind of data that is required for building the desired display.

System action: Incomplete performance data is shown. Dots will be inserted for fields where the information is not available.

User response: None.

FCXxxx492I *screen* not available, requires at least two monitor sample intervals

Explanation: An attempt was made to select a performance screen for displaying or printing, but the screen could not be prepared because it required at least two monitor sample intervals for data calculation. In batch mode, PERFKIT was set up (with the FC MONCOLL RESET, FC SET BYTIME and/or FC SET INTERIM commands) to print that screen, but the second set of samples had not yet been processed. An example of such a screen is the PRIVOP report that consists completely of counter deltas.

System action: The display is not selected or printed.

User response: The actions to try, before selecting the performance screen again, depend on the current PERFKIT mode of operation:

- If permanent data collection was active, wait for the second monitor sample interval to arrive.
- If you are running manual MONSCAN, issue the NEXTSAMP subcommand(s) to get additional monitor sample(s).

In batch mode, this message can be ignored.

FCXxxx493E No multitasking application data available

Explanation: A performance display based on multitasking application data was selected, but no such data had been collected yet, and the performance display cannot be shown.

System action: The selected screen cannot be shown and the initial menu is displayed instead.

User response: Select another display.

FCXxxx494E *screen* not available, requires *data_domain* data

Explanation: An attempt was made to select a performance screen for display or printing, but the display could not be prepared because the prerequisite data was not available.

System action: The display is not selected or printed.

User response: Activate the required data domain before trying to call that display again. If the problem persists, refer to the corresponding performance screen description for possible additional prerequisites.

FCXxxx495I Screen incomplete, no *ccccc/.../ccccc* data

Explanation: The selected performance display requires data from several CP monitor domains, but not all of them are currently enabled. The string *ccccc/.../ccccc* gives you the name of the domain(s) for which no monitor records have been processed.

System action: Performance data are shown but will be incomplete.

User response: Activate the required data domain(s).

FCXxxx496E Error *nnn* processing record *mm* of file *fn ft fm*

Explanation: An error was encountered while processing file *fn ft fm*. Record *mm* of this file contains a command (or specifications which are translated internally to a command) which resulted in an error code *nnn*. This error code corresponds to the error message number generated as a result of the faulty command.

System action: See the description of message number *nnn*.

User response: Check and fix the faulty specification; see the description of message number *nnn* for more information.

FCXxxx497E No channel-path measurement facility data available

Explanation: The LPAR channel load display has been selected, but the Channel-Path Measurement Facility data which are required as input for building this display are not available.

System action: The selection is ignored.

User response: Refrain from selecting this particular display on systems where the channel-path measurement facility is not available.

FCXxxx498E No extended function data available

Explanation: A CACHEXT command has been entered to show the cache extended function display, but this display cannot be generated because no monitor data have been collected yet for extended function cache data. Possible reasons are:

- The system's I/O configuration does not include a cached control unit is capable of handling extended function operations.
- Monitor I/O data collection for the disks connected to the cached control unit has not been enabled.

System action: The selection is ignored.

User response: Enable data collection for sample data of the I/O domain, if that was the problem.

FCXxxx499E No Linux *cccccccc* application data available

Explanation: A Linux performance data screen has been selected whose contents are based on APPLDATA domain monitor data, but no such application data records have been collected. The string *cccccccc* indicates the kind of application data record that is required for building the desired display.

Possible reasons include:

- The Linux systems have not been set up to generate application data records (requires installation of the data gathering code in the Linux, and the 'APPLMON' option in the virtual machine's directory entry).
- Monitor APPLDATA collection has not been enabled for the Linux guest(s).

System action: The selection is ignored.

User response: Inform your systems programmer of the problem and make sure both the Linux systems and the CP monitor are set up to collect the application.

FCXxxx500I Performance Toolkit for VM *releaselevel servicelevel*

Explanation: This message indicates which level of the program you are using.

System action: None.

User response: None.

FCXxxx510I New sort sequence set, will become active with next update

Explanation: This message is shown after changing the sort sequence on a display where the screen output is sorted only after collecting new data.

System action: None.

User response: Wait for the next automatic data collect cycle at the end of the current 1-minute interval, or force an extra collect cycle by pressing the ENTER key.

FCXxxx511I *xxxxxxx* data set, active for this display after next update

Explanation: An AVERAGE or CURRENT command has been entered, as indicated by the string *xxxxxxx*, but the performance display being viewed will show the changed data only after collecting new data.

System action: None.

User response: Wait for the next automatic data

collect cycle at the end of the current 1-minute interval, or force an extra collect cycle by pressing the ENTER key.

FCXxxx512E Cannot add definition, all entries in use

Explanation: An 'FC DEFSCRN' command has been entered for a user-defined screen for which eight specifications have already been saved, so there is no more space for another definition.

System action: The command is ignored.

User response: None.

FCXxxx513I '*cccccccc*' definitions deleted

Explanation: An 'FC DEFLOG' command has been entered for removing the definitions of user defined log *cccccccc*. The message indicates successful execution of the command.

System action: Operation continues.

User response: None.

FCXxxx514E Trailing quote missing or string too long

Explanation: An 'FC DEFLOG' command has been entered with the LOCATE argument. The string to be located is either too long, or the mandatory trailing quote after the string is missing.

System action: The definition is ignored.

User response: Correct the command syntax and re-enter the command.

FCXxxx515E No string found between quotes

Explanation: An 'FC DEFLOG' command has been entered with the LOCATE argument. However, no string was found between the two quotes, i.e. the 'LOCATE' argument does not make sense.

System action: The definition is ignored.

User response: Re-enter the command with a valid string definition.

FCXxxx516E No user defined displays found

Explanation: An 'UDEFMENU' command has been entered to display the selection menu for user defined displays. No such displays were found, either because none had previously been defined, or because the monitor data required for building them are not available.

System action: The general performance data selection menu is displayed.

User response: None.

FCXxxx519E S&F connect attempt to S&F interface by *uuuuuuuu*

Explanation: User *uuuuuuuu* tried to connect to the APPC/VM resource used by the S&F interface. The data received indicates that this attempt was made by the S&F interface of user *uuuuuuuu*. This is an error due to incorrect target resource specifications in user *uuuuuuuu*'s FCONRMT SYSTEMS file for this system, or in the xCOMDIR NAMES file.

System action: The connection is severed.

User response: Systems programmer should specify the correct APPC/VM resource name for the system user *uuuuuuuu* tried to connect to.

FCXxxx520E Error *nnnn* during *cccccccc cccccccc* for APPC/VM

Explanation: A return code of *nnnn* was received when executing the macro function *cccccccc cccccccc* for APPC/VM processing. For example you may get 'Error 1041 during CMSIUCV CONNECT' if you specified a modename in the communications directory entry for the local resource.

System action: The APPC/VM connection is not established.

User response: See the appropriate manual for the meaning of the return code and take appropriate corrective action.

FCXxxx521I Connecting to server

Explanation: An FCONAPPC command has been entered to start an APPC/VM session with a Performance Toolkit performance data collector machine, and the program is now trying to establish the connection.

System action: The program is trying to establish the connection.

User response: None.

FCXxxx522I Connected to resource *cccccccc*

Explanation: An FCONAPPC command has been entered to start an APPC/VM session with a Performance Toolkit performance data collector machine, and the program is now confirming that the connection could be made to the selected global resource *cccccccc*.

System action: None.

User response: None.

FCXxxx523E Resource '*cccccccc*' not available

Explanation: An FCONAPPC command has been entered to start an APPC/VM session with a Performance Toolkit performance data collector machine. The resulting connect request was made for global resource *cccccccc*, but that resource was found to be not available.

System action: The APPC/VM connection cannot be established.

User response: Adapt your communications directory if the FCONAPPC command resulted in unexpected APPC/VM connect request, or check why it was not possible to connect to the selected resource.

FCXxxx524E Not authorized to manage resource '*cccccccc*'

Explanation: An 'FC MONCOLL VMCF ON' command has been executed, resulting in the Performance Toolkit for VM trying to establish a connection to the *IDENT service in order to define itself as the resource manager for global resource *cccccccc*. The Performance Toolkit for VM received a return code indicating that it has not been authorized to manage that resource.

System action: The Performance Toolkit for VM cannot define itself as resource manager for *cccccccc*.

User response: Include an 'IUCV *IDENT *cccccccc* GLOBAL' statement in the directory of the machine. Make sure the directory is activated, then logoff/logon and try again.

FCXxxx525E Not currently connected to server, resetting

Explanation: The Performance Toolkit for VM noticed that it can no longer use the APPC/VM connection needed for data retrieval and it will, therefore, reset the connection and return to basic mode.

System action: The APPC/VM connection is severed from our side.

User response: Try to re-establish the APPC/VM connection by entering the 'FCONAPPC ...' command again. You should either receive an error message indicating what is wrong, or be connected again.

FCXxxx526I Not in SEND state, command stacked

Explanation: A command has been entered for transmission to the server machine, but we are currently in receive state, waiting for the result of a previous command to be returned first. The new command has been stacked and will be transmitted when the previous command's output has arrived.

System action: The new command is stacked for later execution.

User response: Wait until the previous command's output has arrived.

FCXxxx527I User *cccccccc* connected on path *nnnn*

Explanation: The APPC/VM server machine (the toolkit's performance data collector machine) has received a request on path *nnnn* from user *cccccccc* to connect, and it has granted permission to establish this connection.

System action: None.

User response: None.

FCXxxx528I User *cccccccc* has severed path *nnnn*

Explanation: The APPC/VM server machine (the toolkit's performance data collector machine) has received a 'sever' indication for path *nnnn* from user *cccccccc*, and it has severed the path too.

System action: None.

User response: None.

FCXxxx529I Path *nnnn* to *cccccccc* severed by other side, code *xxxx*

Explanation: The APPC/VM path *pppp* to resource *cccccccc* has been severed by either the server or by some intermediate function (e.g. AVS). The sever code *xxxx* should have to determine the reason. Some sever codes, and the likely reasons, are:

X'0142'

Resource *cccccccc* is not available on the remote system we tried to connect to. Probably

- either the AVS and/or TSAF connection is down
- or the target server did not correctly initialize to manage the target resource. Make sure that the correct directory entries (IUCV ... statement and communication directory entries were made and that APPC/VM connections are enabled by means of the 'FC MONCOLL VMCF ON' command. Check its log: messages generated while trying to initialize the interface should help you to find what's wrong.

X'0160'

Error found while trying to map our LU/userid combination to a local userid in the remote AVS machine. Probably 'AGW ADD USERID ...' statement missing.

X'0301'

Incorrect target LU specified in the communications directory.

X'0302'
Remote connection, but the modname in the communications directory is invalid or missing.

Check the console logs of the AVS machines involved in the connection; they may contain error messages which will help to locate the source of the problem.

System action: The current APPC/VM session is reset and basic mode entered.

User response: None.

FCXxxx530I Connected to *IDENT for resource *cccccccc*

Explanation: The Performance Toolkit for VM data collector machine has established a connection to the *IDENT system service and has identified itself as manager of the resource *cccccccc*, as the result of an 'FC MONCOLL VMCF ON' command.

System action: The machine is now identified as global resource manager for *cccccccc*.

User response: None.

FCXxxx531I All paths severed for resource *cccccccc*

Explanation: All paths have been severed for global resource *cccccccc*, probably following an 'FC MONCOLL VMCF OFF' command.

System action: All paths have been severed.

User response: None.

FCXxxx532E Not authorized to connect to resource '*cccccccc***'**

Explanation: A connection request to global resource *cccccccc* resulted in a return code indicating that you are not authorized to connect to that resource.

System action: The connect request is aborted.

User response: Contact your systems administrator and have your virtual machine authorized to connect to resource *cccccccc*. (The 'IUCV ALLOW' statement is probably missing in the server machine's CP directory).

FCXxxx533I Path *nnnn* **for resource** *cccccccc* **severed by *IDENT**

Explanation: The IUCV path *nnnn* to the *IDENT system service for global resource *cccccccc* has been severed by *IDENT.

System action: The connection is severed.

User response: Determine the reason for the sever and correct the problem.

FCXxxx534E Incorrect request X'*xxxxxxxxxxxxxxxx***' received**

Explanation: The string X'*xxxxxxxxxxxxxxxx*' was received by the server from its partner in an APPC/VM session. The request format is incorrect and the request cannot be executed. This can be due to a mismatch between the code levels of the PERFKIT module in the server and requestor machines.

System action: The request is ignored.

User response: Make sure that PERFKIT modules with the same version, release and maintenance level are used on both sides of the requestor-server connection.

FCXxxx535I Connected to resource *rrrrrrrr* **on path** *p*, **for** *uuuuuuuu*

Explanation: This information message informs the user that the S&F server function has established an APPC/VM connection to resource *rrrrrrrr* for user *uuuuuuuu*, on IUCV path *p*.

System action: None.

User response: None.

FCXxxx536I Path *p* **to resource** *rrrrrrrr* **severed**

Explanation: This information message informs the user that the S&F server function has severed the APPC/VM connection to resource *rrrrrrrr* on IUCV path *p*.

System action: None.

User response: None.

FCXxxx537E Requestor module backlevel, no S&F support

Explanation: A user connected to the APPC/VM resource defined for the store and forward interface, but is using a backlevel Performance Toolkit for VM module that does not yet support S&F sessions.

System action: The APPC/VM connection is severed.

User response: Obtain a current PERFKIT module and try again.

FCXxxx538E Target server module backlevel, no S&F support

Explanation: The PERFKIT module on the target service machine is backlevel and does not yet support store and forward APPC/VM connections.

System action: The connection is severed.

User response: Have a systems programmer install a current level of the PERFKIT module on the target system.

FCXxxx539I No FCONRMT SYSTEMS file; S&F interface not activated

Explanation: No FCONRMT SYSTEMS file was found on any of the accessed minidisks. Performance Toolkit depends on information stored in that file (system identifications and matching APPC/VM resource IDs) for setting up its store and forward connections, so the S&F interface could not be activated.

System action: None.

User response: Make a valid FCONRMT SYSTEMS file available to the S&F PERFSVM machine.

FCXxxx540E *cccccccc xxxx* **not benchmarked, log not available**

Explanation: A command has been entered to display a log for an object, but the selected log is not available because the specified object is not currently benchmarked. The strings *cccccccc xxxx* will be in one of the following formats: '`User` *userid*' if a user log was selected, '`Device` *devicenumber*' if an I/O device log was selected, '`LLink` *partner*' if an ISFC Logical link log was selected, or '`Epoint` *epoint*' if an ISFC end point was selected.

System action: The selection is ignored.

User response: Use the command 'FC BENCHMRK ...' to activate benchmarking for the specified object before trying to view one of the related logs.

FCXxxx541E No data available for this log of *cccccccc xxxx*

Explanation: A command has been entered to display a log for a benchmarked object, but the selected log is not available even though the specified object is currently benchmarked. The strings *cccccccc xxxx* will be in one of the following formats: '`User` *userid*' if a user log was selected, '`Device` *devicenumber*' if an I/O device log was selected, '`LLink` *partner*' if an ISFC Logical link log was selected, or '`Epoint` *epoint*' if an ISFC end point was selected. Possible reasons are:

- The selected log depends on data from a monitor domain which is not currently enabled.
- A log was selected to display data which do not apply to the I/O devive (e.g. CPOWNLOG selected for a disk which does not contain system areas, or cache data selected for a disk which is not connected to a cached control unit).

System action: The selection is ignored.

User response: Enable monitor data creation for the object, if required.

FCXxxx542E No BENCHMRK data available

Explanation: A command has been entered to display a log for a benchmarked object, but no specified object has previously been selected for benchmarking. The strings *cccccccc xxxx* will be in one of the following formats: '`User` *userid*' if a user log was selected, '`Device` *devicenumber*' if an I/O device log was selected, '`LLink` *partner*' if an ISFC Logical link log was selected, or '`Epoint` *epoint*' if an ISFC end point was selected.

System action: The selection is ignored.

User response: Use the command 'FC BENCHMRK ...' to activate benchmarking for a selected object before trying to view one of the related logs.

FCXxxx543E Device/User/EndPoint/LogicalLink not benchmarked

Explanation: An 'FC BENCHMRK ...' command was entered to disable benchmarking for a specific object (user, I/O device, ISFC end point or ISFC logical link), but the specified object was not previously benchmarked.

System action: The command is ignored.

User response: Verify the target object identification and reissue the command with the correct argument.

FCXxxx544E Filetype *ttttttt* **not valid for benchmark log file**

Explanation: The string *ttttttt*, entered as part of a command for displaying or printing a benchmark log file, is interpreted as filetype of the file but is not one of the valid filetypes.

System action: The command is ignored.

User response: Re-enter the command with a valid benchmark log filetype.

FCXxxx545E Unexpected record length *nnnn* **for log file** *fn ft fm*

Explanation: A command has been entered for processing benchmark log file *fn ft fm*, but the record length of that file does not correspond to the expected format for the selected filetype.

System action: The input file is considered invalid, and the command is not executed.

User response: Re-enter the command for a valid benchmark log file.

FCXxxx546E Invalid data format for benchmark log file

Explanation: A command has been entered for processing a benchmark log file, but the data read

shows a format that is inconsistant with the expected benchmark log file layout.

System action: The input file is considered invalid, and the command is not executed.

User response: Re-enter the command for a valid benchmark log file.

FCXxxx547E Invalid data format for *ccccccc* FILE

Explanation: A command has been entered for processing a file but the data read shows a format that is inconsistent with the expected data layout, where the string *ccccccc* indicates the supported input file type(s).

System action: The input file is considered invalid, and the command is not executed.

User response: Re-enter the command for a valid file.

FCXxxx550E Control file '*fn ft fm*' not found

Explanation: A command has been entered which requires an additional control file *fn ft fm* as input, but the file could not be found on any of the user's accessed disks.

System action: The command aborts.

User response: Create the required control file and then re-execute the command.

FCXxxx551I Control record with unexpected IPTYPE X'*xx*'

Explanation: While processing a monitor data file a control record was found with an unexpected IPTYPE value of X'*xx*' in the fourth byte of the record The expected value for files created by MONWRITE is X'09'. This message will always be followed by message 553 that lists the contents of the first five fullwords.

System action: The control record and any monitor data it describes are ignored.

User response: Report the problem.

FCXxxx552I Control record without data control area

Explanation: While processing a monitor data file a control record was found that does not contain the expected data control area pointers in the fourth and fifth message will always be followed by message 553 that lists the contents of the first five fullwords.

System action: The control record and any monitor data it describes are ignored.

User response: Report the problem.

FCXxxx553I Record *nnn*: X' *xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx* '

Explanation: This message lists the first five fullwords of a control record that was found to contain unexpected data while processing a monitor data file. The string *nnn* is the number of the record and the strings *xxxxxxxx* show the data in hexadecimal. This message is always preceded by messages 551 or 552 that explain which part of the record contains unexpected information.

System action: See action for the preceding message 551 or 552.

User response: See action for the preceding message 551 or 552.

FCXxxx554I No monitor data found

Explanation: An attempt has been made to scan a monitor data file by means of the MONSCAN command but no monitor data could be found. MONSCAN can process only monitor data files created by MONWRITE, or by any other tool that produces the same output record format.

System action: No performance data can be displayed.

User response: Make sure the MONSCAN arguments refer to a valid monitor data file and re-enter the command.

FCXxxx560E Less than two samples for *vvv*, CORREL, screen cannot be built

Explanation: Less than two samples were found with valid data for the base variable *vvvv*, so it is not possible to calculate correlation coeddicients, and the CORREL display cannot be built.

System action: The CORREL display is not shown.

User response: Wait until more data have been collected, or select another, larger history log as input.

FCXxxx561E Unexpected HISTLOG/HISTSUM file format

Explanation: The format of the selected input file is incorrect. The input file is probably not one of the supported performance history files (default filetypes HISTLOG*n* or HISTSUM).

System action: The display is not shown.

User response: Enter the command again, specifying a valid history file as input.

FCXxxx562I Base variable is a constant

Explanation: The selected base variable appears to be a constant.

System action: The display is shown, but it does not provide useful information.

User response: Select another base variable.

FCXxxx563I No HELP text available for user defined variables

Explanation: The current release does not allow users to add help text for variables they define, so it is not possible to display it either.

System action: None.

User response: None.

FCXxxx564I No APPC/VM or TCP/IP connections in FCONRMT SYSTEMS file

Explanation: During remote performance monitoring facility initialization Performance Toolkit found the FCONRMT SYSTEMS control file, but no systems with an APPC/VM connection have been defined in it.

System action: Operation continues.

User response: Define in the file FCONRMT SYSTEMS at least one system with an APPC/VM connection. For more information, see the "Preparing the Performance Toolkit" chapter in *z/VM: Performance Toolkit Guide*.

FCXxxx565I S&F interface not activated

Explanation: This message is issued after the message FCXxxx564I indicating that remote performance monitoring facility has not been enabled.

System action: Operation continues. The remote performance monitoring facility is not enabled.

User response: Define in the file FCONRMT SYSTEMS at least one system with an APPC/VM connection. For more information, see the "Preparing the Performance Toolkit" chapter in *z/VM: Performance Toolkit Guide*.

FCXxxx570I Unexpected IUCV IPTYPE code *cc* received

Explanation: The Web Server interface received an unexpected IUCV IPTYPE code *cc*.

System action: None.

User response: Contact IBM Service.

FCXxxx571I Connected to TCP/IP server *cccccccc* on path *p*

Explanation: This information message tells you that the Web Server interface has successfully established an IUCV connection to TCP/IP server *cccccccc* on IUCV path *p*.

System action: None.

User response: None.

FCXxxx572I IUCV path severed by *cccccccc*

Explanation: This information message tells you that the IUCV path to virtual machine *cccccccc* has been severed by the other side.

System action: Operation cannot continue, and the Web Server interface is deactivated.

User response: None.

FCXxxx573I Return code *rr*, ERRNO *ee* for LASTERRNO call

Explanation: This information message tells you that an error condition has been detected by the Web Server interface.

System action: The problem could potentially be severe, so the Web Server interface is deactivated.

User response: Contact IBM Service.

FCXxxx574I *cccc* TCP/IP socket number is *nn*

Explanation: This information message provides some information about TCP/IP socket usage The string *cccc* can be

- `Max.`, indicating that the highest socket number available the Web Server interface is *nn*.
- `Main`, indicating that socket number *nn* has been defined as the 'main' socket for the Web Server interface.

System action: None.

User response: None.

FCXxxx575I *ssssssss* host IP address is *iiiiiiiiiii*

Explanation: This information message displays the host IP address of the interface *ssssssss*.

System action: None.

User response: None.

FCXxxx576E Unexpected TCP/IP error *nn* on socket *socket* talking to *ipaddr*

Explanation: An error condition *nn* was found during a TCP/IP call on socket *socket* for *ipaddr*.

System action: Depends on the error found. Operation will usually continue, but you may have to restart the Web Server interface.

User response: There may be an accompanying FCX693I message which will provide more details. If not, look up the error code in Appendix C of the *z/VM: TCP/IP Programmer's Reference* to resolve the problem.

FCXxxx577I *cccc* **for** *iiiiiiiiiii* **on socket** *s*

Explanation: This information message tells you that function *cccc* was executed for the connection to IP address *iiiiiiiiiii* on socket *s*.

System action: None.

User response: None.

FCXxxx578E Doesn't match original IP address of *iiiiiiiiiii*

Explanation: This error message follows a message FCXxxx577I for the RECEIVE function. It indicates that the IP address *iiiiiiiiiii* found in the received data buffer is not the same as the IP address when the user originally logged on.

System action: The Web Server interface is deactivated to force a user action.

User response: Find out why the IP address changed (this could be a hacking attempt) and restart the Web Server interface.

FCXxxx579E IUCV SEND error, IPAUDIT=X'xxxxxxxx'

Explanation: An IUCV SEND error was encountered, where *xxxxxxxx* contains the IPAUDIT field contents.

System action: Depending on the error condition, the Web Server interface may be deactivated.

User response: Check whether the TCP/IP server machine is still operating and restart it if necessary.

FCXxxx580E IUCV interrupt from incorrect path

Explanation: An IUCV interrupt was received on an unexpected path.

System action: None.

User response: Contact IBM Service.

FCXxxx581I Unexpected (non-ASCII) data received

Explanation: Non-ASCII data were found in an input buffer from the TCP/IP interface. our TCP/IP connection was established for the exclusive use by Web Browsers over the Internet, such non-ASCII data cannot be processed.

System action: None.

User response: None.

FCXxxx582I Cannot process specification *ccccccccccc*

Explanation: The Web Server interface received an HTTP specification *ccccccccccc*, but does not know what to do about it. Since the interface has been designed to handle only the subset of Web Server functions required to allow performance data retrieval sessions, the message can probably be ignored.

System action: None.

User response: Contact IBM Service.

FCXxxx583I Unknown *ccccccc* **specification** *aaaaaaaaaaaa*

Explanation: The Web Server interface received an argument *aaaaaaaaaaaa* for HTTP specification *ccccccc*, but does not know what to do about it. Since the interface has been designed to handle only the subset of Web Server functions required to allow performance data retrieval sessions, the message can probably be ignored.

System action: None.

User response: Contact IBM Service.

FCXxxx584E Missing request specification after GET

Explanation: An HTTP 'GET' request was received, but it does not specify what data should be returned.

System action: The home page (logon page) is returned to the requestor.

User response: Contact IBM Service.

FCXxxx585E Incorrect request format *ccccccccccc*

Explanation: An unexpected request *ccccccccccc* was received which we cannot process.

System action: The home page (logon page) is returned to the requestor.

User response: Contact IBM Service.

FCXxxx586E *ccccccc* **HTTP version** *vv* **after GET**

Explanation: The Web Server interface has been designed for HTTP 1.0. The HTTP version was either missing, invalid (not in *n.n* format) or unsupported (pre 1.0), as indicated by the string *ccccccc*.

System action: The home page (logon page) is returned to the requestor.

User response: Contact IBM Service.

FCXxxx587I Userid *userid* **identified on** *ip-address* **Userid** *userid* **by** *byuserid* **identified on** *ip-address*

Explanation: User *userid* (or *userid* by *byuserid*) on IP address *ip-address* just logged on to the Web Server interface, after validation by the DMSPASS routine.

System action: None.

User response: None.

FCXxxx588E User login failed from *ip-address userid* **password expired**

Explanation: User *userid* on IP address *ip-address* tried to log on to the Web Server interface, but that userid's password has expired.

System action: The home page (logon page) is returned to the requestor.

User response: Follow your installation procedure for having your userid reinstated.

FCXxxx590I *ssssssss* **interface activated**

Explanation: This information message indicates that the TCP/IP interface for function *ssssssss* has been correctly activated and is now ready for use.

System action: None.

User response: None.

FCXxxx591I *ssssssss* **interface deactivated**

Explanation: This information message indicates that the TCP/IP interface for function *ssssssss* has been deactivated.

System action: None.

User response: None.

FCXxxx592I User *uuuuuuuu* **at** *iiiiiiiiii* **reset: Idle for over** *nn* **min.**

Explanation: This information message indicates that user *uuuuuuuu* has been found idle for over *nn* minutes, and that his session has been reset.

System action: All control blocks are released, i.e. when the user wants to send another request a new logon is required first.

User response: None.

FCXxxx593E S&F interface not yet active, WebServer interface not started

Explanation: Data retrieval via the WebServer interface is based on the APPC/VM store and forward logic managed by the S&F interface. The S&F interface has to be set up and activated, therefore, before the WebServer interface can be started.

System action: The Web Server interface is not started.

User response: Set up and start the APPC/VM S&F interface, then activate the Web Server interface again.

FCXxxx594E Password missing, or invalid format

Explanation: No password string could be found in the data returned from the logon page by the Web Browser, or it has an invalid format.

System action: The home page (logon page) is returned to the requestor.

User response: Re-enter userid and password.

FCXxxx595E Userid missing, or invalid format

Explanation: No userid string could be found in the data returned from the logon page by the Web Browser, or it has an invalid format.

System action: The home page (logon page) is returned to the requestor.

User response: Re-enter userid and password.

FCXxxx596E Unexpected forms data received

Explanation: The data returned by the Web Browser has an unexpected format and cannot be correctly analyzed. This could happen if a very old Web Browser is used, or if a very new Web Browser introduces a different forms format that the interface is not yet prepared for.

System action: The home page (logon page) is returned to the requestor.

User response: Contact IBM Service.

FCXxxx597E File '*fn ft fm***' not found**

Explanation: The userid/password file with fileid *fn ft fm* could not be found on any of the accessed disks. Userid and password validation is not possible, therefore, and logon to the Web Server interface is inhibited.

System action: The home page (logon page) is returned to the requestor.

User response: Contact your systems programmer to have the password file set up, then try logging on again.

FCXxxx598E Missing data in POST request

Explanation: A WWW 'POST' request was received, but without the expected data after the HTTP header part. This should be a problem of the WWW browser used, or of a proxy server that did not pass the data on.

System action: The home page (logon page) is returned to the requestor.

User response: Inform your network people about the probable proxy problem.

FCXxxx599I Max. number (*nnn*) of connections reached (*ipaddr*)

Explanation: An attempt was made to establish a new TCP/IP connection to the Performance Toolkit web interface from IP address *ipaddr*, but the maximum allowed number of connections was already active.

System action: Operation continues.

User response: Try again later to establish the connection. You can also try increasing the maximum number of connections by using the FC MONCOLL WEBSERV MAXCONN command. If the problem persists, restart the Performance Toolkit web interface using the FC MONCOLL WEBSERV command.

FCXxxx601E *cccccccc* **trace already active**

Explanation: An 'FC TRACE *cccccccc* ON' command has been entered, but the selected trace was already active.

System action: Operation continues.

User response: None, trace is already active.

FCXxxx602E *cccccccc* **trace is not active**

Explanation: An 'FC TRACE *cccccccc* OFF' command has been entered, but the selected trace was not active.

System action: Operation continues.

User response: None, trace is already deactivated.

FCXxxx603I *cccccccc* **trace activated**

Explanation: An 'FC TRACE *cccccccc* ON' command has been entered, and the message indicates that the selected trace is now activated.

System action: Operation continues.

User response: None.

FCXxxx604I *cccccccc* **trace deactivated**

Explanation: An 'FC TRACE *cccccccc* OFF' command has been entered, and the message indicates that the selected is now deactivated.

System action: Operation continues.

User response: None.

FCXxxx605I User *username* **at** *ip-address* **logged off**

Explanation: This message indicates that user *username* has clicked the "Logoff" button and terminated the web session.

System action: All control blocks are released. That is, when the user wants to send another request a new logon is required first.

User response: None.

FCXxxx610E Different path used - please logon again

Explanation: A 'GET' request was received by the WWW interface, but the request claims to be a continuation of a session previously active from another IP address. This can happen, for instance, when a user decides to use a different proxy server for setting up Internet connections. A new logon is forced to preserve some security.

System action: The home page (logon page) is returned to the requestor.

User response: Provide your userid and password again, and restart your session.

FCXxxx612E No TCP/IP data available

Explanation: The TCP/IP performance data menu was selected for display, but no TCP/IP monitor records were received, so far. TCP/IP monitor record generation requires:

- TCP/IP Version 3.1 or later,
- setting up the TCP/IP server machine(s) so that monitor data will be and
- enabling CP monitor SAMPLE and EVENT APPLDATA domain for the TCP/IP server.

System action: The selection is not accepted.

User response: Let your systems programmer set up the TCP/IP server machines so that they can generate APPLDATA for CP monitor.

FCXxxx613E Missing *cccccccc* **config. data - APPLDATA EVENT based**

Explanation: A TCP/IP server configuration display was selected. However, some of the configuration information cannot be shown because it was never received from CP monitor. Since configuration data is generated by TCP/IP servers only during initialization, or when CP monitor is started, such data will usually be missing whenever Performance Toolkit for VM data collection is activated after starting CP monitor.

System action: Most of the configuration data cannot be shown.

User response: None.

FCXxxx614A SELECT pending for more than *nn* minutes

Explanation: The WWW interface sets up its SELECT requests to the TCP/IP server machine so that it should end after one minute even if there is no client request pending. The message tells us that the normal wait time has been exceeded, probably indicating some sort of problem with the TCP/IP server machine.

System action: None.

User response: Check whether the TCP/IP stack machine is still active and restart it if necessary.

FCXxxx615I Attempting restart of *cccccccc* interface

Explanation: The *cccccccc* interface was deactivated due to some problem – for example, because the TCP/IP server machine was deactivated or restarted. *cccccccc* will be either WebServer or TCPRequest, depending on which TCP/IP interface is being restarted. Since the deactivation was not the result of a user command, the program will attempt to reactivate the interface.

System action: Up to five initial restart attempts will be made in one minute intervals; if not yet successful further single attempts will be made each full hour.

User response: Make sure the TCP/IP server machine is restarted, if necessary.

FCXxxx616E Not authorized to use Diag. X'84'

Explanation: The WWW interface was started so as to use CP passwords for validating userid/password pairs, but the machine where the Performance Toolkit for VM is running is not authorized to use diagnose code X'84' which is a prerequisite for validating CP passwords.

System action: Users are not allowed to connect to the WWW interface and performance data cannot be retrieved via Web Browsers.

User response: Obtain the required authorization for diagnose X'84' for the PERFSVM machine or indicate some other method for userid validation when activating the WWW interface.

FCXxxx617A Cannot ACCEPT connection, all *nn* sockets in use

Explanation: A user tried to connect to the WWW interface but all *nn* sockets defined for the interface were already in use and the additional connection could not be accepted.

System action: No new connections can be accepted until some of the existing ones have been terminated.

User response: Try again later. Inform your systems programmer of the problem if it persists.

FCXxxx620E Selection not valid for trend file scan mode

Explanation: You tried to set the performance data display period to 'current' while in trend file scan mode, but only 'average' data can be shown in this mode.

System action: The command is ignored.

User response: Reduce the interval for creating trend file records if you need performance data for shorter periods.

FCXxxx621E Graphics not supported for this file type

Explanation: You tried to create graphics from a file that is not supported as input for graphics in the current level of the program.

System action: The command is ignored.

User response: Try building your graphics based on one of the supported input file types.

FCXxxx622E No data found for variable *cccccccc*

Explanation: You tried to display a variable for which no valid value could be found, because no matching trend file record is available, or because the value could not be calculated (e.g. due to zero-divide).

System action: The value is not displayed.

User response: Make sure you select only data from trend records that are available.

FCXxxx623E Command too long: omit some variables/specifications

Explanation: You were working with the graphics selection menu and specified so many variables and/or other specifications that the resulting command string became too long (exceeding the max. length of a command line).

System action: The graphics selection menu is shown again.

User response: Omit one or more variables, or some other specification(s), from your selection and try again.

FCXxxx630E No Reusable Server Kernel data available

Explanation: You tried to select the Reusable Server Kernel displays selection menu but no such menu could be built because no RSK data were collected.

System action: The RSK selection menu cannot be shown.

User response: Make sure that the RSK server is set up to produce APPLDATA monitor records, and that the current CP monitor settings include the collection of

APPLDATA records for the RSK server(s).

FCXxxx631E No Linux data available

Explanation: You tried to select the Linux performance data selection menu LINUXMEN, but no Linux internal performance information is currently available because the system has not been set up to produce such data.

System action: The Linux performance data selection menu is not shown.

User response: Inform your systems programmer of the problem and make sure that the prerequisite setup is made. See "Monitoring Linux Internal Performance Data" in the *z/VM: Performance Toolkit Guide* for more information.

FCXxxx635E Invalid IP address found: '*cccccccc***'**

Explanation: An invalid IP address has been found in the FCONX LINUXUSR file, where *cccccccc* is the string that was found to be not valid as an IP address.

System action: The incorrect statement is skipped.

User response: Check the control file and fix the Linux system entry with the incorrect IP address.

FCXxxx636I No Linux systems defined

Explanation: A Linux related performance display has been selected but no Linux systems are currently defined. The Performance Toolkit for VM requires that any Linux system that you want to retrieve data from be first defined in control file FCONX LINUXUSR, and that the TCP/IP interface needed for data retrieval be activated.

System action: None.

User response: Have the prerequisites checked/implemented, then re-issue the command.

FCXxxx637E TCP/IP request interface not active

Explanation: A Linux related performance display has been selected but the prerequisite TCP/IP interface is not currently active. Linux performance data are retrieved via TCP/IP connection, and no such data can be made available without first activating the request interface.

System action: The request is ignored.

User response: Have the TCP/IP request interface activated, then re-issue the command.

FCXxxx638E No free sockets on TCP/IP request interface

Explanation: The TCP/IP request interface has run out of sockets and cannot open yet another connection. The current implementation provides for a maximum of 49 such connections; seeing this message proves that this number is either insufficient, or that sockets were not freed after use due to some software problem.

System action: None.

User response: Contact IBM Service.

FCXxxx639E No IP address defined for Linux system *ssssssss*

Explanation: A Linux performance data screen has been selected for system *ssssssss*, but this system has not been defined and, since its IP address is thus not known, no data can be retrieved.

System action: None.

User response: Have your systems programmer include the Linux system and its IP address in file FCONX LINUXUSR.

FCXxxx640E RC = *rc* **for** *system* **at** *ipaddr*, *more_info*

Explanation: A Linux performance data screen has been selected for system *system* at IP address *ipaddr*, but the connection could not be established (TCP/IP CONNECT request ended with return code *rc*). *more_info* is a further explanation of *rc* (if it is available). Probable cause: either the target system and/or DDS interface are not active, or there is a problem with the TCP/IP network.

System action: The connection is reset.

User response: Have your systems programmer check the status of the Linux system and its DDS interface.

FCXxxx641E Unexpected call: *cccccccc*

Explanation: An unexpected TCP/IP data call *cccccccc* has been received by the Linux performance data interface. This is a probable logic error.

System action: The current connection is reset.

User response: Contact IBM Service.

FCXxxx642I Connecting to *ssssssss* **at** *iiiiiiii*

Explanation: A Linux performance data display for a new Linux system *ssssssss* has been selected. The Performance Toolkit for VM is trying to open a connection to its IP address *iiiiiiii*.

System action: Operation continues.

User response: None.

FCXxxx643I Retrieving performance metrics

Explanation: A Linux performance data display for a new Linux system has been selected. The TCP/IP connection could be established, and the Performance Toolkit for VM is now trying to retrieve performance metrics from the system.

System action: Operation continues.

User response: None.

FCXxxx644E Unexpected data format received from *ssssssss*

Explanation: The data returned by Linux system *ssssssss* does not have the expected XML format.

System action: The connection is reset.

User response: Make sure that the IP address specified in file FCONX LINUXUSR for system *ssssssss* is correct, and that a recent level of the DDS interface is active on the system.

FCXxxx645E *cccc...cccc*

Explanation: An error message issued by the Linux DDS interface has been found in the returned data. The string *cccc...cccc* is a copy of (the beginning of) that string. One possible cause is the selection of Linux performance data for a period where that information has not been collected by the Linux DDS code.

System action: Operation continues.

User response: Make sure you are not trying to retrieve data that are not collected by the Linux system.

FCXxxx646E Error *rc* **trying to obtain socket for** *ssssssss*

Explanation: A Linux performance display for system *ssssssss* has been selected, and the Performance Toolkit for VM tried to obtain a socket and establish a TCP/IP connection to that system. However, the SOCKET request failed with return code *rc* and the connection could not be established.

System action: Data cannot be shown currently for the selected system.

User response: Inform your systems programmer.

FCXxxx647E *cccccccc* **interface has already been activated**

Explanation: A command has been entered to activate the TCP/IP *cccccccc* interface, but the interface appears to have been already activated.

System action: The command is ignored.

User response: If the interface is not responding then deactivate it first before trying to activate it again.

FCXxxx648I REQUEST TO *cccccccc* **CANCELLED DUE TO EXCESSIVE WAIT**

Explanation: A request for data retrieval was sent to *cccccccc* but has not been answered for a long time, so the request has been cancelled.

System action: The retrieval request is cancelled.

User response: Make sure the RMF PM DDS interface in the target Linux system is active, and that it can be reached via TCP/IP, then try again.

FCXxxx656E '*cccccccc***' statement in master file not recognized**

Explanation: The program has been invoked for batch processing and the master control files contains the invalid specification '*cccccccc*'.

System action: Operation continues.

User response: See the "MASTER File" section of the "Operation in Batch Mode" chapter in the *z/VM: Performance Toolkit Guide* for a description of valid master file specifications and correct the statement.

FCXxxx657E Control file *fn ft fm* **not found**

Explanation: The control file *fn ft fm* specified in a command or control file has not been found. This file either does not exist or is not currently accessed.

System action: Batch operation ends.

User response: Make sure the control file is available.

FCXxxx658I No valid report specifications found

Explanation: The program was invoked for operation in batch mode, but no valid performance report specifications were found in the REPORTS control file.

System action: Only the default MONDATA report will be generated.

User response: Prepare or update the REPORTS control file if you expect more than the default MONDATA report to be created

FCXxxx661I No valid report selections processed - generating default MONDATA

Explanation: The program was invoked for operation in batch mode, but no reports were generated because no valid performance report specifications were found in the REPORTS control file.

System action: Only the default MONDATA report is generated.

User response: If you want more than the default MONDATA report to be created, update the REPORTS control file.

FCXxxx676I File *fn ft fm* reloaded.

Explanation: A 'FCONTROL RELOAD' command has successfully completed.

System action: The reload is completed and processing continues. The definitions in the new file are now in effect.

User response: None.

FCXxxx677E Not authorized for S&FSERV on Resource *resource*

Explanation: An attempt to establish an APPC/VM connection to resource *resource* posing as an intermediate store and forward server was detected, but the virtual machine has not been defined as an S&F server in the FCONRMT AUTHORIZ file.

System action: Store and forward requests are not allowed.

User response: Update the FCONRMT AUTHORIZ file on the client machine to include the required S&FSERV definition.

FCXxxx678E Error processing file *fn ft fm*

Explanation: One or more errors were encountered while performing an 'FC RELOAD' subcommand.

System action: The reload is completed, using valid entries from the file.

User response: Review the console log for error messages associated with the file being reloaded.

FCXxxx679E User login failed from *ip-address* for *userid* - ESM not available.

Explanation: An attempt to logon to *userid* from *ip-address* resulted in return *rc* from DMSPASS, indicating that the External Security Manager (ESM) was not available. This should be accompanied by message FCXxxx680 with more information.

System action: The home page (logon page) is returned to the requestor.

User response: Try again later. If the problem persists, contact your support team to have them address the problem.

FCXxxx680I *information*

Explanation: This message contains logdata information from the ESM, after the DMSPASS call to authenticate a user who is trying to log on from the web. This message should be accompanied by message FCXxxx679E or FCXxxx692E.

System action: The user is unable to logon.

User response: None. This is additional information for your support personnel.

FCXxxx681I Invalid parameter 'IDTEST' ignored

Explanation: IDTEST is no longer a valid parameter for the FC MONCOLL WEBSERV command. It has been ignored.

System action: Processing continues using the user authentication available on the system.

User response: Remove the IDTEST parameter and other associated parameters.

FCXxxx682E Not authorized to issue DIAGx88, WEBSERV not enabled

Explanation: While attempting to start the WEBSERV interface, the virtual machine running PERFKIT was not authorized to issue DIAGNOSE X'88' for user/password authentication.

System action: The WEBSERV interface is not started.

User response: Contact your support team to have the PERFKIT machine authorized for password checking.

FCXxxx683I Unexpected remsend data from *userid* at *nodeid* ignored

Explanation: Perfkit received data sent from another node (*nodeid*) using FC MONCOLL REMSEND. The FCONRMT SYSTEMS file on this node does not have an entry for this other node.

System action: The data is ignored and processing continues.

User response: Either remove the REMSEND from the sending node's FCONX $PROFILE or add information about the sending node to the FCONRMT SYSTEMS file.

FCXxxx684E File 'FCXBANNR *ft fm*' is too large

Explanation: Perfkit cannot process the banner file FCXBANNR HTML or FCXBANNR GIFBIN because its size exceeds the allowed limit (approximately 11.5K).

System action: Until it is replaced with a file of the appropriate size, the file will not be used for banner setup during Web interface initialization.

User response: Replace the file with one of smaller size and restart the Web server interface (by issuing FC MONCOLL WEBSERV OFF and then FC MONCOLL WEBSERV ON).

FCXxxx685E ERROR *nn*: File 'FCXBANNR HTML *fm*' has invalid structure

Explanation: Perfkit found an error while processing the Web banner file FCXBANNR HTML. The reason code *nn* has the following meaning:

1 The file has no <body> tag.

2 There is no 'src=' attribute on the <img> tag.

3 Premature end of parm for the 'src=' keyword.

System action: Until it is corrected, the file will not be used for banner setup during Web interface initialization.

User response: Correct the file as appropriate and restart the Web server interface (by issuing FC MONCOLL WEBSERV OFF and then FC MONCOLL WEBSERV ON).

FCXxxx686I File 'FCXBANNR *ft fm*' is used for Web banner processing

Explanation: Perfkit will use the banner file (FCXBANNR HTML or FCXBANNR GIFBIN) for building the customized Web interface banner screen. You will always receive one message for FCXBANNR HTML, and then optionally one more message for FCXBANNR GIFBIN.

System action: The file will be used for banner setup during Web interface initialization.

User response: None.

FCXxxx687I ERROR *nn*: 'Insufficient Storage, default TREND or SUMMARY settings used'

Explanation: Perfkit didn't have enough storage to process the TRENDREC or SUMREC file.

System action: The default settings for the TRENDREC or SUMREC will be used.

User response: Increase the virtual storage for the PERFKIT machine.

FCXxxx688I ERROR *nn*: 'Error reading file, default TREND or SUMMARY settings used'

Explanation: Perfkit encountered a problem reading the TRENDREC or SUMREC file.

System action: The default settings for the TRENDREC or SUMREC will be used.

User response: Verify that the TRENDREC or SUMREC file is usable.

FCXxxx689A Insufficient storage for PERFKIT to continue - exiting

Explanation: Perfkit requires a certain amount of virtual storage for the program itself, and may require a considerable amount of additional storage to hold its data tables when performance monitoring is activated. The required storage is *not* available.

If the emergency safeguard feature (ESF) has been previously activated, then Perfkit will initiate actions processing as defined with the FC EMERGENC ORDER command (creating printed reports, saving trend/summary files, executing a user EXEC procedure) prior to program termination.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: If the ESF is activated, Perfkit will attempt to perform all required actions, and then terminate. If ESF is not activated, Perfkit will terminate immediately.

User response: Increase the storage size of your virtual machine, re-IPL CMS, and then restart Perfkit.

FCXxxx690E User login failed from *ip-address* for *userid* Read Error

Explanation: User *userid* on IP address *ip-address* tried to log on to the Web Server interface, but the External Security Manager (ESM) encountered a read error while trying to access the user directory.

System action: The home page (logon page) is returned to the requestor.

User response: Contact your support team to have them address the problem.

FCXxxx691E User login failed from *ip-address* for *userid* CP is backlevel

Explanation: User *userid* attempted to logon to Perfkit through the web from IP address *ip-address*, but the External Security Manager (ESM) was unable to verify the userid/password because CP was not at the required level.

System action: The home page (logon page) is returned to the requestor.

User response: Contact your support team to have them address the problem.

FCXxxx692E User login failed from *ip-address* RC = *rc* from DMSPASS

Explanation: A user attempted to log on to Perfkit through the web from IP address *ip-address*, but the External Security Manager (ESM) was unable to verify the userid/password and returned an unexpected return code. There may be an accompanying

FCXxxx680 message with additional information.

System action: The home page (logon page) is returned to the requestor.

User response: Contact your support team to have them address the problem.

FCXxxx693I *operation* **-** *explanation*

Explanation: An error condition was found during a TCP/IP call, as described in message FCXxxx576E. *operation* tells what operation was being attempted, followed by the explanation of the error code.

System action: Depends on the error found. Operation will usually continue, but you may have to restart the Web Server interface.

User response: Have the error condition corrected and try again.

FCXxxx694E User login failed from *ip-address userid* **id or pw not valid**

Explanation: User *userid* on IP address *ip-address* tried to log on to the Web Server interface, but the userid/password combination is not valid.

System action: The home page (logon page) is returned to the requestor.

User response: Determine the correct userid and password and try again.

FCXxxx695E User login failed from *ip-address userid* **logonby** *byuserid*

Explanation: A password provided during the 'Logon by' procedure is incorrect.

System action: The home page (logon page) is returned to the requestor.

User response: Re-enter the user ID(s) and password.

FCXxxx698E You are not authorized to act as user *userid*

Explanation: A user attempted to log on to the *userid* user ID, but the 'Logon by' authorization was not allowed.

System action: The home page (logon page) is returned to the requestor.

User response: Re-enter the user ID(s) and password.

FCXxxx696E Your password has expired.

Explanation: You tried to log on with a password that has expired.

System action: The home page (logon page) is returned to the requestor.

User response: Follow your installation procedure for having your userid reinstated.

FCXxxx697E The userid or password you entered is not valid

Explanation: You tried to log on with a userid/password combination that is not valid.

System action: The home page (logon page) is returned to the requestor.

User response: Determine the correct userid and password and try again.

FCXxxx699E Error reading the user directory

Explanation: The External Security Manager (ESM) encountered a read error while trying to access the user directory. Therefore, Perfkit is unable to authenticate your userid at this time.

System action: The home page (logon page) is returned to the requestor.

User response: Contact your support team to have them address the problem. The Perfkit console may provide additional information.

FCXxxx700E External Security Manager not available. Try later.

Explanation: You attempted to log on to Perfkit but the External Security Manager (ESM) was not available.

System action: The home page (logon page) is returned to the requestor.

User response: Try again later. If the problem persists, contact your support team to have them address the problem. The Perfkit console may provide additional information.

FCXxxx701E PERFKIT Server is not authorized to verify user IDs

Explanation: The External Security Manager (ESM) did not allow Perfkit to verify the userid and password.

System action: The home page (logon page) is returned to the requestor.

User response: Contact your support team to have them address the problem. The Perfkit console may provide additional information.

FCXxxx702E Unexpected error while authenticating your userid

Explanation: Perfkit received an unexpected return code from DMSPASS while trying to verify your userid and password.

System action: The home page (logon page) is returned to the requestor.

User response: Contact your support team to have them address the problem. The Perfkit console may provide additional information.

FCXxxx703E User login failed from *ip-address* for *userid* No Diag88 authorized.

Explanation: User *userid* attempted to logon to Perfkit through the web from IP address *ip-address*, but the External Security Manager (ESM) did not allow Perfkit to use DIAGNOSE X'88' to verify the userid and password.

System action: The home page (logon page) is returned to the requestor.

User response: Contact your support team to have them address the problem.

FCXxxx704E Unable to verify your userid/password CP is back level

Explanation: The External Security Manager (ESM) was unable to provide the verification of the userid and password because CP was not at the required level.

System action: The home page (logon page) is returned to the requestor.

User response: Contact your support team to have them address the problem.

FCXxxx705I Emergency Safeguard Feature activated

Explanation: In response to an FC EMERGENC ON command, Perfkit's emergency safeguard feature is enabled for detection of emergency events such as a z/VM shutdown or a shortage of virtual memory. Under these conditions, all actions defined with the FC EMERGENC ORDER command will be performed. The main purpose of these actions will be to save any unsaved collected data. For more information, see "FCONTROL EMERGENC" on page 29.

System action: Operation continues. Perfkit will detect the emergency events and take actions as defined with the FC EMERGENC ORDER command.

User response: None.

FCXxxx706I Emergency Safeguard Feature deactivated

Explanation: In response to an FC EMERGENC OFF command, Perfkit's emergency safeguard feature is disabled for detection of emergency events. No actions will be taken if an emergency event occurs.

System action: Operation continues. Perfkit will ignore any subsequent emergency events.

User response: None.

FCXxxx707A Signal Shutdown event detected - exiting

Explanation: Perfkit's emergency safeguard feature detected a z/VM shutdown, and started performing the required emergency actions as defined with the FC EMERGENC ORDER command (creating printed reports, saving trend/summary files, executing a user EXEC procedure) prior to program termination.

This message is also sent to the maintenance user ID defined with the FC MAINTID command.

System action: Perfkit will perform all required actions and load a disabled wait PSW with the code X'FFF'.

User response: None.

FCXxxx708E Error '*errcode*' activating Emergency Safeguard Feature

Explanation: An FC EMERGENC ON command was entered, but Perfkit was unable to activate the emergency safeguard feature because an internal processing error occurred. The error code *errcode* designates the reason for this error.

System action: Operation continues. The emergency safeguard feature is not activated.

User response: Contact IBM service.

FCXxxx709E Error '*errcode*' processing Signal event

Explanation: The signal event external interrupt was received, but Perfkit was unable to correctly process it because an unexpected internal processing error occurred. The error code *errcode* designates the reason of this error.

System action: Operation continues.

User response: Contact IBM service.

FCXxxx710A Emergency Safeguard: *action* processing {started | ended} Emergency Safeguard: all processing complete

Explanation: The first message is issued when *action* processing is started or ended, as part of the emergency safeguard feature's response to the detection of an emergency event. Possible actions and their meanings are as follows:

PRINT Create print reports defined with the FC MONCOLL RESET *hh*:*mm*:*ss*P command.

INTERIM
Create print reports defined with the FC MONCOLL RESET *hh*:*mm*:*ss*I command.

TREND
Process and save trend records defined with the FC MONCOLL RESET *hh*:*mm*:*ss*T command.

SUMMARY
Process and save summary records defined with the FC MONCOLL RESET *hh*:*mm*:*ss*S command.

REMPRINT
Create print reports defined with the FC SETEVENT ... PRINTRMT command.

EXECPROC(*name*)
Call the user-defined *name* EXEC procedure.

The second message is issued when all required emergency actions have been processed.

For more information, see "FCONTROL EMERGENC" on page 29.

System action: Operation continues.

User response: None.

FCXxxx711E Emergency Safeguard Feature already active - command ignored

Explanation: An FC EMERGENC ON command has been entered, but the emergency safeguard feature of Perfkit has already been activated.

System action: The command is ignored.

User response: None.

FCXxxx712E Invalid action '*action*' specified

Explanation: An FC EMERGENC ORDER <...> *action* <...> command has been entered with an invalid action.

System action: Only actions preceding the first invalid action (if any) are accepted. The rest that follow are ignored.

User response: Check the syntax of the FC EMERGENC ORDER command and re-enter it with correct action(s).

FCXxxx713E Duplicate action '*action*' specified

Explanation: An FC EMERGENC ORDER <...> *action* <...> command has been entered with an action specified more than once.

System action: Only actions preceding the first duplicate occurrence of the invalid action are accepted. The rest that follow are ignored.

User response: Re-enter the FC EMERGENC ORDER command, specifying each required action only once.

FCXxxx714E No CMS EXEC procedure name defined

Explanation: An FC EMERGENC ORDER <...> EXECPROC <...> command was entered, but the CMS EXEC procedure name had not been previously specified with the FC EMERGENC EXECPROC command.

System action: Only actions preceding the EXECPROC action (if any) are accepted. The rest that follow are ignored.

User response: Define the CMS EXEC procedure name with the FC EMERGENC EXECPROC command first, and then re-enter the FC EMERGENC ORDER <...> EXECPROC <...> command.

FCXxxx715E CMS EXEC procedure name missing or invalid

Explanation: An FC EMERGENC EXECPROC command was entered, but the EXEC procedure name was not specified or is too long (more than 8 characters).

System action: The command is ignored.

User response: Re-enter the FC EMERGENC EXECPROC command, specifying the name of existing CMS EXEC procedure.

FCXxxx716I ESF enabled, but no emergency actions have been defined yet

Explanation: In response to an FC EMERGENC ON command, Perfkit is enabled for detection of emergency events, but because no emergency actions have been defined, no actions will be taken if such events occur.

System action: Operation continues.

User response: Define the appropriate emergency actions with the FC EMERGENC ORDER command.

FCXxxx717I No emergency actions have been defined - ESF exiting

Explanation: The emergency safeguard feature has detected an emergency event, but no emergency actions were previously defined with the FC EMERGENC ORDER command.

System action: Operation continues.

User response: None at present. But for future emergency events, you should define the appropriate emergency actions with the FC EMERGENC ORDER command.

FCXxxx718I ESF is now in suspended state - no emergency actions allowed

Explanation: Although the emergency safeguard feature was previously enabled, permanent data collection appears to be turned off. No actions will be taken upon detection of any emergency event.

System action: If this message was received because permanent data collection was turned off by the FC MONCOLL DCSS/DISK OFF command, then operation continues with the emergency safeguard feature in a suspended state.

If permanent data collection was turned off by some type of emergency event, then operation terminates.

User response: To activate the emergency safeguard feature, permanent data collection must be turned on using the FC MONCOLL DCSS/DISK ON command.

FCXxxx719I *action* **processing skipped - not scheduled till the end of this day**

Explanation: During processing of an emergency event, Perfkit tried to perform a specific *action*, but all scheduled actions of that type have already been processed for that day. This is possible if *action* is PRINT, INTERIM, TREND, SUMMARY, or PRINTRMT, which are scheduled using the FC MONCOLL RESET command (for PRINT/INTERIM/TREND/SUMMARY), or the FC SETEVENT command (for PRINTRMT).

System action: Operation continues.

User response: None.

FCXxxx720I *rrr* **TREND|SUMMARY record(s) X'FC***nn***' not written - data not available**

Explanation: During processing of *rrr* TREND/SUMMARY record(s) X'FC*nn*', the Performance Toolkit determined that data required for building these records is not available. Possible reasons for that are the following:

- The corresponding CP sample monitor domain was not enabled during the whole time interval for which the history record was to be written
- There is insufficient storage to allocate work buffer for these records.

rrr is the name of the TREND/SUMMARY record as defined in the file FCONX TRENDREC of FCONX SUMREC by the 'RECORDS' statement, and *nn* is its number.

System action: Operation continues.

User response: None.

FCXxxx768E SEGOUT segment *segname* **is already in use by user:** *user*

Explanation: Only one user at on your system can write into the SEGOUT segment. You have attempted to load *segname* in write mode in a second user's virtual machine.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Have the first user stop using *segname* or define another DCSS to be used as a second SEGOUT segment.

FCXxxx770I Arithmetic value overflow for attribute: *attribute*

Explanation: An internal processing error occurred in the formatted data collectors. The values are not logged in the SEGOUT segment.

System action: PERFKIT operation and formatted data collection continues.

User response: Contact your IBM representative if the problem persists.

FCXxxx771I SEGOUT data collection is off

Explanation: This the response to the FC MONCOLL SEGOUT OFF subcommand, indicating that the formatted output collectors are turned off.

System action: Processing continues.

User response: None.

FCXxxx772I SEGOUT data collection is active. Using segment : *segname*

Explanation: This the response to the FC MONCOLL SEGOUT ON *segname* subcommand, indicating that the formatted output collectors are turned on and using segment *segname*.

System action: Processing continues.

User response: None.

FCXxxx773E SEGOUT data collection is off due to an error, Reason: *reason_code*

Explanation: An internal error occurred during formatted data collection processing.

Reason Code	Explanation
5	The Performance Toolkit is not set to Current mode. It is either in Interim mode or Average mode.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Ensure that the Performance Toolkit is set to Current mode.

FCXxxx774E Insufficient space in SEGOUT segment. Larger segment needed

Explanation: The formatted data collectors do not have a large enough segment in which to collect data.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Use the FCXSEGSZ EXEC to re-estimate the size of the segment. The amount of space in the segment needed by the formatted data collectors depends on the number of users, the number of devices, and so on being monitored in your z/VM system.

FCXxxx775E Derived offset less than zero, SEGOUT segment underflow

Explanation: An internal processing error occurred in the formatted data collectors. Initialization of the SEGOUT segment has failed.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Correct any problems with the SEGOUT segment. Contact your IBM representative if the problem persists.

FCXxxx777I SEGOUT is not enabled

Explanation: The segment used by the formatted data collectors is not enabled.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Issue the FC MONCOLL SEGOUT ON to start collecting data in the segment.

FCXxxx778I SEGOUT data collection ended normally

Explanation: The formatted data collectors have stopped processing data without errors.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: A FC MONCOLL SEGOUT OFF was issued to stop collecting data in the segment. Issue FC MONCOLL SEGOUT ON to restart the data collection.

FCXxxx779E Error locating DCSS, unable to find segment: *segname*

Explanation: The specified DCSS, *segname*, does not exist.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Use a valid SEGOUT DCSS on the FC MONCOLL SEGOUT command.

FCXxxx780E Error on DCSS load, unable to load segment: *segname* **Storage overlay**

Explanation: There was an error while loading segment *segname*. The CMS SEGMENT LOAD command encountered a problem trying to load the *segname* segment in the PERFKIT virtual machine.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Issue the command "CMS SEGMENT LOAD *segname*" from the PERFKIT command. Check the error message from that command and correct the problem stated. The most likely cause of this error is that the SEGOUT *segname* is defined at a storage location which overlaps another DCSS (e.g. MONDCSS). This is error message DMSxxx343E from SEGMENT LOAD. If this is the case, you must redefine the *segname* DCSS in a different storage location. After doing that, you can then restart the formatted data collectors.

FCXxxx781E Error collecting *data* **data in shared memory**

Explanation: An internal processing error occurred in the formatted data collectors while collecting data of the type *data*.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Correct any problems with the SEGOUT segment. Contact your IBM representative if the problem persists.

FCXxxx784E Command option: *option* **is not valid**

Explanation: The option *option* is either not valid for the command or is incorrectly specified.

System action: PERFKIT operation continues, but formatted date collection terminates.

User response: Check and correct the command syntax and reissue the command

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FCXxxx787E SEGOUT segment name: *segname* **is not valid**

Explanation: The segment name defined for use by the formatted data collectors is not valid.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Issue the command again with a valid segment name.

FCXxxx788I Interval time value: INTRVLTM unavailable from monitor, RC=*rc*

Explanation: The CP MONITOR did not return a valid interval time. The return code is the error code returned by the CP MONITOR.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Correct any problems with the CP MONITOR based on the return code.

FCXxxx789E Error inserting LPAR record in shared memory, FCXOMXSM RC=8

Explanation: There is no LPAR performance data available from PERFKIT. If z/VM is running in logically partitioned mode on the hardware (first level), this error is likely a result of CP MONITOR not being enabled to monitor processor data. If z/VM is running as a guest on a z/VM system (second level), then this error is a result of no LPAR data being available to a z/VM guest.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: If running first level, enable processor monitoring in CP MONITOR.

FCXxxx790E DCSS initialization failed. Error code: *error_code* RC=*rc*

Explanation: The segment defined for use by the formatted data collectors did not initialize correctly. This error can be caused by any of the following:

Error Code	Reason
INIT_DP1	Initialization of the segment data area prefix failed
INIT_DP2	No address for the segment data area prefix returned
INIT_SPR	No address for the SEGOUT segment name can be obtained
NO_DAP	Address of second data area in SEGOUT segment is not valid

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Check that the segment name is correctly defined and that it is large enough to contain your system's data. Use the FCXSEGSZ EXEC to check the size. If everything is correctly defined, contact your IBM representative.

FCXxxx791E SEGOUT collection stopped due to INTERIM or AVERAGE command

Explanation: An INTERIM or AVERAGE command was issued in the PERFKIT virtual machine. The formatted data collectors must run in CURRENT mode in PERFKIT. The formatted data collection process is stopped.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: In the PERFKIT virtual machine, issue the CURRENT command and restart the formatted data collectors with the FC MONCOLL SEGOUT command.

FCXxxx792E SEGOUT is not enabled. Can not write to Segment *segname*

Explanation: Perfkit cannot write to the *segname* segment, and therefore cannot begin collecting SEGOUT data.

System action: Perfkit operation continues, but formatted data collection is not enabled.

User response: Make sure that you have a DCSS correctly defined to collect SEGOUT data. Then restart the formatted data collectors with the FC MONCOLL SEGOUT command.

FCXxxx798E Error calling SEGOUT Storage Management, incorrect parameter passed

Explanation: An internal processing error occurred in the formatted data collector's storage management routines.

System action: PERFKIT operation continues, but formatted data collection terminates.

User response: Restart the formatted data collectors with a new FC MONCOLL SEGOUT command. Contact your IBM representative if the problem persists.

FCXxxx800A Invalid *cccc* found for device *devno*

Explanation: This message is generated by a trap set up to catch incorrect I/O device service time information which has caused Performance Toolkit for VM abends due to bugs in the microcode. The string *cccc* indicates which service time component is invalid, and *devno* is the device number for which the incorrect service time was returned.

System action: Operation continues using the interval time. Service times and percent busy for this device are not valid.

User response: Contact your hardware support and inform them of the problem.

FCXxxx801A RC *nn* for CMSSTOR OBTAIN from FCX*ccc*+*dddd* for *mmmmmm* DWs

Explanation: The program FCX*ccc* at hex displacement *dddd* tried to obtain *mmmmmm* doublewords of free storage but did not obtain the space. Return code *nn* is the return code of the CMSSTOR OBTAIN macro and indicates the reason for the error. If the problem was not simply a case of insufficient storage, this return code helps the Performance Toolkit for VM developer determine what went wrong. If the problem was insufficient storage, this message can also be followed by message 327A.

This message is also sent to the maintenance user ID defined with the FC MAINTID command. Please note that only the first occurrence per day of this message will be sent to that user ID.

System action: Operation continues, if possible, but data will be incomplete.

User response: See the return codes of the CMSSTOR macro for the reason for the error. Increase the virtual storage size of the PERFSVM machine if the problem was insufficient storage.

FCXxxx811T 'Proc/Reset *call_type* call *timestamp_info* [*reset_info*]'

Explanation: The message is produced during BATCH operation. It provides information about RESETs that are performed during the BATCH run.

System action: Processing continues.

User response: None.

FCXxxx999E Message nr. *nnn* not found in FCXMSG MODULE

Explanation: Performance Toolkit for VM programming error: The number *'nnn'* of the error message to be displayed could not be found in module FCXMSG.

System action: Operation continues.

User response: Inform systems programmer.

Appendix A. Graphical Displays of Performance History Data

Many different ways of displaying performance history data graphically are supported. They differ in:

- The origin of the history data to be analyzed
- The variable to be used for the x-scale, and the scale factor
- The type of graphics which is to be generated

but they all use a very similar logic and command structure.

Origin of history data: You can use all of the many performance variables which can be displayed on the performance redisplay screen (see "REDISP" on page 260), the extended history data log display (see "REDHIST" on page 259), and also most of the variables that are contained in an object's benchmark log files for generating performance graphics. These variables can be found in

- *Performance redisplay buffer* (in storage). It contains data from the most recent measurements for many key performance variables, and it is automatically updated whenever new data are collected by the performance monitor. It's size can be defined by the 'FC MONCOLL REDISP' command (see "FCONTROL MONCOLL" on page 52) to accomodate data of between 60 and 14,400 of the most recent measurements.

  The length of the period covered by these measurements depends on the length of the CP monitor sample interval to which all permanent data collection is linked.
- *Disk files with general system load performance data:*
  - Files *yyyymmdd* HISTLOG*n* (new) and/or *mmddyy* PERFLOG*n* (old) with detailed performance data for a single day (one record per measurement).
  - File 'ACUM HISTSUM' (new) and/or file 'ACUM PERFHIST' (old) which contain summary data (one record per hour), but for all days where data collection to history files has been active.

    Both detailed and summary files will be available, however, only when data collection to disk had previously been activated by the command 'FC MONCOLL PERFLOG ON' (see "FCONTROL MONCOLL" on page 52).
  - File '*systemid* FCXTREND'with extended summary history data: data for several weeks or months will usually be kept, and the data can include performance information on individual users, I/O devices, etc.

    See the "Creating Extended Summary and Trend Files" section in the "Using Performance Toolkit in Performance Monitor Mode" chapter of the *z/VM: Performance Toolkit Guide* for a more detailed description of extended trend files and their creation.

  Collection of performance history data in disk files is an absolute pre-requisite for long-term trend analysis.

  See also the "Data Collection in History Files on Disk" section in the "Using Performance Toolkit in Performance Monitor Mode" chapter of the *z/VM: Performance Toolkit Guide* for a more detailed description of history data collection.
- *Benchmark log files:* These can optionally be created while benchmarking specific objects, and most of the log files on disk can be used as input for graphics creation just like the general system load files (user logs such as MTUSRLG, USERLOG, etc. and I/O device log files such as CACHELG, DEVLOG, etc.).

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Note: The remainder of this section has been adapted to refer mainly to the new HISTLOG files as examples for detailed performance history data, but such references always apply to the old PERFLOG files as well, to *mmddyy* RMONLOG*n* files created by the central monitoring facility, and also to an object's benchmark log files.

Similarly, any references to the new ACUM HISTSUM files as input for condensed summary data should be interpreted to include also the old ACUM PERFHIST files and extended FCXTREND files.

The default source for all the graphical history displays is the redisplay buffer, other sources must explicitely be defined by the 'FILE *fn ft fm*' arguments of the selected PLOT*xxx* or GRAPH*xxx* command.

Variable to be used for the x-scale: The horizontal x-scale can be used for plotting

- *Elapsed time*. Depending on the desired amount of detail to be shown (and on the amount of detail available in the source data), different commands must be used for generating the graphical displays:
  - *Detailed graphics*, generated by the GRAPHDET or PLOTDET commands, can show data from up to 140 measurements on one display.
  - *Summary graphics*, generated by the GRAPHSUM or PLOTSUM commands, can show data for a period of up to 12 hours. They can be based on data from the current redisplay buffer (default), or from a *'yyyymmdd* HISTLOG*n'* or benchmark log disk file with detailed performance data.
  - *Trend graphics*, also generated by the GRAPHSUM or PLOTSUM commands, can show data for a period of many months or even years. They are based on data from an 'ACUM HISTSUM' or '*systemid* FCXTREND' history file.
  - *Daily performance 'profiles'* can also be generated by the GRAPHSUM or PLOTSUM commands. They will show how performance or system load varied during an average day of the selected period. They are based on data from an 'ACUM HISTSUM' or '*systemid* FCXTREND' history file.
- *A selected performance variable*. The GRAPHVAR and PLOTVAR commands allow the creation of 'variable correlation' graphics, which show graphically how up to three Y-performance variables depend on another variable which is plotted on the X-scale.

Type of display: Data can be plotted using

- Simple plots based on ordinary display characters. Such plots can be shown on any kind of display terminal, and they do not require any additional software. The values of the different variables shown are distinguished by different plot characters. However, displaying more than two y-variables on the same screen with simple character plots is not recommended as it will usually lead to overloaded pictures which are difficult to interpret.

  Use the 'PLOT*xxx*' commands to generate simple character plots.
- GDDM graphics displays. For host connected users these require both a display terminal with graphics capability and access to GDDM code (Graphical Data Display Manager V.3).

  For users connected via the WWW interface and a Web browser, the graphics capabilities and Java applet support of their workstation and Web browser are used, and they do not need additional host software to create line graphics.

  Different colors and line types are used for the different variables. This kind of graphics will be generated by the 'GRAPH*xxx*' commands.

The following table gives an overview of the commands used for generating a specific type of performance graphics, and of the type of source data needed.

Table 1. Available performance graphics

	Source of history data		
Type of graphics	**Redisplay buffer**	**Disk files *)** **yyyymmdd HISTLOGn** **or** **benchmark** **log file**	**Disk file *)** **ACUM HISTSUM or** *systemid* **FCXTREND**
Detailed history graphics	GRAPHDET	GRAPHDET	-
Summary history graphics	GRAPHSUM	GRAPHSUM	-
Performance trend graphics	-	-	GRAPHSUM
Daily performance profile	-	-	GRAPHSUM
Variable correlation graphics	GRAPHVAR	GRAPHVAR	GRAPHVAR

Note:

***)** These history files will be available only for periods where data collection to disk had been activated.

The GRAPH*xxx* commands included in the above table will cause full GDDM graphics to be generated. Equivalent PLOT*xxx* commands are available which allow creation of simple plots for exactly the same data, these can be used if either GDDM or a graphics terminal are not available.

Examples for each of the different types of performance graphics will be given on the following pages, mostly in the form of GDDM graphics, but also including some simple plots.

Some common features:

- *Y-scale used:* Up to four (three for GRAPHVAR) of the many performance variables can be selected for concurrent display. Their values will be plotted on the vertical y-axis, and the scale automatically adapted so that
  - the highest value found for a variable will still fit into the plot
  - similar variables (same unit-type, e.g. 'pages/sec.') will be plotted using the same scale if they are shown on the same plot.

  The scale used is indicated by the numbers shown on the left hand side of the y-axis. If more than one variable is being shown, the value at the top is the scale for the first variable, the next lower one is the scale for the second variable and so on.

  Where only a few of the y-values are much higher than the remainder, such values may be ignored so as to allow displaying the bulk of the data in a better scale.
- *Saving / printing GDDM graphics:*

– press the PF-key correponding to the SAVE function (PF6 if you work with the initial setting) to save the graphics part of the display as file '*xxxxxxxx* ADMGDF A', where *xxxxxxxx* is the file name previously entered in the File Name field in the bottom line of the screen. The resulting file can later be retrieved by GDDM for re-displaying, or it can be converted and included in a script file for processing by DCF (Document Composition Facility, 5748-XX9).
– press the PF-key correponding to the PRINT function (PF9 if you work with the initial setting) to save the graphics part of the display as file '*xxxxxxxx* ADMPRINT A'. It can then be printed using standard GDDM facilities. Select the desired number of copies by entering the corresponding number in the Copies-field in the bottom line.

Graphics Selection Menu

The graphics selection menu will be shown after entering the GRAPHICS command. It is intended to help you in generating performance graphics based on history data.

```
FCX128                  Graphics Selection Menu       Perf. Monitor

General Specifications

Format         : GDDM_                          Truncate X-var. at: _________
Data origin    : STORAGE_____________________   Y-var. cumulative (Y/N): N
Graphics type  : DETailed history____________   Scatter plot (Y/N): Y
Selected period: Last measurements___________
Selected hours : _____________________________
Selected days  : All days_____________________

Variables Selection                Trend Record Selection
Var   Name       Description       Display   Record Details
X   : ACT_____ - Active users      _________ __________
Y * : CPU_____ - % total CPU       _________ __________
  o : IO/S____ - SSCH rate/s       _________ __________
  = : _________ -                  _________ __________
  / : _________ -                  _________ __________


To select graphics
- either key in your choice directly in the fields above
- or enter '?' in the first position of any field for which you
  want additional information. A detailed selection menu will then
  be shown with further explanations.
pressing ENTER without any changes will start graphics creation.

Command ===> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
```

Figure 200. Graphics selection menu

The screen should essentially be self-explaining:

- Entering incorrect data will lead to a pop-up window being shown which displays the valid selections from which you can then select.
- Changing one field will automatically change other related fields to their default values if the 'old' value (from a previous graphics selection) is not valid for the new combination.
- Fields which are valid for input with the current graphics type selection are highlighted.

Graphics will be generated when the ENTER key is press without any changes to the input fields.

Field Description:

General Specifications:

Format
The kind of graphics to be generated. It can be

GDDM
for the creation of real GDDM-based graphics

PLOT
for the creation of simple plots, using normal display characters.

FILE for creating a 'flat file' on disk, with one record per X-value, and each record containing the matching Y-values in EBCDIC format, and with a leading and trailing double quote sign (") per value. This format is suitable for importing the data into PC applications so that real graphics can be prepared even where GDDM is not available on a system, or where the resulting graphics are to be included in reports written with a PC text processing program.

The data will be written to your A-disk as file `FCONDATA IMPORT`. The following is an example for such a file:

```
"Time        " "% total CPU " "SSCH rate/s "
"7           " "           90" "          59"
"            " "           98" "          45"
"            " "          135" "          78"
"            " "          179" "          99"
"            " "          274" "         147"
"            " "          277" "         140"
"8           " "          388" "         166"
"            " "          397" "         180"
"            " "          391" "         197"
"            " "          417" "         218"
"            " "          432" "         223"
"            " "          399" "         196"
"9           " "          343" "         155"
"            " "          369" "         170"
 ...
 ...
```

Data origin
The source data which are to be processed. Valid selections are

STOrage
for graphics based on data from the current day's REDISP buffer

File fn ft fm
for graphics based on a performance history file.

Graphics Type
The desired graphics format. Valid selections are

DETailed history
for a detailed display of about two hours from the current redisplay buffer or from a detailed disk log file, with time being shown on the X-axis (see “Detailed Performance History Display” on page 896).

SUMmary history
for a more condensed display of about 12 hours from the current redisplay buffer, or from one of the detailed history log files, or for any length of time from the accumulated HISTSUM or PERFHIST

file (see “Summary Performance History Display” on page 898 and “Performance Trend Display” on page 898).

PROfile history
for displaying load variations during an average day in the selected interval (see “Daily Performance Profile” on page 899). This selection is valid only when the source data come from a HISTSUM or PERFHIST file.

VARiable correlation
for displaying up to three performance variables as a function of a another 'base'-variable (see “Variable Correlation Display” on page 900).

Selected period
The period for which data are to be analyzed. Valid selection formats depend on the selected data origin:

All to show all of the available data. Automatically translated to LAST when entered with a detailed history selection.

Last to show the last part of the available detailed data. Valid with a detailed history selection only.

From *hh:mm*
indicates the time stamp of the first data record which is to be analyzed from the current redisplay buffer (STOrage) or a detailed history file. Not valid with HISTSUM or PERFHIST files.

From *yyyy/mm/dd*
indicates the date of the first data record which is to be analyzed from the selected HISTSUM file. Not valid with HISTLOG or RMONLOG files, or when working with the redisplay buffer.

To *yyyy/mm/dd*
indicates the date of the last data record which is to be analyzed from the selected HISTSUM file. Not valid with HISTLOG or RMONLOG files, or when working with the redisplay buffer.

Both the 'From' and 'To' dates can also be entered in the formats mm/dd/yy or mmddyy.

Selected hours
Can be specified only when analyzing summary HISTSUM or PERFHIST data. Hours have to be specified in two different ways, depending on the selected type of graphics:

- *SUMmary history* graphics: Specifies the hours of each day for which data are to be analyzed (typically hours with peak load). Up to eight hours can be selected.
- *PROfile history* graphics: Specifies the first and last of a range of hours for which the average daily load is to be determined, i.e. only two values should be entered.

Selected days
Can be specified only when analyzing summary HISTSUM or PERFHIST data. Select the weekday(s) for which performance data are to be included, where your specification can be a combination of the following strings:

ALL if all weekdays are to contribute to the analysis

M-F if only the normal workdays Monday to Friday are to contribute data

MON if all Mondays are to contribute data

TUE if all Tuesdays are to contribute data

WED if all Wednesdays are to contribute data

THU if all Thursdays are to contribute data

FRI if all Fridays are to contribute data

SAT if all Saturdays are to contribute data

SUN if all Sundays are to contribute data

All of the available data will be analyzed when no specific weekdays are specified.

When specified, only performance data collected for the selected weekdays are used for calculating the averages which will eventually be plotted.

Example: Specifying `'M-F SAT'` will cause data to be selected for the weekdays Monday to Saturday, excluding any data for Sundays.

Truncate X-var. at

Specifies a maximum value for the X-variable above which measurements are to be ignored. The specification is valid for variable correlation graphics only; it will be ignored in all other cases.

This option has been introduced to give the user some means to influence the X-scale in cases where a few extreme X-values would otherwise make the PERFKIT use a scale that is not suitable for the remainder of the data.

Scatter plot (Y/N)

Specifies whether dots are to be included in the graphics output for *all* measurements. The specification is meaningful only for 'variable correlation' graphics with a single Y-variable; it will be ignored in all other cases.

Variables:

X Specifies the name of the performance variable which is to be plotted on the X-scale. Valid for variable correlation graphics only and ignored in all other cases.

Y * Specifies

1. the display character to be used when plotting the variable in PLOT format, i.e. non-GDDM graphics. The specification is ignored when creating GDDM graphics. The initial setting is `'* o = /'` for Y-variables 1 to 4, as indicated in the sample screen above.
2. the name of the Y-variable which is to be plotted.

What variables can be selected depends on the data origin specified. You can choose any of the many variables which are available on the general performance redisplay screen (see “REDISP” on page 260), and any 'user variables' which you have defined using the 'FC USERVAR ...' command (see “More on Graphics ...” on page 902 for more information) as an X- or Y-variable if data from the redisplay buffer or from a HISTLOG/HISTSUM or PERFLOG/PERFHIST file are to be processed. When processing data from a benchmark log file, you will have to select from the variables available in that file.

Entering a question mark (or any invalid variable name) will let a prompting window be shown with the names and descriptions of the available variables. You can then select the variable directly from that window.

A short description of the selected variable will be appended when the variable name has been read and accepted.

Y-var. cumulative (Y/N)
Specifies whether the values of the selected Y-variables are to be added to each other for plotting.

This makes sense only if all of the selected Y-variables are similar (same units, e.g. '%') and if their total is also a meaningful value (see also "More on Graphics ..." on page 902).

Detailed Performance History Display

This type of graphics display will be generated by the GRAPHDET or PLOTDET commands. It allows creating detailed plots with the values of up to four variables. This often gives a much better overview over general system behaviour than the original figures as seen on the redisplay or benchmark screen.

Example Using GDDM Graphics

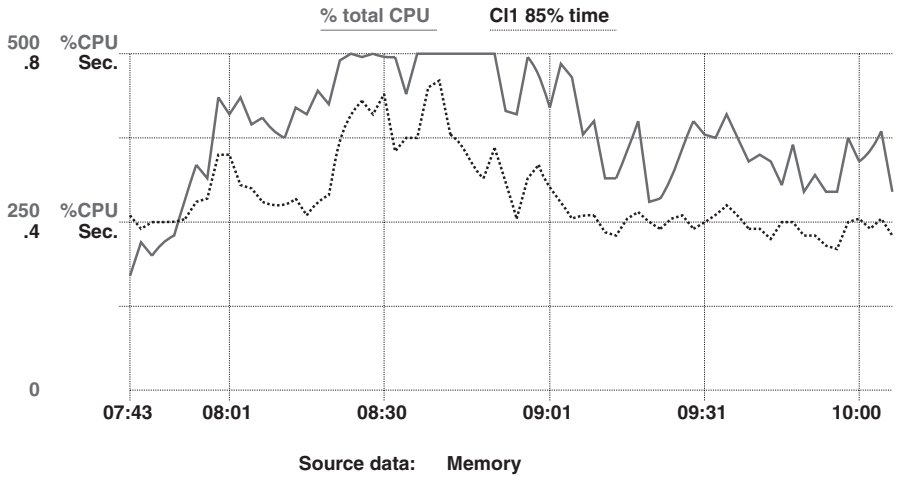

Figure 201. Detailed performance history display with GDDM graphics

The example shown was created with the command 'GRAPHDET CPU C1ES', causing total CPU load and the class 1 elapsed time slice to be plotted in the form of a full GDDM graphics display. These are also the default variables which will be displayed if the GRAPHDET command is entered without additional arguments.

Data from up to 140 measurements can be shown in one display (the average values of 2 consecutive measurements are used to generate a total of up to 70 plot points if the default monitor interval of 60 seconds is used). If more data are available, you can select the period to be analyzed by specifying the time stamp of the first measurement to be shown by means of the

`'FROM hh:mm:' argument.`

The last measurements will be shown if no start time is specified.

Note that different colors and also different line types will be used for the graphical representation of the selected variables, and that the same colors and line types are used again for the variable descriptions and the underline-type in the title line.

See “GRAPHDET / PLOTDET” on page 181 for a detailed description of the GRAPHDET command.

Example Using Simple Character Plot

The following example shows the kind of display which will be generated by the 'PLOTDET' command: a detailed display based on data from the current redisplay buffer, like the example on the preceding page, but using ordinary display characters for plotting instead of GDDM graphics.

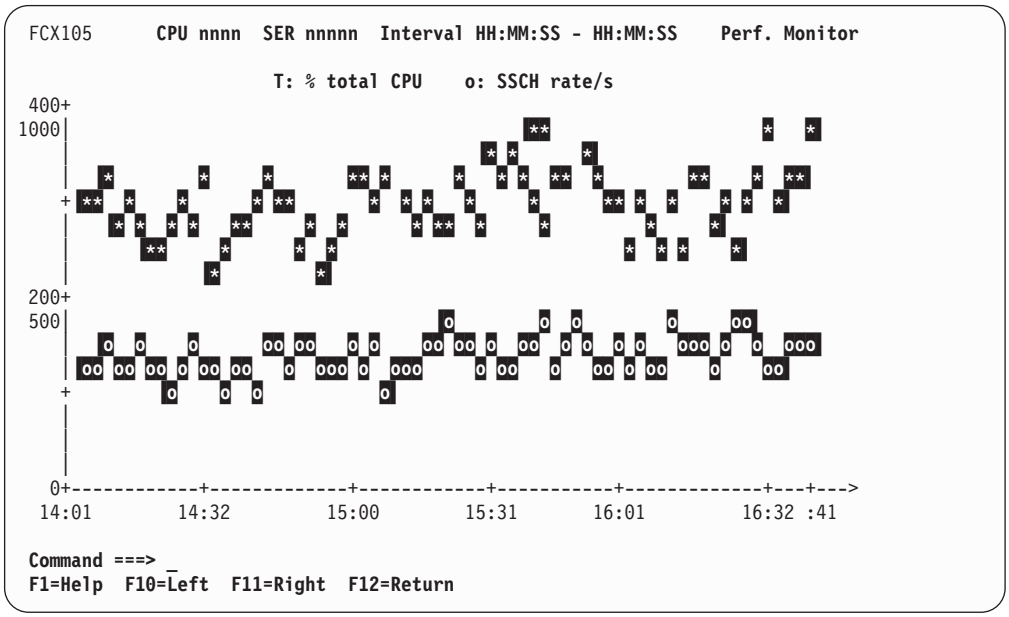

Figure 202. Detailed performance history display using simple plot

This display was generated by entering the command 'PLOTDET CPU IO/S', i.e. it shows the total CPU load and the total I/O rate for the system.

Note that there are two big differences between the output created by the PLOTDET command and the previous GRAPHDET example, in addition to the obvious difference in the graphic aspect:

1. If sufficient data are available in the redisplay buffer, i.e. if it's size has been increased from the default 120 entries by means of the 'FC MONCOLL REDISP *nnn*' command, the remainder of the buffer contents can also be displayed graphically simply by shifting the screen window to the left or right, using either the 'LEFT' and 'RIGHT' sub-commands, or the corresponding PF-keys.
2. If the most recent data have been selected for display (default), the plot shown will automatically be updated with each new measurement. If you can spare a display terminal, you could so have a continuous graphic display of some key performance variables.

These features are available only with the detailed plots generated by the PLOTDET sub-command, but *not* with GDDM graphics generated by the GRAPHDET command.

Summary Performance History Display

Summary history displays can be generated by the GRAPHSUM and PLOTSUM commands. They can be based either on data contained in the current redisplay buffer, or on data from a detailed '*yyyymmdd* HISTLOG*n*', '*mmddyy* PERFLOG*n*' or *mmddyy* RMONLOG*n*' file, or from one of the object's benchmark log files. Summary history displays allow plotting of the values of up to four redisplay variables for a period of up to 12 hours.

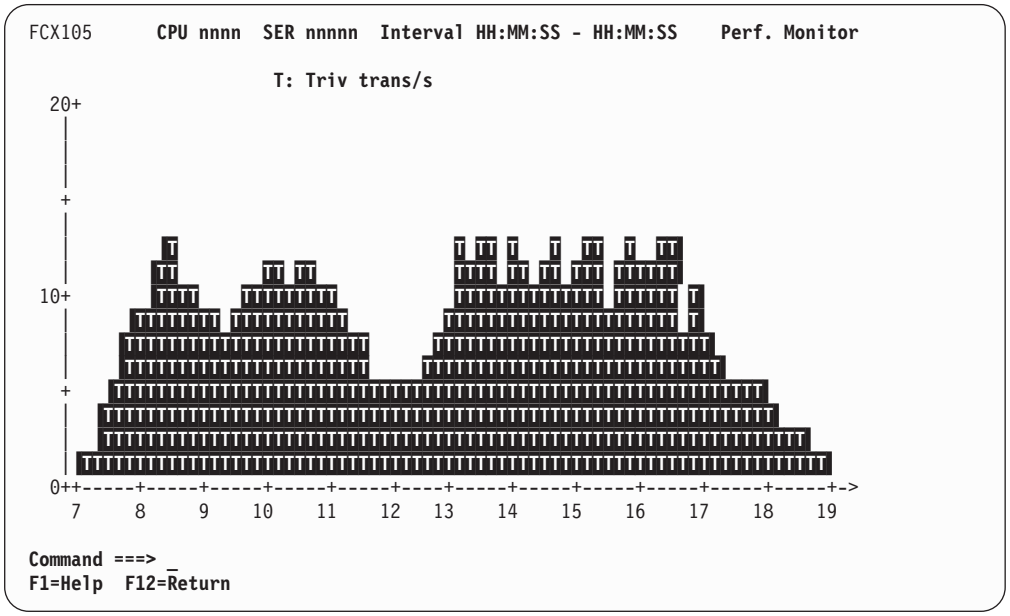

Figure 203. Summary performance history display using simple plot

The example above has been created using the command 'PLOTSUM TR/S CHAR T', i.e. the trivial transaction rate on the system has been plotted. A bar-chart type of plot has been created because only one variable was selected, and the character 'T' was used for plotting the variable as specified in the command. Since no 'FILE' argument has been included, data from the current redisplay buffer have been used as input.

Averages are calculated and plotted for each ten minute interval. Data from up to 12 hours can thus be shown in one plot.

See “GRAPHSUM / PLOTSUM” on page 184 for a detailed description of the GRAPHSUM command.

Performance Trend Display

Trend analysis graphics are based on performance history files 'ACUM HISTSUM' or 'ACUM PERFHIST'. Depending on the selected period, the average load for one day or for several days will be represented by a single plot position, thus allowing periods of several months or even years to be included in a single display. The resulting graphics can so show performance trends over long periods, and they are a good basis for capacity planning.

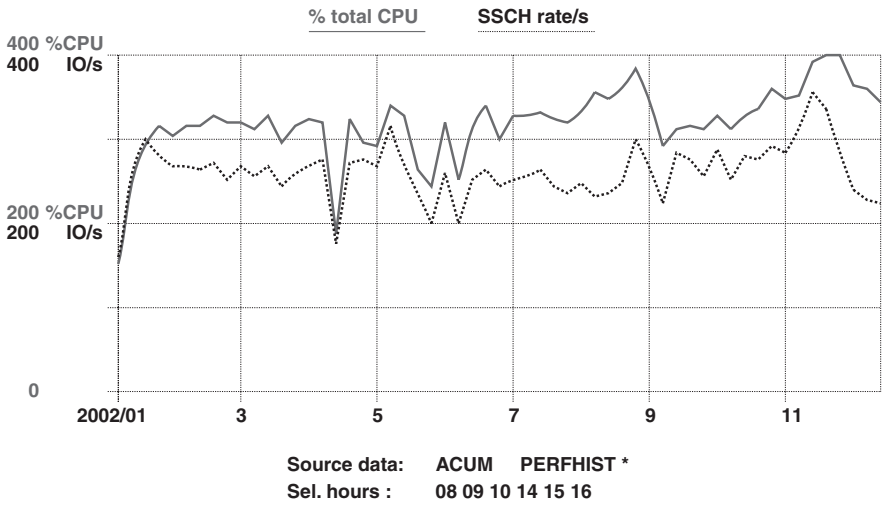

Figure 204. Layout of performance trend display (GDDM)

The above example has been created by entering the command 'GRAPHS CPU IO/S FI ACUM PERFHIST FR 010103 TO 122303 H 8 9 10 14 15 16', i.e. the trends for total CPU load and the I/O request rate have been plotted for the year 2003. The 'HOURS' selection has been added to make sure that the resulting graphics show the trends for heavily loaded periods of the day only (averages which include many hours of low activity are of little help for capacity planning).

Be careful and make sure you are really plotting the data you want:

- All days found within the selected period are going to contribute to our trend graphics. Suppress weekends by specifying the `DAYS` argument of the GRAPHSUM command, and delete other records for days with non-representative load (such as the public holidays of January 1/2 and Easter in the example), if necessary, before generating trend graphics which are to serve as a base for capacity planning.
- All hours for which data are available in any given day will contribute to this day's average unless you specify the 'HOURS' argument of the GRAPHSUM or PLOTSUM command. If your history file includes data from many hours with low activity, these will cause correspondingly low averages to be generated if you do not explicitely select peak hours.

See “GRAPHSUM / PLOTSUM” on page 184 for a detailed description of the GRAPHSUM command.

Daily Performance Profile

This type of display is based on history data from 'ACUM HISTSUM' or 'ACUM PERFHIST' summary files. Instead of using the data for analyzing trends in the average load per day as in the 'trend' type of display, you can also show the average load during each hour of the day within the selected period. The result is a performance 'profile' which illustrates how system load changes with each hour of an average day.

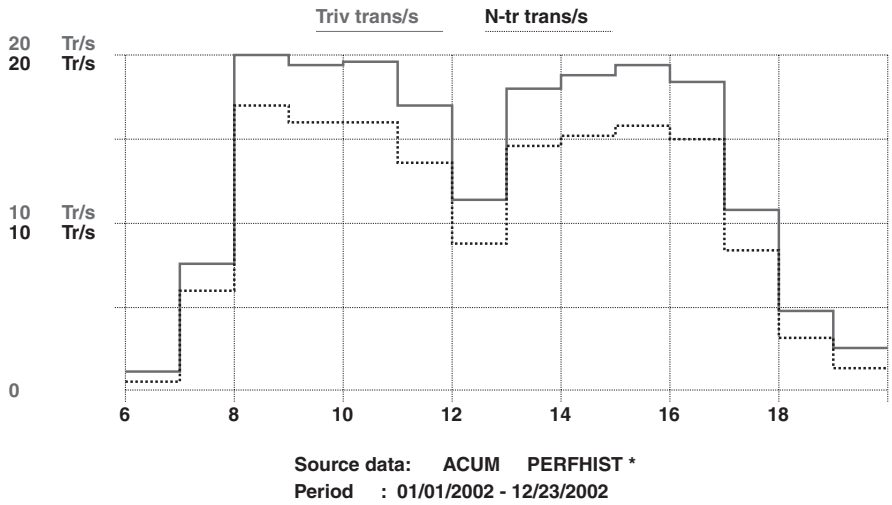

Figure 205. Layout of daily performance profile display (GDDM)

The example above has been created by the command 'GRAPHSUM TR/S NT/S FILE ACUM PERFHIST FROM 010103 TO 122303 PROFILE 6 19', i.e. the display shows the transaction rate for trivial and non-trivial transactions (UP and MP) on the system for the period of 06:00 to 19:59 of an average day of the year 2003 (these transaction rates are good indicators of user activity).

Warning:

All days found within the selected period are going to contribute to our average day's values, and this may include weekends and holidays. While you can exclude weekends by means of the 'DAYS' specification, you may have to check the source file and delete records for holidays with non-representative load before generating performance profiles.

The example above is based on the same data as the performance trend display on the preceding page.

See “GRAPHSUM / PLOTSUM” on page 184 for a detailed description of the GRAPHSUM command.

Variable Correlation Display

This display is similar to the history plots and graphics described on the preceding pages insofar as it also uses the data collected in the performance redisplay buffer, or in performance history files on disk, for creating a graphic image of the behavior of different performance indicators. However, while the (horizontal) x-coordinate is always a time scale for the history plots, any of the available performance variables can be chosen as the x-variable for a correlation plot. All other selected variables will then be inserted as y-variables on the vertical y-scale, based on the value of the x-variable in the same measurement interval.

The resulting plots show how the different variables depend on each other. They are, therefore, an excellent tool which can help you in analyzing performance bottlenecks on your current system, and they show trends which can tell you what to expect should the current average load increase.

Variable Correlation Display with Simple Plot

This screen will be shown after entering the 'PLOTVAR' sub-command. It allows plotting of the values of up to three redisplay variables on the vertical y-scale, depending on the corresponding values of the selected x-variable which will be plotted on the horizontal x-scale (see “GRAPHVAR / PLOTVAR” on page 189 for details).

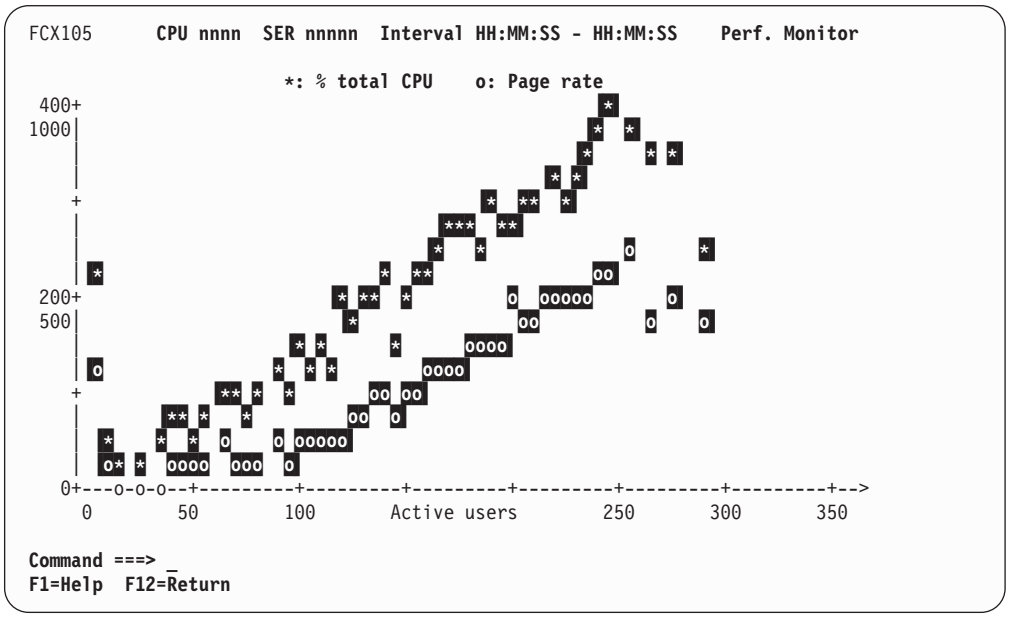

Figure 206. Layout of screen for variable correlation plots

The above example has been created by entering the command 'PLOTVAR ACT CPU PG/S', thus generating a plot with the x-variable 'ACT' and the y-variables 'CPU' and 'PG/S', i.e. the total CPU load and the page rate have been plotted based on the number of users which were active during the corresponding measurement intervals.

Plots based on the number of active users are particularly useful when planning for the future of systems where the main load is caused by a high number of similar users (e.g. CMS machines). Make sure they are based on a sufficiently high number of samples, and that they also contain samples taken during peak load. Today's activity level during peak load may be an example of tomorrow's average system activity, and the trends shown for the different performance variables can tell you what to expect when system load is increased.

Note: The number of users which were found to have been active (used some virtual CPU time) during a certain interval obviously depends on the length of this interval. Correlation plots based on the number of active users will yield meaningful results only if the same measurement interval was used for collecting all the data which are now used as input. Be careful expecially when doing correlation plots based on a summary HISTSUM or PERFHIST file, and make sure the same interval was used for the whole period which is to be analyzed.

Scales: All scales are automatically adapted, depending on the maximum values of the variables to be shown.

- The scale for the x-axis is selected depending on the maximum value of the x-variable. The corresponding figures, and the description of the variable, are inserted underneath the x-axis.
- The y-coordinate is used for plotting the values of the dependent y-variables. The scale is automatically adapted according to the same logic used for all other graphic displays.

If only a few x- or y-values are much higher than the remainder, such values may be ignored so as to allow displaying the bulk of the data in a better scale.

Where the resulting plots or graphics are not satisfactory because of an unsuitable x-scale, you can define the extent of the x-scale by means of the 'TRUNC' argument of the PLOTVAR or GRAPHVAR commands. See "GRAPHVAR / PLOTVAR" on page 189 for a detailed description of the two commands.

Variable Correlation Display Using GDDM Graphics

GDDM graphics will be shown when a variable correlation display is requested with the 'GRAPHVAR' command (requires access to GDDM libraries and a display terminal with graphics support). As for the 'PLOTVAR' command, up to three of any of the performance variables shown on the performance redisplay screen can be selected as y-variables whose values are to be plotted for the corresponding values of a selected x-variable. See "GRAPHVAR / PLOTVAR" on page 189 for a detailed description of the GRAPHVAR command.

The average values of the y-variables for each x-variable value are represented by the marker symbols which are also inserted in front of the variable description in the title line. In order to better show trends even where the y-values are widely scattered, averages are also calculated for each of the x-scale grid line values and, where possible, for one intermediate x-value. Where the resulting average carries sufficient weight, i.e. if it is based on a relatively high number of samples, these averages are interconnected using a polygon line.

Different colors and line types are used for the graphical representation of the selected variables, as indicated by the color and underline-type of the variable description in the title line.

When only one y-variable is selected you can also have 'scatter plot' type graphics generated by specifying the argument 'SCATTER'. *ALL* measurements will then be shown, in addition to the average values which are always displayed.

More on Graphics ...

While going through the preceding sections of this chapter, and thereby becoming an expert on the creation of performance graphics with Performance Toolkit, you may have wished for some additional features:

- Possibility to create graphics based on other than the original set of performance variables
- Possibility to generate 'cumulative' graphics, where the value of each y-variable is added to the sum of the preceding variables

The following paragraphs explain how to do this.

Definition of 'User Variables'

The `USERVAR` argument of the FCONTROL command has been added to allow definition of 'User Variables', whose value is derived from the original performance

variables in the REDISP screen or in the history files of Performance Toolkit according to some formula which you supply when defining the variable.

Once defined, such user variables can then be selected as input for performance graphics like the original performance variables which we referred to in the preceding sections. See “FCONTROL USERVAR” on page 96 for details on the 'FC USERVAR ...' command.

Generation of Cumulative Graphics

The CUMULAT argument of the GRAPHxxx and PLOTxxx commands allows creation of 'cumulative' graphics, where the position of each value on the Y-axis is determined by the *sum* of the values of the preceding Y-variables plus the value of the current Y-variable.

Just use the CUMULAT argument when you generate your graphics. The program will then

- translate the values to all use the same scale, and display only one scale value for all variables
- display the different y-values cumulatively, i.e. on top of each other
- insert the string 'Cumul.' over the Y-axis to indicate that cumulative values are being shown
- shade the areas between the different polygon lines which correspond to the variables' values in the same color as the the variables' lines.

Cumulative graphics can make sense only when *similar* variables are selected, i.e. variables whose values have the same units (e.g. percent, seconds, ...). However, Performance Toolkit will not prevent you from ignoring this basic rule, so you are free to create very pretty, but absolutely meaningless pictures ...

See “GRAPHDET / PLOTDET” on page 181, “GRAPHSUM / PLOTSUM” on page 184 and “GRAPHVAR / PLOTVAR” on page 189 for a detailed description of the GRAPHxxx and PLOTxxx commands.

Example of Cumulative Graphics with User Variables

The basic performance variables with CPU load information are

- CPU, the total CPU load in percent
- %CP, the total CP load in percent (user + system)
- %EM, the total emulation mode load, in percent
- %WT, the total wait time, in percent
- %SY, the total SYSTEM CP time in percent.

We would like to show all this information in the form of a cumulative graphic display, as history graphics for the first half of 2003. Unfortunately we cannot just specify all the variables, because some of them are already contained within others: CPU is the sum of %CP and %EM, so it is of no use for our current purpose, and %SY is already contained in %CP. We want to display the components

- %EM, the total emulation mode load
- %SY, the total SYSTEM CP time
- the total USER CP time
- %WT, the total wait time

where the sum of the first three variables will be the total CPU load (i.e. equal to the original CPU value), and the sum of all four variables should be a constant: the

totally available CPU power in percent. What is missing is the 'total user CP time', so we have to define the corresponding user variable for calculating it by the commands

```
FC USERVAR SET USERCP = %CP - %SY        (the formula)
FC USERVAR SET USERCP DESCR USER %CP     (the description)
FC USERVAR SET USERCP UNITS %CPU         (the units shown)
```

The desired graphics would then be created with the command

```
GRAPHSUM %EM USERCP %SY %WT FI ACUM PERFHIST FROM 010103 H 8 9 10 CUMUL
```

which results in the following display:

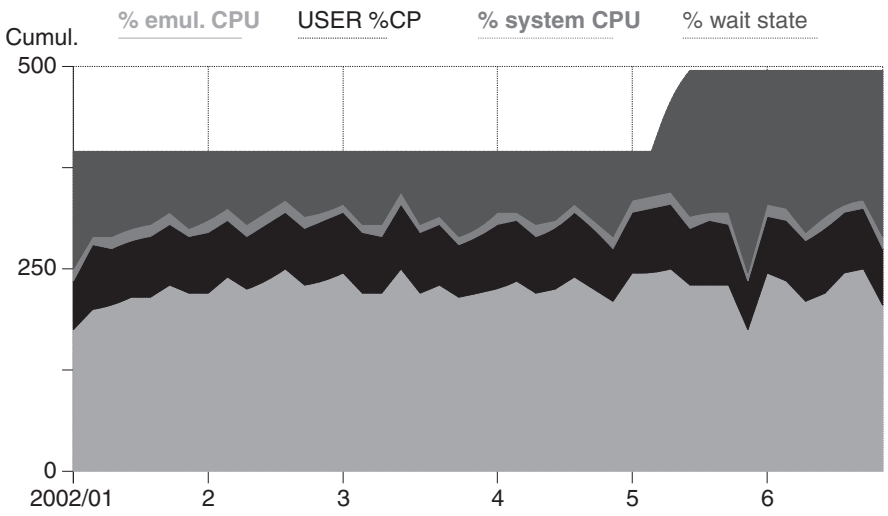

Figure 207. Layout of GDDM history data display in cumulative form

The sum of variables %EM (emulation time), USERCP (user CP time) and %SY (system CP time) is the total CPU load of the system. The wait time %WT has been added to show how much reserve power is left; in our example the result shows that a fifth processor has been added sometime in May 2003 (since averages are calculated for several days, we see two steps from a total of 400% to 500% instead of just one).

Appendix B. Numerical Analysis of Performance History Data

The performance history files 'ACUM HISTSUM' and 'ACUM PERFHIST' contain one record per hour with the averages of many general system performance variables for that hour, and the detailed history log files '*yyyymmdd* HISTLOG*n*' and '*mmddyy* PERFLOG*n*' contain detailed data for the same variables, with one record per monitor interval.

You have seen, in the preceding chapter Appendix A, "Graphical Displays of Performance History Data," on page 889, how the data in these history files can be analyzed graphically. Here you will find a description of the 'FCONXREP' procedure which is intended for numerical analysis of such history files.

All these files can also easily be read and analyzed by your own programs to produce special customized reports. The procedure 'FCONXREP', written in REXX, can then serve as an example on how to do that. See Appendix D, "HISTLOG/HISTSUM File Records," on page 917 for the exact format of the new extended history files if you intend to write your own analysis procedures.

Numerical Analysis Using FCONXREP Procedure

FCONXREP is a REXX procedure for analyzing summary performance history data files 'ACUM HISTSUM' and 'ACUM PERFHIST', and also the corresponding detailed history logs (HISTLOG and PERFLOG files). It can calculate averages for selected performance variables on an hourly, daily, monthly and yearly level for summary history files, or averages for smaller intervals for detailed history log files, and it will generate output files

- 'FCONXREP LISTING' with the output in table form, suitable for printing, and
- 'FCONXREP IMPORT' with an output format suitable for importing it into a PC application for further processing.

The procedure is not based on any of the components of the Performance Toolkit performance monitor, i.e. it can be executed from standard CMS, without first invoking Performance Toolkit. It can be called for either:

- interactive use, intended for cases where you want to create 'ad hoc' reports sporadically, or
- batch use, which allows you to let specific reports be created automatically (e.g. for the generation of monthly performance overview reports by a disconnected service machine).

Both methods are described here.

Interactive Use of FCONXREP Procedure

This is the default operating mode. Just call the procedure by entering this command:

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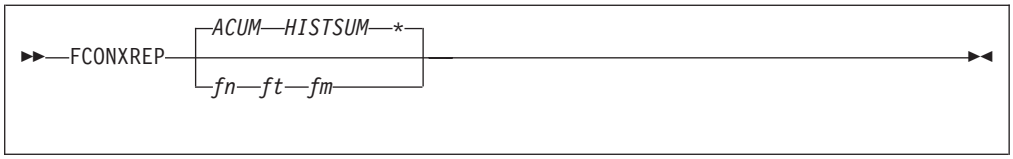


The following screen will be shown if a summary history file has been selected for input:

```
 FCX201          Perf. Toolkit Numerical Performance Analysis        Perf. Report

Period: Date       ==> 2003/01/01  to  2003/02/28   (YYYY/MM/DD)
        Time       ==> 08          to  17           (all hours in period)
        Sel. hours ==> __    __    __    __    __   (only selected hours)
                   ==> __    __    __    __    __
        Sel. days  ==> M-F_ ____ ____ ____ ____ ___ (only selected days)

Desired detail: HOURS  ==>  TOT      (ALL or TOT)
                DAYS   ==>  ALL      (ALL or TOT)
                MONTHS ==>  ALL      (ALL or TOT)

Variable selection ==> CPU           Total CPU load (all processors)
                   ==> PG/S          System page rate (reads & writes)
                   ==> C1ES          85% class 1 elapsed time slice
                   ==> TR/S          Trivial transactions executed per sec.
                   ==> NT/S          Non-triv. transact. executed per sec.
                   ==> ________
                   ==> ________
                   ==> ________

Processing file 'ACUM HISTSUM A1' (new SUM format)

F1=Help  F2=Browse  F3=Quit  F5=XEDIT  F10=Execute  F12=Return
```

Figure 208. Layout of FCONXREP Summary History Files Screen (FCX201)

The menu shown allows selection of a specific subset of the data contained in the history data file. You can specify:

- the time frame you are interested in,
- the amount of detail to be shown, and
- the performance variables for which you want averages to be calculated.

Selecting Date and Time for the Period to be Analyzed

The 'ACUM PERFHIST' file contains one record per hour of data collection, with the averages for each of the selectable performance values during that hour. Both the creation date and hour are contained in each history record, and they can be specified as key variables to specify the period for which performance data are to be analyzed.

Date the first and the last date of the period for which data are to be analyzed (format *yyyy/mm/dd*).

The period during each day for which performance data records are to be analyzed can be specified in *either* of the following two ways (not both):

Time the first and the last hour of each day within the period for which data are to be analyzed (format *hh*). Hours include all minutes within that hour, i.e. specify the hours '07' to '18' for a report of the period 07:00 to 18:59.

Sel. hours
all hours of each day for which data are to be analyzed (need not be

consecutive, format *hh*). This selection would typically be used for specifying some hours with peak load (e.g. '09', '10', '14' and '15'). Enter only selected hours *or* start and end times for a range of hours, *not both*.

Sel. days
the weekdays for which data are to be analyzed (MON TUE WED THU FRI SAT SUN, ALL or M-F are accepted values). Specifying weekdays is important especially if the history file includes data for weekends that should be omitted from the analysis.

Selecting the Amount of Detail to be Shown

Since data for each hour within the selected period are available, the output could show performance information split down to a certain hour's performance on a specific day. More general information will usually be desired, however, so one must be able to specify how much detail is to be shown. This is what the 'Hour', 'Day' and 'Month' specifications are for. Accepted values are 'ALL' and 'TOT', meaning

HOURS
`ALL`: generates one output line for each hour of each day within the selected period

`TOT`: suppresses generation of hourly data

DAYS
`ALL`: generates one output line for each day, with the average values of all selected hours of that day

`TOT`: suppresses generation of daily data

MONTHS
`ALL`: generates one output line for each month, with the average values of all days of the selected period within that month

`TOT`: suppresses generation of monthly data

A selection of 'TOT' on a daily or monthly level is not accepted if a selection of 'ALL' is made on a lower (more detailed) level.

Summaries for each year, and a line with the overall average for the whole of the selected period, will always be included, regardless of the above specifications.

Selecting Performance Variables

Up to eight performance variables can be chosen. What performance variables are selectable depends on the input file. See “REDHIST” on page 259 for a list of the performance variables available with the new extended history log files, or “REDISP” on page 260 for the variables contained in the old PERFLOG and PERFHIST files. When specifying one of the two-word 'user extremes' variables such as 'MAX. CPU', the separating blank must be replaced by an underscore character.

Using FCONXREP with a Detailed History Log

When a detailed history log file is specified as input with the FCONXREP command, the following screen layout will be shown:

```
 FCX201          Perf. Toolkit Numerical Performance Analysis        Perf. Report

Processing a detailed history log file for a single day. Please specify the
period to be analyzed, the interval to be used for calculating subtotals,
and the variables that should be included in the report.


Start and end time ==> 06:01 to 09:00 (hh Interval (minutes) ==> 20 (Range 1-120 minutes)

Variable selection ==> CPU           Total CPU load (all processors)
                   ==> PG/S          System page rate (reads & writes)
                   ==> C1ES          85% class 1 elapsed time slice
                   ==> TR/S          Trivial transactions executed per sec.
                   ==> NT/S          Non-triv. transact. executed per sec.
                   ==> ________
                   ==> ________
                   ==> ________

Processing file '20030214 HISTLOG2 B1' (new LOG format)

F1=Help  F2=Browse  F3=Quit  F5=XEDIT  F10=Execute  F12=Return
```

Figure 209. Layout of FCONXREP screen for detailed history files

The screen layout is different from the one shown for summary files, adapted to the needs for analyzing a detailed log file.

Selecting Period and Interval

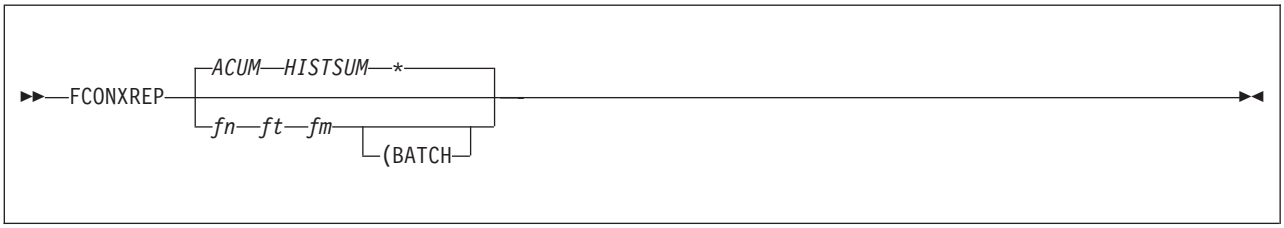
The detailed history logs contain one record per monitor interval, with the load values for that interval. For the analysis you have to specify

- the `Start and end time` of the period that should be analyzed, and
- the `Interval` length, in minutes, for which sub-averages are to be calculated. The interval should be chosen as a multiple of the monitor interval used in the creation of the input file.

No date or weekday selection are possible since one such detailed log file contains data for a single day only.

Batch Use of FCONXREP Procedure

The FCONXREP procedure can be invoked in batch mode by entering the command



Since the idea is to let the procedure run without user interference, you have to provide the selection criteria (e.g. start date/time, end date/time, and performance variables to be reported) in machine readable form. The procedure expects all of this information to be contained in file FCONXREP SETTINGS, on any of the accessed disks. The following is an example for the FCONXREP SETTINGS file, with specifications corresponding exactly to what was shown in the previous example for the interactive selection menu of the procedure.

```
*** Start and End Date (YYYY/MM/DD)

 SDATE 2003/01/01
 EDATE 2003/02/28

*** Start and end hour (HH for summary file, HH *STIME 07:01 *ETIME 19:00

*** Specific weekdays  (MON, TUE, WED, THU, FRI, SAT, SUN, or
***                      M-F  for all working days Monday-Friday, or
***                      ALL  for all days of the week

 WEEKDAYS M-F

*** Selected hours (HH, up to 10 hours in a day can be defined)
*** If you define SELHOURS then start and end hours (STIME and
*** ETIME) will be ignored for processing

*SELHOURS 01 03 07 09 21

*** Hours Days Months (ALL or TOT), valid for summary files only

 HOURS  TOT
 DAYS   ALL
 MONTHS ALL

*** Reporting interval in minutes, valid for detailed logs only

*INTERVAL 15

*** Performance Variables; up to 8 variables can be defined for selection

 PERFVARS CPU PG/S C1ES TR/S NT/S

***  END of Input file
```

A sample file FCONXREP SETTINGS is supplied with the program. The above is not an exact copy, some comment lines have been removed.

Explanation of keywords:

The required input is exactly the same as for the interactive menu; it is only explained in abbreviated form here. Refer to the descriptions for the interactive use of the program for more detail.

SDATE
: The first date for which performance data are to be analyzed (format *yyyy/mm/dd*). The argument is valid for processing of summary history files only.

EDATE
: The last date for which performance data are to be analyzed (format *yyyy/mm/dd*). The argument is valid for processing of summary history files only.

WEEKDAYS
: The days of the week for which summary performance data are to be analyzed. Valid day specifications are the strings MON TUE WED THU FRI SAT SUN for single days, ALL for all days and M-F for all working days from Monday to Friday. The argument is valid for processing of summary history files only.

STIME
: The first hour of each day for which performance data are to be analyzed

(format *hh*) for summary files, or the start time in hours and minutes (format *hh:mm*) for detailed history logs.

ETIME
The last hour of each day for which performance data are to be analyzed (format *hh*) for summary files, or the end time in hours and minutes (format *hh:mm*) for detailed history logs.

INTERVAL
The time interval in minutes for which sub-averages are to be calculated and printed. The argument is valid for processing detailed history logs only.

SELHOURS
All hours of each day for which data are to be analyzed (need not be consecutive, entered as up to 10 hours in format *hh*). The argument is valid for processing of summary history files only.

You can only specify STIME/ETIME values ***or*** SELHOURS values, not both.

HOURS
Set to either `ALL` (values for each hour to be shown) or `TOT` (suppress generation of hourly data)

DAYS
Set to either `ALL` (values for each day to be shown) or `TOT` (suppress generation of daily data)

MONTHS
Set to either `ALL` (values for each month to be shown) or `TOT` (suppress generation of monthly data)

A selection of 'TOT' on a daily or monthly level is not valid if a selection of 'ALL' is made on a lower (more detailed) level. The HOURS, DAYS and MONTHS arguments are valid for processing of summary history files only.

PERFVARS
Specify up to eight performance variable names, out of the list given earlier in this section.

Example Output

The table with the averages for the selected variables will be written to disk in output file 'FCONXREP LISTING' and, in different format, also in file 'FCONXREP IMPORT', regardless of whether the procedure is used interactively or in batch mode. The examples shown on the following page are the output created with the data selection made in the sample FCONXREP menu shown in Figure 208 on page 906, or in the sample FCONXREP SETTINGS file, i.e. for

- the two months of January and February 2003
- the period from 8:00h to 17:59h of each day (prime shift)
- 'HOURS = TOT', 'DAY = ALL' and 'MONTH = ALL', i.e. hourly details are suppressed, but we can see each day's and month's average load, in addition to the yearly and the overall average which will always be shown.
- the performance variables

  CPU total CPU load

  PG/S total system page rate

C1ES 85% class 1 elapsed time slice (internal response time)

TR/S the average trivial transaction rate, and

NT/S the average non-trivial transaction rate.

```
PERFKIT Statistics for Period 2003/01/01 to 2003/02/28, Hours 8  to 17
------------------------------------------------------------------------

+----------------+-----------------------------------------------------+
| Year Mon Day Hr |       CPU      PG/S      C1ES      TR/S      NT/S |
+----------------+-----------------------------------------------------+
|          01    |         8         0      0.20       0.1       0.0 |
|          02    |        13         0      0.29       0.3       0.0 |
|          03    |       352       373      0.89       9.6       7.7 |
|          04    |       271       296      0.83       8.4       6.7 |
|          05    |       363       341      0.95       9.4       7.4 |
|          08    |       323       425      0.93       9.9       7.8 |
|          09    |       330       306      0.94       8.6       6.8 |
|          ..    |       ...       ...      ....       ...       ... |
|          ..    |       ...       ...      ....       ...       ... |
|          24    |       346       402      0.95       9.3       7.3 |
|          25    |       323       407      0.97       9.5       7.6 |
|          26    |       263       366      0.87       9.2       7.5 |
|          29    |       274       364      0.86       9.7       7.8 |
|          30    |       251       333      0.89       9.0       7.3 |
|          31    |       242       335      0.86       8.9       7.3 |
| 2003 Jan TOT   |       280       338      0.87       8.4       6.7 |
|                |                                    300054    239602 |
|                |                                                     |
|          01    |       265       359      0.88       8.7       6.9 |
|          02    |       281       403      0.92       9.4       7.7 |
|          05    |       267       425      0.93       9.6       7.8 |
|          06    |       284       372      0.90       9.2       7.7 |
|          07    |       266       339      0.88       9.0       7.4 |
|          08    |       281       313      0.89       8.6       7.0 |
|          ..    |       ...       ...      ....       ...       ... |
|          ..    |       ...       ...      ....       ...       ... |
|          21    |       277       339      0.86       9.6       7.5 |
|          22    |       330       306      0.89       9.0       7.1 |
|          23    |       245       349      0.86       9.6       7.8 |
|          26    |       327       442      0.96      10.0       8.4 |
|          27    |       328       377      1.04       9.8       8.1 |
|          28    |       267       305      0.95       8.7       7.2 |
| 2003 Feb TOT   |       278       348      0.89       9.3       7.5 |
|                |                                    334088    268635 |
|                |                                                     |
| 2003 TOT       |       279       343      0.88       8.8       7.1 |
|                |                                                     |
| Total          |       279       343      0.88       8.8       7.1 |
+----------------+-----------------------------------------------------+
```

Figure 210. Example of 'FCONXREP' output (file FCONXREP LISTING)

The following is the FCONXREP IMPORT file which corresponds to the FCONXREP LISTING file on the preceding page.

```
" Year Mon Day " "      CPU " "     PG/S " "     C1ES "  ...
" 2003 Jan 01  " "        8 " "        0 " "     0.20 "  ...
" 2003 Jan 02  " "       13 " "        0 " "     0.29 "  ...
" 2003 Jan 03  " "      352 " "      373 " "     0.89 "  ...
" 2003 Jan 04  " "      271 " "      296 " "     0.83 "  ...
" 2003 Jan 05  " "      363 " "      341 " "     0.95 "  ...
" 2003 Jan 08  " "      323 " "      425 " "     0.93 "  ...
" 2003 Jan 09  " "      330 " "      306 " "     0.94 "  ...
  .... ... ..           ...          ...         ....    ...
  .... ... ..           ...          ...         ....    ...
```

```
" 2003 Jan 24  " "      346 " "      402 " "     0.95 "  ...
" 2003 Jan 25  " "      323 " "      407 " "     0.97 "  ...
" 2003 Jan 26  " "      263 " "      366 " "     0.87 "  ...
" 2003 Jan 29  " "      274 " "      364 " "     0.86 "  ...
" 2003 Jan 30  " "      251 " "      333 " "     0.89 "  ...
" 2003 Jan 31  " "      242 " "      335 " "     0.86 "  ...
" 2003 Feb 01  " "      265 " "      359 " "     0.88 "  ...
" 2003 Feb 02  " "      281 " "      403 " "     0.92 "  ...
" 2003 Feb 05  " "      267 " "      425 " "     0.93 "  ...
" 2003 Feb 06  " "      284 " "      372 " "     0.90 "  ...
" 2003 Feb 07  " "      266 " "      339 " "     0.88 "  ...
" 2003 Feb 08  " "      281 " "      313 " "     0.89 "  ...
  .... ... ..           ...          ...         ....    ...
  .... ... ..           ...          ...         ....    ...
" 2003 Feb 21  " "      277 " "      339 " "     0.86 "  ...
" 2003 Feb 22  " "      330 " "      306 " "     0.89 "  ...
" 2003 Feb 23  " "      245 " "      349 " "     0.86 "  ...
" 2003 Feb 26  " "      327 " "      442 " "     0.96 "  ...
" 2003 Feb 27  " "      328 " "      377 " "     1.04 "  ...
" 2003 Feb 28  " "      267 " "      305 " "     0.95 "  ...
```

Note that only the records with the most detailed data are shown (daily averages, in this case), while the higher averages are omitted.

Appendix C. Printed Reports

While the format of the actual performance data on printed reports is identical to the format shown on display terminals, some special header lines and a table of contents will precede the performance information.

Table of contents for printed reports

A table of contents is automatically created whenever multiple reports are printed with a PRINT ALL command. The table of contents will precede all of the actual performance data reports; its creation cannot be suppressed.

The following is an example for a table of contents:

```
FCXTOC  Run 2003/04/03 16:30:57         Table of Contents                                                    Page    i
                                        Performance Toolkit Reports in Order of Appearance
From 2003/04/03 19:04:19                                                                          CHVM4
To   2003/04/04 16:30:55                                                                          CPU 3090      SN  11619
For  77196 Secs 21:26:36                Performance reports for test system CHVM4                 z/VM V.n.n.n  SLU 9401
_____________________________________________________________________________________________________________________
Rpt ID   Report Description                                 Page    From Date/Time          To Date/Time
FCX100   General CPU Load and User Transactions                1    2003/04/04 13:29:55  -  2003/04/04 16:30:55
FCX126   Logical Partition Activity                            2    2003/04/04 13:29:55  -  2003/04/04 16:30:55
FCX155   Count and Size of Processed Monitor Records           3    2003/04/04 13:30:55  -  2003/04/04 16:30:55
FCX149   Monitor Settings: Initial and Changed                 5    2003/04/03 19:04:19  -  2003/04/04 16:30:55
FCX154   System Scheduler Settings, Initial and Changed        6    2003/04/03 19:04:19  -  2003/04/04 16:30:55
FCX130   Overall Resource Usage per Transaction Statistic     7    2003/04/04 13:30:54  -  2003/04/04 16:30:55
FCX111   Load and Performance for Cached Disks                9    2003/04/04 13:29:55  -  2003/04/04 16:30:55
FCX177   Cache Extended Functions Performance                10    2003/04/04 13:29:55  -  2003/04/04 16:30:55
FCX107   Channel Load and Channel Busy Distribution          11    2003/04/04 13:30:55  -  2003/04/04 16:30:55
FCX176   Cached Control Units Overall Performance           12    2003/04/04 13:29:55  -  2003/04/04 16:30:55
FCX108   General I/O Device Load and Performance             13    2003/04/04 13:29:55  -  2003/04/04 16:30:55
FCX109   Load and Performance of CP Owned Disks              14    2003/04/04 13:29:55  -  2003/04/04 16:30:55
 ....    ...
 ....    ...
```

Figure 211. Layout of print file table of contents

It lists the reports in the order in which they are appended, which is equal to the order in which they were specified in the FCONX REPORTS file.

Field description:

General header lines: See "Layout of print file header:" on page 914 for their description.

Table of contents:

Rpt ID
The internal report identification, equal to the report ID on the header of the report.

Report Description
The report description, equal to the description on the header part of the report, except that it will be truncated to a maximum length of 48 characters.

Page The number of the first page of the report.

From Date/Time
The date and time of the first monitor sample which contributed to the data included in the report.

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To Date/Time
The date and time of the last monitor sample which contributed to the data included in the report.

Layout of print file header:

All print output is created with a common header which precedes the actual performance data. You can define the contents of two of the header fields; the remainder is generated automatically when building the print output. The following is an example for a print file header:

```
FCXnnn  Run yyyy/mm/dd hh:mm:ss         reportname                              Page    n
                                        report description
From yyyy/mm/dd hh:mm:ss                                                        systemid
To   yyyy/mm/dd hh:mm:ss                                                        CPU nnnn      SN  nnnnn
For   nnnn Secs hh:mm:ss                system description                      z/VM V.n.n.n  SLU nnnn
_______________________________________________________________________________________________

 ... ... ... ... ... ....
 ... Performance data ...
 ... ... ... ... ... ....
```

Figure 212. Layout of print file header

Field description:

FCXnnn Run yyyy/mm/dd hh:mm:ss
The first item is the internal report identification, and the Run information provides the date and time when the performance analysis run was made.

From yyyy/mm/dd hh:mm:ss
This is the date and time of the first monitor sample which contributed to the data included in the report.

To   yyyy/mm/dd hh:mm:ss
This is the date and time of the last monitor sample which contributed to the data included in the report.

For   nnnn Secs hh:mm:ss
This is the length of the report period, in seconds and in hours/minutes/seconds.

reportname
This is the short report name, equal to the command used for selecting it.

report description
This is a more detailed description of the data contained in the report.

system description
This is a field for user data, intended to describe the system where the analyzed monitor data come from. It can be set using the command 'FC SETTINGS SYSTEM ...'; see “FCONTROL SETTINGS” on page 84 for details.

systemid
This is a short system identification. It is intended to contain the system identification or the RSCS nodeid of the system where the analyzed monitor data come from. The field can be set using the command 'FC SETTINGS SYSTEMID ...'; see “FCONTROL SETTINGS” on page 84 for details. The system-ID of the VM system which provided the monitor data will be inserted if the user does not specify something else.

CPU nnnn SN nnnnn
These fields provide the CPU model and serial numbers of the VM system whose data were processed.

z/VM V.n.n.n SLU nnnn
These fields describe the CP software level of the VM system which provided the data.

Appendix D. HISTLOG/HISTSUM File Records

The record layout of HISTLOG and HISTSUM files is described by HISTSECT DSECT. It is defined in COPY files in FCXGPI MACLIB, which is available on the Performance Toolkit production minidisk.

Usage Notes:

1. Short floating point format (E) is used storing the values of all performance variables. A value of X'FFFFFFFF' indicates that the corresponding value was not available, or could not be calculated because the calculation would have resulted in a division by zero. *Always test for a string of X'FFFFFFFF' before interpreting a value as valid data.*
2. When using these variable names in commands – for example FCONTROL LIMIT – if you wish to use a variable that begins with the pound character (#), which would otherwise be interpreted as the logical line end character, you must precede that character with the logical escape character (double quote, "). For example, for the variable `#CPU`, you must specify `"#CPU`.

   Note that these characters *cannot* be used when accessing Perfkit remotely. For more information, see the "Logical Line End and Escape Characters" section of the "General System Operation" chapter in the *z/VM: Performance Toolkit Guide*.

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Appendix E. Extended Trend File Records

The following trend records can be created by Performance Toolkit, subject to specifications in file FCONX TRENDREC and the availability of the prerequisite monitor data.

<Record Number> Toolkit	Contents	Selection
X'FC00'	System configuration data	--
X'FC01'	General system load data	--
X'FC02'	Processor load data	--
X'FC03'	LPAR load data	--
X'FC04'	Minidisk / fulltrack cache data	--
X'FC05'	CP services activity data	--
X'FC06'	Channel busy (HF sampling)	CHANNEL
X'FC07'	Channel measurment facility data	CHANNEL
X'FC08'	Extended channel measurement facility data	CHANNEL
X'FC09'	System spin lock data	--
X'FC0A'	Privileged instructions counters	PRIVOPS
X'FC0B'	DIAGNOSE instructions counters	DIAGS
X'FC0C'	ISFC End Point configuration	--
X'FC0D'	ISFC Logical Link configuration	--
X'FC0E'	ISFC End Point Activity	--
X'FC0F'	ISFC Logical Link Activty	--
X'FC3A'	Overall user transaction & response time data	--
X'FC3C'	Shared segments data	NSS
X'FC3E'	Shared data spaces data	DSPACES
X'FC41'	User resource usage & wait states data	USER
X'FC42'	User class resource usage & wait states data	--
X'FC43'	Overall user resource usage & wait states data	--
X'FC44'	User transaction & response time data	USER
X'FC45'	User class transaction & response time data	--
X'FC46'	Overall user transaction & response time data	--
X'FC51'	I/O processor activity data	--
X'FC55'	VSWITCH activity data	VSWITCH
X'FC56'	VNIC activity data	VNIC
X'FC61'	General DASD data	DASD
X'FC65'	DASD cache data	DASD
X'FC68'	DASD CP owned data (system areas)	DASD
X'FC6D'	QDIO device data	QDIO
X'FC6F'	SCSI device data	SCSI
X'FC71'	DASD seeks data	SEEKS
X'FCA2'	SFS and BFS server data	SFS
X'FCA4'	Multitasking users data	MTUSER
X'FCA6'	TCP/IP server data	TCPIP
X'FCA7'	TCP/IP links data	TCPIP
X'FCA8'	Reusable server kernel summary data	RSK
X'FCA9'	Linux internal summary data	LINUX
X'FCB1'	SSI configuration	--
X'FCB2'	SSI State Change Synchronization Activity and State/Mode information	--

In the "Selection" field, a "--" denotes those records dealing with general system performance data. They are always created (provided the prerequisite monitor domains were enabled) and need not be explicitly specified. The remaining records will be created only if the corresponding selection fields are specified on the RECORDS statement in the FCONX TRENDREC and FCONX SUMREC control files. See the "Creating Extended Summary and Trend Files" section in the "Operation in Performance Monitor Mode" chapter in the *z/VM: Performance Toolkit Guide* for more information.

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The layout of these trend file records is described by a number of assembler DSECTs:

- TRNDRHDR DSECT for the common record header format
- HIS*xx*SCT DSECT for the actual data area, where the *xx* part corresponds to the second half of the hexadecimal record number; the first byte of Performance Toolkit trend record numbers is always X'FC'.

These DSECTs are defined in COPY files in FCXGPI MACLIB, which is available on the Performance Toolkit production minidisk.

Format of Physical Records

Trend records are accumulated and written as physical 4kB blocks, where the first record in the first block of each set of trend records for a new period is record X'FC00'. The remaining records are directly appended, i.e. you find the start of the following logical record by adding the length of the first (or current) record to its start address. Records are not spanned, i.e. where a record does not fit into the remaining space of a 4k block it will be written as the first record in a new block. The remainder of the block is cleared to X'00', i.e. you will have to read the next block and continue processing there if the offset to the start of the next record is 4096 or if you find a 'record' with a length of 0, and a record number of X'0000'.

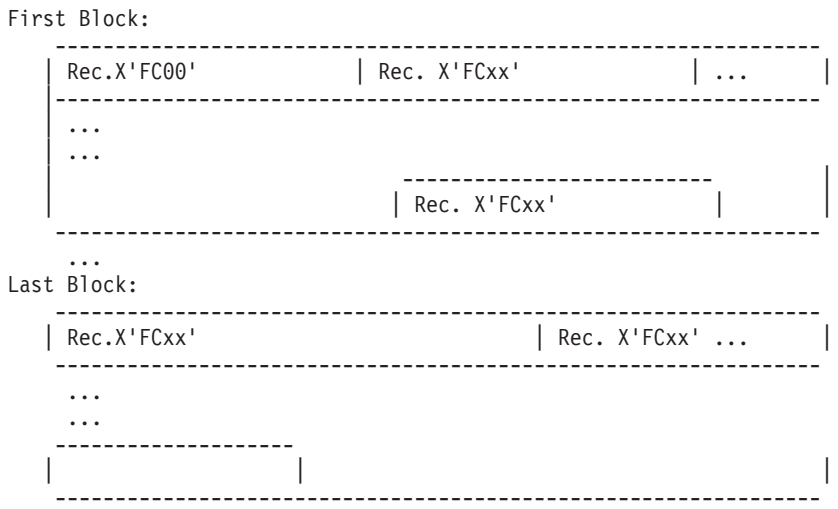

Figure 213. Trend file layout

Appendix F. Extended Summary File Records

The summary file is intended for use as input to some other program, such as SLR. It contains only data for one single 'summary' period, and its records are written as separate variable length records to facilitate processing by other programs.

Similar to trend files, summary file creation is controlled by means of the 'FC MONCOLL RESET' command which allows you to define 'summary' periods that are independent of 'trend' and other periods. See the “Creating Extended Summary and Trend Files” and “Resetting Performance Data/Defining Periods” sections in the “Using Performance Toolkit in Performance Monitor Mode” chapter of the *z/VM: Performance Toolkit Guide* for the corresponding guidelines.

Summary Record Headers

To allow easier processing, a different record header is used that contains the system identification and CPUID of the originating VM system.

SUMRHDR DSECT describes the layout of summary record headers. It is defined in COPY files in FCXGPI MACLIB, which is available on the Performance Toolkit production minidisk.

The actual data part after the header is identical in layout to one of the corresponding trend records. Please note, however, that due to the longer record header you will have to add 16 (X'10') to the field offsets in order to obtain the correct displacement of a field in a summary record.

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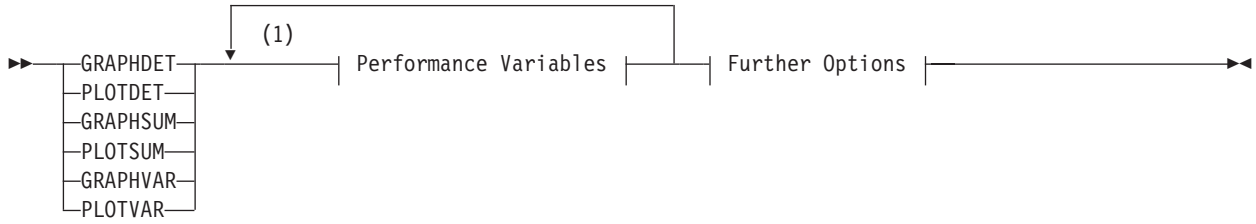
Appendix G. Trend File Variables Selection

This appendix lists the performance variables that can be selected for the creation of graphics from trend records. All of the variables listed are fields from a performance display. Since Performance Toolkit trend records only include data required for building the performance displays that could have been viewed based on the original monitor data, this covers most of the meaningful data that can be extracted from Performance Toolkit trend files.

The selectable variable names are listed in separate sections, under the heading of the trend record number on which they are based. Note that all of the syntax diagrams in this appendix are just fragments, to be used for specifying the composite trend variable selection arguments in lieu of the simple single strings documented for the original PLOTxxx and GRAPHxxx commands (see "GRAPHDET / PLOTDET" on page 181, "GRAPHSUM / PLOTSUM" on page 184, and "GRAPHVAR / PLOTVAR" on page 189). The complete graphics selection command would therefore look as follows:



Performance Variables:

Notes:

1 For GRAPHDET/PLOTDET and GRAPHSUM/PLOTSUM, one to four y-var arguments are defined. For GRAPHVAR/PLOTVAR, one x-var argument and one to three y-var arguments are defined.

2 This is the general format for the performance variables. See the specific section for each trend file record.

where

display(
: is the name of the performance display that shows the variable. The following left parenthesis *must* be directly appended, without any intervening blanks.

selector
: is a further selector that is required for all record types where multiple similar records can be created, for instance a

  - processor number
  - channel path ID

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- user identification
- device number

varname
: is the variable name. Wherever possible the variable name is chosen to be identical to the string shown in the lowest one of the header lines describing the variable, similar to the logic used for defining SORT arguments.

  Where this logic could not be adhered to because the string is not unique on the display, new names have been defined and included with the affected variable description.

The selection format appropriate for specific trend file records, i.e. the specific 'selector' format to be used, is described at the beginning of the actual variable description section for each trend record.

Performance Variables of Trend Records X'FC01'

Trend record X'FC01' contains overall system utilization and performance data.

The selection format for record 01 variables is:

```
├──SYSTEM(─varname─)──────────────────────────────────────────────────────────────┤
```

where:

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Where possible, the same names have been chosen as for the equivalent variables defined for HISTLOG and HISTSUM files, i.e. they usually *do not* correspond directly to part of the header line of a performance display. Their description also includes the formula used to calculate the values from the original trend record data fields.

Not all of the data needed for calculating the old HISTLOG variables ended up in trend record X'FC01'. In order to simplify the migration to using the new trend file for capacitiy planning and trend analysis, the program has been set up to accept some of these old variables also when the prerequisite data comes from some other trend record. This is true at least in cases where the selection would have become more complex, otherwise, because some additional argument would have had to be entered (e.g. processor number).

Display	Variable Name	Variable Description and Derivation
General Sample Collect Information		
SYSTEM	EL_TIME	Total elapsed time covered by trend record (TRNDRELT)
	SAMPLES	Number of CP monitor samples covered by trend record (to be used for dividing totals in order to obtain average values) (TRNDRSMP)
CPU Load Fields		
All values are based on processor trend records X'FC02'. Values are calculated by processor, and the total of the values for all processors is returned. CPU load percentages can thus reach a value of 100 times the number of processors.		
SYSTEM	#CPU	Number of processors (TRNDRSMP / TRNDRSMP) (adding one per HIS02SCT record)

Display	Variable Name	Variable Description and Derivation
	CPU	Total CPU load, in percent ((H02USTIM+H02SYTIM) * 100 / TRNDRELT)
	%US	User CPU utilization, in percent (H02USTIM * 100 / TRNDRELT)
	%CP	CP CPU utilization, in percent ((H02USTIM+H02SYTIM-H02EMTIM) * 100 / TRNDRELT)
	%EM	Emulation CPU utilization, in percent (H02EMTIM * 100 / TRNDRELT)
	%SY	System CPU utilization, in percent (H02SYTIM * 100 / TRNDRELT)
	%SPIN	CPU spin utilization, in percent (H02SPIN * 100 / TRNDRELT)
	%WT	CPU voluntary wait, in percent (H02WAIT * 100 / TRNDRELT)
	%LOGLD	Logical CPU load, in percent (based on CPU active and voluntary wait time, but excluding any suspended time when running 2nd level or in an LPAR) ((H02USTIM+H02SYTIM) * 100 / (H02USTIM+H02SYTIM+H02WAIT))
	%VEC	Total vector utilization, in percent ((H02VFTIM+H02VOTIM) * 100 / TRNDRELT)
	%VEM	Vector emulation load, in percent (H02VFTIM * 100 / TRNDRELT)
	VECLD	Vector load rate, per second (H02VFLOD / TRNDRELT)
	PRIV	Privileged instruction simulation rate per sec. (H02PRVCT / TRNDRELT)
	DIAG	Diagnose instruction execution rate per sec. (H02DIACT / TRNDRELT)
	SIGP	SIGP Ext Call receipt rate, per second (H02SIGCT / TRNDRSMP)
	IO/S	SSCH and RSCH rate per second ((H02SSCH+H02RSCH) / TRNDRSMP)
	%EMPT	Percent of time PLDV found empty (H02EMPTY * 100 / H02HFSMP)

Display	Variable Name	Variable Description and Derivation
	#USRS	Mean VMDBKs in PLDV while not empty (H02VMDBK / (H02HFSMP-H02EMPTY))
	#MAST	Mean VMDBKs in master processor PLDV (H02MASTR / H02HFSMP)
	VMSTL	VMDBKs stolen from processor, per second (H02VMSTO / TRNDRELT)
	TOMAST	VMDBKs moved to master proc. per second (H02VMMAS / TRNDRELT)
	AVEMP	Seconds between available list empty (TRNDRELT / (sum of H02AVEMP))

Display	Variable Name	Variable Description and Derivation

General System Activity

Where values are based on processor trend records X'FC02', these values are calculated by processor, and the total of the values for all processors is returned.

SYSTEM	DSPTCH	New users dispatched rate, per second (H02LNGDS / TRNDRELT)
	SIE	SIE instruction rate, per second (H02SIE / TRNDRELT)
	SIEIC	SIE intercept rate, per second (H02SIEIC / TRNDRELT)
	PGFLT	Host page fault rate, per second (H02PGFLT / TRNDRELT)
	FPSIM	Fastpath instruction simulation rate/s (H02FPSIM / TRNDRELT)
	SPRDS	Spool I/O rate: reads per second (H02SPRDS / TRNDRELT)
	SPWRT	Spool I/O rate: writes per second (H02SPWRT / TRNDRELT)
	CSCH	Clear subchannel rate, per second (H02CSCH / TRNDRELT)
	HSCH	Halt subchannel rate, per second (H02HSCH / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	EXTINT	
		External interrupts rate, per second (H02EXTIT / TRNDRELT)
	SOLINT	
		Solicited interrupts rate, per second (H02SOLIT / TRNDRELT)
	UNSOLI	
		Unsolicited interrupts rate, per second (H02USLIT / TRNDRELT)
	LOGN	
		Average users logged on (H01UCLOG)
	ACT	
		Average users active in monitor interval (H01UCACT)
	VIO/S	
		Virtual I/O rate, per second (H01UCVIO)

Central Storage Variables

SYSTEM	PPAG	
		Number of pageable frames in the DPA ((H01PGBL-H01NPAG+H01PGBL2) / TRNDRSMP)
	PPAG<2G	
		Number of pageable frames below the 2GB line ((H01PGBL-H01NPAG) / TRNDRSMP)
	PPAG>2G	
		Number of pageable frames above the 2GB line (H01PGBL2 / TRNDRSMP)
	NONPAG	
		Number of non-pageable DPA pages below 2GB line (H01NPAG / TRNDRSMP)
	%ST	
		Percent of DPA pageable frames in use ((H01SCWS0+H01SCWS1+H01SCWS2+H01SCWS3) * 100 * TRNDRSMP / (H01PGBL-H01NPAG+H01PGBL2))
	SHAR	
		Number of resident shared pages (H01RSHR / TRNDRSMP)
	FPGS	
		Number of FREE storage pages (H01XFRE / TRNDRSMP)
	%FR	
		Percentage of FREE subpool storage in use (H01FRUS / TRNDRSMP)
	V=R	
		V=R storage size in Bytes (H01VRSIZ)
	VRFREE	
		V=R FREE storage in use (doublewords) (H01VFRUS / TRNDRSMP)

Display	Variable Name	Variable Description and Derivation
	FEX/S	
		Frames extended rate, per second (H02FRTAK / TRNDRELT) (Sum of rates for all processors)
	FRMISS	
		Number of frames missing from free storage reserved frames list (H01PGXTE / TRNDRSMP)
	FRSUB	
		Free subpool space available (pages) (converted from doublewords) (H01SPAV / TRNDRSMP / 512)
	FRSAV	
		Number of save area pages (H01PGSAV / TRNDRSMP)
	RESRVD	
		Number of reserved pages (H01PGRSV / TRNDRSMP)
	LOCKED	
		Number of locked pages ((H01PGLOK+H01LOCKG) / TRNDRSMP)
	LOCK<2G	
		Number pages locked below the 2GB line (H01PGLOK / TRNDRSMP)
	LOCK>2G	
		Number pages locked above the 2GB line (H01LOCKG / TRNDRSMP)
	SXSTLOCK	
		Total SXS alias pages locked (H01SXLPT / TRNDRSMP)
	SYSLLOCK	
		SXS alias pages locked by CP LOCK command (H01SXLPL / TRNDRSMP)
	DI98LOCK	
		Pages locked for Diagnose X'98' in 31-bit mode (H01DIA98 / TRNDRSMP)
	LOWTH<2G	
		Low threshold for <2GB available list (H01ALLTH / TRNDRELT)
	LOWTH>2G	
		Low threshold for >2GB available list (H01ALLTG / TRNDRELT)
	HITH<2G	
		High threshold for <2GB available list (H01ALHTH / TRNDRELT)
	HITH>2G	
		High threshold for >2GB available list (H01ALHTG / TRNDRELT)
	AVAIL	
		Number of pages on the available list (H01AVAL / TRNDRSMP)
	AVAIL<2G	
		Number of pages on the <2GB available list (H41AVALP / TRNDRSMP)

Display	Variable Name	Variable Description and Derivation
	AVAIL>2G	
		Number of pages on the >2GB available list (H41AVALG / TRNDRSMP)
	MS-LIFE	
		Estimated central storage page life, based on Little's law, in seconds ((H01PGBL-H01NPAG) / TRNDRSMP * TRNDRELT / (sum of H02PGWRT+H02PGOUT)) The MS-LIFE value can be calculated only if the sum of all H02PGWRT and H02PGOUT values is nonzero.
	PRD/S	
		Page read rate, per second (H02PGRDS / TRNDRELT) (Sum of rates for all processors)
	PWR/S	
		Page write rate, per second (H02PGWRT / TRNDRELT) (Sum of rates for all processors)
	PG/S	
		Total page rate, per second ((H02PGRDS+H02PGWRT) / TRNDRELT) (Sum of rates for all processors)
	NSS/S	
		Page read rate/s for shared segments (H02SHRRD / TRNDRELT) (Sum of rates for all processors)
	GUEST/S	
		Single page read rate/s for guests (H01SRDUS / TRNDRELT)
	SYST/S	
		Single page read rate/s for system (H01SRDSY / TRNDRELT)
	SPAG/S	
		Total single page read rate, per second ((H01SRDUS+H01SRDSY) / TRNDRELT)
	ALO/S	
		Pages allocation rate, per second (H02PGALO / TRNDRELT) (Sum of rates for all processors)
	#TW	
		Nr. of tasks waiting for a page, per second (H02TSKWT / TRNDRELT) (Sum of rates for all processors)
	FRWT	
		Number of tasks waiting for a frame (H01DFRW / TRNDRSMP)
	SCAN1	
		Demand scan 1 successful rate, per second (H02SCAN1 / TRNDRELT) (Sum of rates for all processors)

Display	Variable Name	Variable Description and Derivation
	SCAN2	Demand scan 2 successful rate, per second (H02SCAN2 / TRNDRELT) (Sum of rates for all processors)
	E-SCAN	Emergency scan successful rate, per second (H02SCANE / TRNDRELT) (Sum of rates for all processors)
	SCFAIL	Not enough frames after scan, per second (H02SCAFA / TRNDRELT) (Sum of rates for all processors)
	ESCN	Percent of demand scans which did not complete with scan 1 ((H02SCAN2+H02SCANE) * 100 / (H02SCAN1+H02SCAN2+H02SCANE)) (Average value for all processors)
	BKRD	Average page read block size (H01RDBSZ * H01RDBIO / H01RDBIO) The H01RDBSZ field is valid only if the H01RDBIO field is nonzero. A dummy multiplication and division is used to force an 'invalid' value when H01RDBIO is zero.
	BKMG	Average page migrate block size (H01MGBSZ * H01MGBIO / H01MGBIO) The H01MGBSZ field is valid only if the H01MGBIO field is nonzero. A dummy multiplication and division is used to force an 'invalid' value when H01MGBIO is zero.
	BKST	Average page steal block size (H01WRBSZ * H01WRBIO / H01WRBIO) The H01WRBSZ field is valid only if the H01WRBIO field is nonzero. A dummy multiplication and division is used to force an 'invalid' value when H01WRBIO is zero.

Expanded Storage Variables

SYSTEM	XSTAV	Total number of expanded storage blocks in CP partition (H01CPPAR / TRNDRSMP)
	XSTPGBK	Total number of expanded storage paging blocks ((H01CPPAR-H01MDCNE) / TRNDRSMP)
	%XS	Percent of expanded storage in use ((H01CPPAR-H01CPXAV) * 100 / H01CPPAR)

Display	Variable Name	Variable Description and Derivation
	XAL/S	
		Expanded storage blocks allocation rate/s (H01XSGET / TRNDRELT)
	XPG/S	
		Expanded storage page rate (PGIN + PGOUT) ((H02FPGIN+H02PGINS+H02PGOUT) / TRNDRELT) (Sum of rates for all processors)
	XDEAL/S	
		Expanded storage blocks deallocation rate/s (H01XSREL / TRNDRELT)
	MIGVIS	
		Shared system migration visits rate/s (H01XSHRV / TRNDRELT)
	PGIN/S	
		PGIN rate, per second ((H02FPGIN+H02PGINS) / TRNDRELT) (Sum of rates for all processors)
	%FP_PGIN	
		Percent of PGINs done using fast-path logic (H02FPGIN * 100 / (H02FPGIN+H02PGINS)) (average for all processors)
	PGOUT/S	
		PGOUT rate, per second (H02PGOUT / TRNDRELT) (Sum of rates for all processors)
	MIGR/S	
		Page migrate rate/s, exp. storage to DASD ((H01MBKDM+H01MBKND+H01MBKSH +H01MBKSY) / TRNDRELT)
	XAGE	
		Average expanded storage page age (sec) (H01AVAG / TRNDRSMP)
	MAGE	
		Average XSTORE page age at migration (sec) (H01MIGAG * H01MBKDM / H01MBKDM) The H01MIGAG field is valid only if the H01MBKDM field is nonzero. A dummy multiplication and division is used to force an 'invalid' value when H01MBKDM is zero.
	XSTLIFE	
		Estimated XSTORE page life, based on Little's law, in seconds ((H01CPPAR-H01MDCNE) / TRNDRSMP * TRNDRELT / (sum of H02PGOUT)) The XSTLIFE value can be calculated only if the sum of all H02PGOUT values is nonzero.

Minidisk Cache Data

Please see the performance variables defined for trend records X'FC04' (“Performance Variables of Trend Records X'FC04'” on page 956, full-track cache data) for all variables related to the minidisk cache.

Display	Variable Name	Variable Description and Derivation
Auxiliary Storage Variables (AUXLOG)		
SYSTEM	PGSLOTS	Total page slots available on paging areas (H01AUPSL)
	%PGSL	Paging area utilization, in percent (H01AUPUS * 100 / H01AUPSL)
	SPSLOTS	Total spool slots available on spooling areas (H01AUSSL)
	%SPSL	Spooling area utilization, in percent (H01AUSUS * 100 / H01AUSSL)
	DUSLOTS	Total spool slots on dedicated dump areas (H01AUDSL)
	%DUSL	Dump spooling area utilization, in percent (H01AUDUS * 100 / H01AUDSL)
	SPCREA	Total spool files created (H01AUFCR)
	SPCRE/S	Spool files created per second (H01AUFCR / TRNDRELT)
	SPPURG	Total spool files purged (H01AUFPU)
	SPPUR/S	Spool files purged per second (H01AUFPU / TRNDRELT)
	PGMLOAD	Paging MLOAD (average page I/O response time, per page) in msec. (H01AUAMP / 1000)
	SPMLOAD	Spooling MLOAD (average spool I/O response time, per spool block) in msec. (H01AUAMS / 1000)
Scheduler Queues (SCHEDLOG)		
SYSTEM	INQUE	Total users in dispatch and eligible lists (H01SCDSP + H01SCEL1)
	Q0	Class 0 users in dispatch list (H01SCDSP - H01SCDS1)
	Q1	Class 1 users in dispatch list (H01SCDS1 - H01SCDS2)

Display	Variable Name	Variable Description and Derivation
	QX	
		Class 0, 2 and 3 users in dispatch list (H01SCDSP-H01SCDS1+H01SCDS2)
	Q2	
		Class 2 users in dispatch list (H01SCDS2 - H01SCDS3)
	Q3	
		Class 3 users in dispatch list (H01SCDS3)
	Q0L	
		Loading class 0 users in dispatch list (H01SCLDG - H01SCLD1)
	Q1L	
		Loading class 1 users in dispatch list (H01SCLD1 - H01SCLD2)
	QXL	
		Loading class 0, 2 and 3 users in dispatch list (H01SCLDG-H01SCLD1+H01SCLD2)
	Q2L	
		Loading class 2 users in dispatch list (H01SCLD2 - H01SCLD3)
	Q3L	
		Loading class 3 users in dispatch list (H01SCLD3)
	LIMLST	
		Users in limit list (H01SCLLS)
	E1	
		Class 1 users in eligible list (H01SCEL1 - H01SCEL2)
	EX	
		Class 2 and 3 users in eligible list (H01SCEL2)
	E2	
		Class 2 users in eligible list (H01SCEL2 - H01SCEL3)
	E3	
		Class 3 users in eligible list (H01SCEL3)
	E1L	
		Loading class 1 users in eligible list (H01SCLE1 - H01SCLE2)
	EXL	
		Loading class 2 and 3 users in elig. list (H01SCLE2)
	E2L	
		Loading class 2 users in eligible list (H01SCLE2 - H01SCLE3)
	E3L	
		Loading class 3 users in eligible list (H01SCLE3)
	C1ES	
		Class 1 elapsed time slice (sec.) (H01SCETS / 1000)

Display	Variable Name	Variable Description and Derivation
	ABSSHR	
		Sum of absolute shares for all in-queue users (H01SCABS * 100 / 65534)
	RELSHR	
		Sum of relative shares for all in-queue users (H01SCREL)
	CONSID	
		Total storage considered (pages) (H01SCPGS)
	Q0WSS	
		Total WSS of all Q0 users (pages) (H01SCWS0)
	Q1WSS	
		Total WSS of all Q1 users (pages) (H01SCWS1)
	Q2WSS	
		Total WSS of all Q2 users (pages) (H01SCWS2)
	Q3WSS	
		Total WSS of all Q3 users (pages) (H01SCWS3)
Scheduler Activity (SCHDATA, Timer Pop Data)		
SYSTEM	SC_PG/S	
		Page read rate per second (H01SDPRT / H01SDSMP)
	SC_MS/P	
		Milliseconds per page read (H01SDTRD / H01SDSMP / 10)
	SC_PSV	
		Page steal value (H01SDSTL / H01SDSMP)
	SC_SWGT	
		Storage resource weight (H01SDSTW / H01SDSMP)
	SC_PWGT	
		Paging resource weight (H01SDPGW / H01SDSMP)
	SC_C1P/S	
		Average class 1 user page rate/s (H01SDEPR / H01SDSMP)
	SC_C1WSS	
		Average class 1 user WSS (H01SDEWS / H01SDSMP)
	SC_ALP/S	
		Average page rate/s for all users (H01SDAPR / H01SDSMP)
	SC_ALWSS	
		Average WSS for all users (H01SDAWS / H01SDSMP)

Display	Variable Name	Variable Description and Derivation
	CL1EXP	
		Class 1 expansion factor (H01SDE1X / H01SDSMP)
	CL2EXP	
		Class 2 expansion factor (H01SDE2X / H01SDSMP)
	CL3EXP	
		Class 3 expansion factor (H01SDE3X / H01SDSMP)

Response Times / Transactions (RESPALL, RESPUP)

SYSTEM	TR_UP_T	
		Trivial UP users' response time (s) (H01RSUTT / H01RSUTC)
	TR_MP_T	
		Trivial MP users' response time (s) (H01RSMTT / H01RSMTC)
	TR-T	
		Average trivial response time (s) ((H01RSUTT+H01RSMTT) / (H01RSUTC+H01RSMTC))
	NT_UP_T	
		Non-trivial UP users' response time (s) (H01RSUNT / H01RSUNC)
	NT_MP_T	
		Non-trivial MP users' response time (s) (H01RSMNT / H01RSMNC)
	NT-T	
		Average non-trivial response time (s) ((H01RSUNT+H01RSMNT) / (H01RSUNC+H01RSMNC))
	UP_RESP	
		Average UP response time (s) ((H01RSUTT+H01RSUNT) / (H01RSUTC+H01RSUNC))
	QD_T	
		Quick-dispatch response time (s) (H01RSQDT / H01RSQDC)
	MEANRESP	
		Mean response time (s) ((H01RSUTT+H01RSUNT+H01RSMTT +H01RSMNT+H01RSQDT) / (H01RSUTC+H01RSUNC+H01RSMTC +H01RSMNC+H01RSQDC))
	TR_UP/S	
		Trivial UP transaction rate per second (H01RSUTC / TRNDRELT)
	TR_MP/S	
		Trivial MP transaction rate per second (H01RSMTC / TRNDRELT)
	TR/S	
		Average trivial transaction rate/s ((H01RSUTC+H01RSMTC) / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	NT_UP/S	Non-trivial UP transaction rate per second (H01RSUNC / TRNDRELT)
	NT_MP/S	Non-trivial MP transaction rate per second (H01RSMNC / TRNDRELT)
	NT/S	Average non-trivial transaction rate/s ((H01RSUNC+H01RSMNC) / TRNDRELT)
	UP_TR/S	Average UP transaction rate per second ((H01RSUTC+H01RSUNC) / TRNDRELT)
	QD_TR/S	Quick-dispatch transaction rate per second (H01RSQDC / TRNDRELT)
	TRANS/S	Total transaction rate per second ((H01RSUTC+H01RSUNC+H01RSMTC +H01RSMNC+H01RSQDC) / TRNDRELT)
	TR-Q	Average trivial transactions active ((H01RSUTT+H01RSMTT) / TRNDRELT)
	NT-Q	Average non-trivial transactions active ((H01RSUNT+H01RSMNT) / TRNDRELT)
	%TR_UP	Percent trivial UP transactions, of all trans. (H01RSUTC * 100 / (H01RSUTC+H01RSMTC+H01RSUNC +H01RSMNC+H01RSQDC))
	%TR_MP	Percent trivial MP transactions, of all trans. (H01RSMTC * 100 / (H01RSUTC+H01RSMTC+H01RSUNC +H01RSMNC+H01RSQDC))
	%NT_UP	Percent non-trivial UP transact., of all trans. (H01RSUNC * 100 / (H01RSUTC+H01RSMTC+H01RSUNC +H01RSMNC+H01RSQDC))
	%NT_MP	Percent non-trivial MT transact., of all trans. (H01RSMNC * 100 / (H01RSUTC+H01RSMTC+H01RSUNC +H01RSMNC+H01RSQDC))
	%Q_DSP	Percent quick-dispatch transact., of all trans. (H01RSQDC * 100 / (H01RSUTC+H01RSMTC+H01RSUNC +H01RSMNC+H01RSQDC))
	#TR_UP	Number of trivial UP transactions (H01RSUTC)

Display	Variable Name	Variable Description and Derivation
	#NT_UP	
		Number of non-trivial UP transactions (H01RSUNC)
	#TR_MP	
		Number of trivial MP transactions (H01RSMTC)
	#NT_MP	
		Number of non-trivial MP transactions (H01RSMNC)
	#TRANS	
		Total number of transactions (H01RSUTC+H01RSMTC+H01RSUNC +H01RSMNC+H01RSQDC)
	#ALLUP	
		Total number of UP transactions (H01RSUTC + H01RSUNC)
	%TRUP/UP	
		% of UP transactions which were trivial (H01RSUTC * 100 / (H01RSUTC+H01RSUNC))
	%NTUP/UP	
		% of UP transactions which were non-trivial (H01RSUNC * 100 / (H01RSUTC+H01RSUNC))

User Wait State Averages (USTLOG)

SYSTEM	%ACT	
		Percent of time an average user was found to be active (not dormant) ((H01STHFC+H01STDRS-H01STDRM) * 100 / H01STHFC)
	%RUN	
		Percent of active time users were found running (H01STRUN * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%CPU	
		Percent of active time users were in CPU wait (H01STCPW * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%LDG	
		Percent of active time users were loading (H01STLOD * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%PGW	
		Percent of active time users were in page wait (H01STPGW * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%IOW	
		Percent of active time users were in I/O wait (H01STIOW * 100 / (H01STHFC+H01STDRS-H01STDRM))

Display	Variable Name	Variable Description and Derivation
	%SIM	
		% of active time users were in inst. simul. wait (H01STSIM * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%TIW	
		Percent of active time users were in test-idle wait (H01STTID * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%CFW	
		Percent of active time users were in CF wait (H01STCFW * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%TI	
		Percent of active time users were in SVM & TI wait (H01STTIS * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%EL	
		Percent of active time users were in SVM wait and in the eligible list (H01STELS * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%DM	
		Percent of active time users were in SVM wait and dormant (H01STDRS * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%IOA	
		% of active time users were in 'I/O active' wait (H01STIOA * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%PGA	
		% of active time users were in 'page active' wait (H01STPGA * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%LIM	
		Percent of active time users were in limit list wait (H01STLMT * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%OTH	
		% of active time users were in another wait state (H01STOTH * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%Q0	
		Percent of active time users were in queue 0 (H01STIQ0 * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%Q1	
		Percent of active time users were in queue 1 (H01STIQ1 * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%Q2	
		Percent of active time users were in queue 2 (H01STIQ2 * 100 / (H01STHFC+H01STDRS-H01STDRM))

Display	Variable Name	Variable Description and Derivation
	%Q3	Percent of active time users were in queue 3 (H01STIQ3 * 100 / (H01STHFC+H01STDRS-H01STDRM))
	%E0-3	Percent of active time users were in elig. list (H01STELI * 100 / (H01STHFC+H01STDRS-H01STDRM))

DASD Load and Performance (DASDLOG)

SYSTEM	LINKS	Average minidisk links per DASD (H01DSLNK / H01DSCNT)
	PATHS	Average number of channel paths per DASD (H01DSPTH / H01DSCNT)
	DASD/S	Total SSCH & RSCH rate per second to DASD (H01DSSSC / TRNDRELT)
	AVOID/S	Total I/Os avoided rate per second (H01DSNIO / TRNDRELT)
	PEND	Average 'function pending' time, in msec. (H01DSPND * 128 / 1000 / H01DSSSC)
	DISC	Average 'disconnected' time, in msec. (H01DSDSC * 128 / 1000 / H01DSSSC)
	CONN	Average 'connected' time, in msec. (H01DSCON * 128 / 1000 / H01DSSSC)
	SERV	Average I/O service time, in msec. (H01DSSRV / 10)
	RESP	Average I/O response time, in msec. (H01DSRSP / 10 / H01DSSSC)
	CUWT	Average control unit queueing time, in msec. (H01DSCUW * 128 / 1000 / H01DSSSC)
	QUED	Average IO request block queue length (H01DSHFQ / H01DSHFC)
	BUSY	Average DASD busy percentage (H01DSBSY / H01DSSMP)
	%READ	Average percentage of I/O requests that were for READ operations only (H01DSRDS * 100 / (H01DSRDS+H01DSWRT))
	CYLS	Average nr. of cylinders skipped per SEEK order (H01DSMOV / H01DSSKS)

Display	Variable Name	Variable Description and Derivation
	RECOV	
		Average number of SSCHs executed for error recovery purposes (H01DSERR / H01DSCT2)
	DLY/S	
		Average throttle I/O delay rate, per second (H01DSTHD / H01DSCT2 / TRNDRELT)

CP Services Activity

Although CP system services activity variables are also described for trend record X'FC05' (see "Performance Variables of Trend Records X'FC05'" on page 958) they have been redefined for being selected as 'SYSTEM' variables, too, in which case the value returned will always be the total activity for all processors. (The formulas in the following descriptions show only the calculations made per processor.)

SYSTEM	IUVM_T	
		Total IUCV and VMCF activity per second ((H05ISEND+H05IRECV+H05IFAIL +H05VMCFS+H05VMCFR+H05VMCFF) / TRNDRELT)
	IUCV_T	
		Total IUCV activity per second ((H05ISEND+H05IRECV+H05IFAIL) / TRNDRELT)
	VMCF_T	
		Total VMCF activity per second ((H05VMCFS+H05VMCFR+H05VMCFF) / TRNDRELT)
	*TOT_T	
		Total system services activity per second ((H05IMSAS+H05IMSGS+H05IRPIS +H05IBIOS+H05IMONS+H05ISIGS +H05ICCSS+H05ISPLS+H05ISYMS +H05IACCS+H05ILOGS+H05ICRMS +H05IIDES+H05ICNFS +H05IMSAR+H05IMSGR+H05IRPIR +H05IBIOR+H05IMONR+H05ISIGR +H05ICCSR+H05ISPLR+H05ISYMR +H05IACCR+H05ILOGR+H05ICRMR +H05IIDER+H05ICNFR +H05IMSAF+H05IMSGF+H05IRPIF +H05IBIOF+H05IMONF+H05ISIGF +H05ICCSF+H05ISPLF+H05ISYMF +H05IACCF+H05ILOGF+H05ICRMF +H05IIDEF+H05ICNFF) / TRNDRELT)
	*MSA_T	
		Total *MSGALL IUCV activity per second ((H05IMSAS+H05IMSAR+H05IMSAF) / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	*MSG_T	
		Total *MSG IUCV activity per second ((H05IMSGS+H05IMSGR+H05IMSGF) / TRNDRELT)
	*RPI_T	
		Total *RPI IUCV activity per second ((H05IRPIS+H05IRPIR+H05IRPIF) / TRNDRELT)
	*BLK_T	
		Total *BLOCKIO IUCV activity per second ((H05IBIOS+H05IBIOR+H05IBIOF) / TRNDRELT)
	*MON_T	
		Total *MONITOR IUCV activity per second ((H05IMONS+H05IMONR+H05IMONF) / TRNDRELT)
	*SIG_T	
		Total *SIGNAL IUCV activity per second ((H05ISIGS+H05ISIGR+H05ISIGF) / TRNDRELT)
	*CCS_T	
		Total *CCS IUCV activity per second ((H05ICCSS+H05ICCSR+H05ICCSF) / TRNDRELT)
	*SPL_T	
		Total *SPL IUCV activity per second ((H05ISPLS+H05ISPLR+H05ISPLF) / TRNDRELT)
	*SYM_T	
		Total *SYMPTOM IUCV activity per second ((H05ISYMS+H05ISYMR+H05ISYMF) / TRNDRELT)
	*ACC_T	
		Total *ACCOUNT IUCV activity per second ((H05IACCS+H05IACCR+H05IACCF) / TRNDRELT)
	*LOG_T	
		Total *LOGREC IUCV activity per second ((H05ILOGS+H05ILOGR+H05ILOGF) / TRNDRELT)
	*CRM_T	
		Total *CRM IUCV activity per second ((H05ICRMS+H05ICRMR+H05ICRMF) / TRNDRELT)
	*IDE_T	
		Total *IDENT IUCV activity per second ((H05IIDES+H05IIDER+H05IIDEF) / TRNDRELT)
	*CNF_T	
		Total *CONFIG IUCV activity per second ((H05ICNFS+H05ICNFR+H05ICNFF) / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
CP Services from CP to Virtual Machines, Rates per Second		
SYSTEM	IUVM>V	Total IUCV and VMCF rate/s, CP to VM ((H05ISEND+H05VMCFS) / TRNDRELT)
	IUCV>V	Total IUCV activity/s, CP to VM (H05ISEND / TRNDRELT)
	VMCF>V	Total VMCF activity/s, CP to VM (H05VMCFS / TRNDRELT)
	*TOT>V	Total system services rate/s, CP to VM ((H05IMSAS+H05IMSGS+H05IRPIS +H05IBIOS+H05IMONS+H05ISIGS +H05ICCSS+H05ISPLS+H05ISYMS +H05IACCS+H05ILOGS+H05ICRMS +H05IIDES+H05ICNFS) / TRNDRELT)
	*MSA>V	Total *MSGALL IUCV rate/s, CP to VM (H05IMSAS / TRNDRELT)
	*MSG>V	Total *MSG IUCV rate/s, CP to VM (H05IMSGS / TRNDRELT)
	*RPI>V	Total *RPI IUCV rate/s, CP to VM (H05IRPIS / TRNDRELT)
	*BLK>V	Total *BLOCKIO IUCV rate/s, CP to VM (H05IBIOS / TRNDRELT)
	*MON>V	Total *MONITOR IUCV rate/s, CP to VM (H05IMONS / TRNDRELT)
	*SIG>V	Total *SIGNAL IUCV rate/s, CP to VM (H05ISIGS / TRNDRELT)
	*CCS>V	Total *CCS IUCV rate/s, CP to VM (H05ICCSS / TRNDRELT)
	*SPL>V	Total *SPL IUCV rate/s, CP to VM (H05ISPLS / TRNDRELT)
	*SYM>V	Total *SYMPTOM IUCV rate/s, CP to VM (H05ISYMS / TRNDRELT)
	*ACC>V	Total *ACCOUNT IUCV rate/s, CP to VM (H05IACCS / TRNDRELT)
	*LOG>V	Total *LOGREC IUCV rate/s, CP to VM (H05ILOGS / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	*CRM>V	
		Total *CRM IUCV rate/s, CP to VM (H05ICRMS / TRNDRELT)
	*IDE>V	
		Total *IDENT IUCV rate/s, CP to VM (H05IIDES / TRNDRELT)
	*CNF>V	
		Total *CONFIG IUCV rate/s, CP to VM (H05ICNFS / TRNDRELT)

CP Services from Virtual Machines to CP, Rates per Second

SYSTEM	IUVM>C	
		Total IUCV and VMCF activity/s, VM to CP ((H05IRECV+H05VMCFR) / TRNDRELT)
	IUCV>C	
		Total IUCV activity/s, VM to CP (H05IRECV / TRNDRELT)
	VMCF>C	
		Total VMCF activity/s, VM to CP (H05VMCFR / TRNDRELT)
	*TOT>C	
		Total system services rate/s, VM to CP ((H05IMSAR+H05IMSGR+H05IRPIR +H05IBIOR+H05IMONR+H05ISIGR +H05ICCSR+H05ISPLR+H05ISYMR +H05IACCR+H05ILOGR+H05ICRMR +H05IIDER+H05ICNFR) / TRNDRELT)
	*MSA>C	
		Total *MSGALL IUCV rate/s, VM to CP (H05IMSAR / TRNDRELT)
	*MSG>C	
		Total *MSG IUCV rate/s, VM to CP (H05IMSGR / TRNDRELT)
	*RPI>C	
		Total *RPI IUCV rate/s, VM to CP (H05IRPIR / TRNDRELT)
	*BLK>C	
		Total *BLOCKIO IUCV rate/s, VM to CP (H05IBIOR / TRNDRELT)
	*MON>C	
		Total *MONITOR IUCV rate/s, VM to CP (H05IMONR / TRNDRELT)
	*SIG>C	
		Total *SIGNAL IUCV rate/s, VM to CP (H05ISIGR / TRNDRELT)
	*CCS>C	
		Total *CCS IUCV rate/s, VM to CP (H05ICCSR / TRNDRELT)
	*SPL>C	
		Total *SPL IUCV rate/s, VM to CP (H05ISPLR / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	*SYM>C	
		Total *SYMPTOM IUCV rate/s, VM to CP (H05ISYMR / TRNDRELT)
	*ACC>C	
		Total *ACCOUNT IUCV rate/s, VM to CP (H05IACCR / TRNDRELT)
	*LOG>C	
		Total *LOGREC IUCV rate/s, VM to CP (H05ILOGR / TRNDRELT)
	*CRM>C	
		Total *CRM IUCV rate/s, VM to CP (H05ICRMR / TRNDRELT)
	*IDE>C	
		Total *IDENT IUCV rate/s, VM to CP (H05IIDER / TRNDRELT)
	*CNF>C	
		Total *CONFIG IUCV rate/s, VM to CP (H05ICNFR / TRNDRELT)
CP Services, Failure Rates per Second		
SYSTEM	IUVM_F	
		Total IUCV and VMCF failures per second ((H05IFAIL+H05VMCFF) / TRNDRELT)
	IUCV_F	
		Total IUCV failures per second (H05IFAIL / TRNDRELT)
	VMCF_F	
		Total VMCF failures per second (H05VMCFF / TRNDRELT)
	*TOT_F	
		Total system services failures per second ((H05IMSAF+H05IMSGF+H05IRPIF +H05IBIOF+H05IMONF+H05ISIGF +H05ICCSF+H05ISPLF+H05ISYMF +H05IACCF+H05ILOGF+H05ICRMF +H05IIDEF+H05ICNFF) / TRNDRELT)
	*MSA_F	
		Total *MSGALL IUCV failures per second (H05IMSAF / TRNDRELT)
	*MSG_F	
		Total *MSG IUCV failures per second (H05IMSGF / TRNDRELT)
	*RPI_F	
		Total *RPI IUCV failures per second (H05IRPIF / TRNDRELT)
	*BLK_F	
		Total *BLOCKIO IUCV failures per second (H05IBIOF / TRNDRELT)
	*MON_F	
		Total *MONITOR IUCV failures per second (H05IMONF / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	*SIG_F	
		Total *SIGNAL IUCV failures per second (H05ISIGF / TRNDRELT)
	*CCS_F	
		Total *CCS IUCV failures per second (H05ICCSF / TRNDRELT)
	*SPL_F	
		Total *SPL IUCV failures per second (H05ISPLF / TRNDRELT)
	*SYM_F	
		Total *SYMPTOM IUCV failures per second (H05ISYMF / TRNDRELT)
	*ACC_F	
		Total *ACCOUNT IUCV failures per second (H05IACCF / TRNDRELT)
	*LOG_F	
		Total *LOGREC IUCV failures per second (H05ILOGF / TRNDRELT)
	*CRM_F	
		Total *CRM IUCV failures per second (H05ICRMF / TRNDRELT)
	*IDE_F	
		Total *IDENT IUCV failures per second (H05IIDEF / TRNDRELT)
	*CNF_F	
		Total *CONFIG IUCV failures per second (H05ICNFF / TRNDRELT)

System Log Data (SYSLOG)

SYSTEM	DONE	
		Fast CCW translation: successful rate/s (H01SLFDO / TRNDRELT)
	ABORT	
		Fast CCW translation: Aborted rate/s (H01SLFAB / TRNDRELT)
	NOTELIG	
		Fast CCW translation: Not eligible rate/s (H01SLFNE / TRNDRELT)
	TOTCCW	
		Fast CCW translation: Total rate/s ((H01SLFDO+H01SLFAB+H01SLFNE) / TRNDRELT)
	EXITTIME	
		Microseconds spent in user exits (H01SLEXT * 1000000)

User Communication Totals (UCOMMLOG)

SYSTEM	MSG/S	
		Total message rate per second, for IUCV and VMCF communication (H01UCTOT / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	ISEND	
		Total IUCV messages sent per second (H01UCUSN / TRNDRELT)
	IRECV	
		Total IUCV messages received per second (H01UCURC / TRNDRELT)
	IFAIL	
		Total IUCV messages failed per second (H01UCUFL / TRNDRELT)
	VSEND	
		Total VMCF messages sent per second (H01UCVSN / TRNDRELT)
	VRECV	
		Total VMCF messages received per second (H01UCVRC / TRNDRELT)
	VFAIL	
		Total VMCF messages failed per second (H01UCVFL / TRNDRELT)
	SENDQ	
		Average IUCV msgs. in send queue (H01UCUSQ / H01UCUS1)
	RECVQ	
		Average IUCV msgs. in receive queue (H01UCUCQ / H01UCUS1)
	REPLQ	
		Average IUCV msgs. in reply queue (H01UCURQ / H01UCUS1)
	QUEUE	
		Average VMCF messages queued (H01UCVQU / H01UCUS1)

Performance Variables of Trend Records X'FC02'

Trend record X'FC02' contains data describing processor utilization and performance.

The selection format for record 02 variables is:

cpuno is the number of the processor for which data are to be extracted.

Totals for the values from all processors will be calculated if the processor number is specified as an asterisk '*'.

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
Processor Activity Data		
	TOTAL	
PRCLOG/ DSVSLOG/ PROCLOG		Total CPU utilization, in percent ((H02USTIM+H02SYTIM) * 100 / TRNDRELT)
	USER	User CPU utilization, in percent (H02USTIM * 100 / TRNDRELT)
	SYST	System CPU utilization, in percent (H02SYTIM * 100 / TRNDRELT)
	EMUL	Emulation CPU utilization, in percent (H02EMTIM * 100 / TRNDRELT)
	%CP	CP CPU utilization, in percent ((H02USTIM+H02SYTIM-H02EMTIM) * 100 / TRNDRELT)
	%SPIN	CPU spin utilization, in percent (H02SPIN * 100 / TRNDRELT)
	%LOGLD	Logical CPU load, in percent (based on CPU active and voluntary wait time, but excluding any suspended time when running 2nd level or in an LPAR) ((H02USTIM+H02SYTIM) * 100 / (H02USTIM+H02SYTIM+H02WAIT))

Display	Variable Name	Variable Description and Derivation
	VECT	
		Total vector utilization, in percent ((H02VFTIM+H02VOTIM) * 100 / TRNDRELT)
	%VEM	
		Vector emulation load, in percent (H02VFTIM * 100 / TRNDRELT)
	VECLD	
		Vector load rate, per second (H02VFLOD / TRNDRELT)
	SIML	
		Privileged instruction simulation rate per sec. (H02PRVCT / TRNDRELT)
	DIAG	
		Diagnose instruction execution rate per sec. (H02DIACT / TRNDRELT)
	SIGP	
		SIGP Ext Call receipt rate, per second (H02SIGCT / TRNDRSMP)
	SSCH	
		SSCH and RSCH rate per second ((H02SSCH+H02RSCH) / TRNDRSMP)
	EMPTY	
		Percent of time PLDV found empty (H02EMPTY * 100 / H02HFSMP)
	#USRS	
		Mean VMDBKs in PLDV while not empty (H02VMDBK / (H02HFSMP-H02EMPTY))
	#MAST	
		Mean VMDBKs in master processor PLDV (H02MASTR / H02HFSMP)
	VMSTL	
		VMDBKs stolen from processor, per second (H02VMSTO / TRNDRELT)
	TOMAST	
		VMDBKs moved to master proc. per second (H02VMMAS / TRNDRELT)
	AVEMP	
		Seconds between available list empty (TRNDRELT / H02AVEMP)
	BEL2GB	
		Pages moved/s below 2GB for translation (H02PGB2G / TRNDRELT)
	PGIN	
		PGIN rate per second from expanded storage ((H02FPGIN+H02PGINS) / TRNDRELT)
	%FAST	
		Percent of fastpath PGINs (H02FPGIN * 100 / (H02FPGIN+H02PGINS))
	PGRD/S	
		Page read rate per second (H02PGRDS / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	MSGS/S	
		Total IUCV and VMCF message rate per second ((H02ISEVM+H02ISTVM+H02ISUVM +H02VSEVM+H02VSTVM+H02VSUVM) / TRNDRELT)

Available List Management Data

Includes activity data shown on both the AVAILLOG and DEMNDLOG reports.

AVAILLOG	OBTAINBL	
		Page frames obtained/s from <2GB available list (H02PGALO / TRNDRELT)
	OBTAINAB	
		Page frames obtained/s from >2GB available list (H02AVOBT / TRNDRELT)
	RETURNBL	
		Page frames returned/s to <2GB available list (H02AVRET / TRNDRELT)
	RETURNAB	
		Page frames returned/s to >2GB available list (H02AVREG / TRNDRELT)
	EMPTYBL	
		Number of times <2GB available list was empty (H02AVEMP)
	EMPTYAB	
		Number of times >2GB available list was empty (H02AVEMG)
	SCAN1	
		Number of times demand scan ended with pass 1 (H02SCAN1)
	FRAMES1	
		Number of frames obtained with scan 1 (H02FR1LD+H02FR1DM+H02FR1NS + H02FR1EL+H02FR1DL)
	SCAN2	
		Number of times demand scan ended with pass 2 (H02SCAN2)
	FRAMES2	
		Number of frames obtained with scan 2 (H02FR2LD+H02FR2DM+H02FR2NS + H02FR2EL+H02FR2DL)
	ESCAN	
		Number of times demand scan ended with emergency pass (H02SCANE)
	FRAMESE	
		Number of frames obtained with scan 1 (H02FR1DM+H02FR1NS+H02FR1EL +H02FR1DL)
	SCANFAIL	
		Number of times demand scan failed obtaining enough page frames (H02SCNFA)

Display	Variable Name	Variable Description and Derivation
	SCN1LDRM	Number of times scan ended with pass 1 of users in the long term dormant list (H02SE1LD)
	SCN1DORM	Number of times scan ended with pass 1 of users in the dormant list (H02SE1DM)
	SCN1NSS	Number of times scan ended with pass 1 of the system VMDBK, NSSs, DCSSs, ... (H02SE1NS)
	SCN1ELIG	Number of times scan ended with pass 1 of users in the eligible list (H02SE1EL)
	SCN1DISP	Number of times scan ended with pass 1 of users in the dispatch list (H02SE1DL)
	SCN2LDRM	Number of times scan ended with pass 2 of users in the long term dormant list (H02SE2LD)
	SCN2DORM	Number of times scan ended with pass 2 of users in the dormant list (H02SE2DM)
	SCN2ELIG	Number of times scan ended with pass 2 of users in the eligible list (H02SE2EL)
	SCN2DISP	Number of times scan ended with pass 2 of users in the dispatch list (H02SE2DL)
	SCNEDORM	Number of times scan ended with the emergency pass of users in the dormant list (H02SEEDM)
	SCNENSS	Number of times scan ended with the emergency pass of the system VMDBK, NSSs, DCSSs, ... (H02SEENS)
	SCNEELIG	Number of times scan ended with the emergency pass of users in the eligible list (H02SEEEL)
	SCNEDISP	Number of times scan ended with the emergency pass of users in the dispatch list (H02SEEDL)

Display	Variable Name	Variable Description and Derivation
	FRM1LDRM	Number of frames obtained with pass 1 from users in the long term dormant list (H02FR1LD)
	FRM1DORM	Number of frames obtained with pass 1 from users in the dormant list (H02FR1DM)
	FRM1NSS	Number of frames obtained with pass 1 from system VMDBK, NSSs, DCSSs, ... (H02FR1NS)
	FRM1ELIG	Number of frames obtained with pass 1 from users in the eligible list (H02FR1EL)
	FRM1DISP	Number of frames obtained with pass 1 from users in the dispatch list (H02FR1DL)
	FRM2LDRM	Number of frames obtained with pass 2 from users in the long term dormant list (H02FR2LD)
	FRM2DORM	Number of frames obtained with pass 2 from users in the dormant list (H02FR2DM)
	FRM2NSS	Number of frames obtained with pass 2 from system VMDBK, NSSs, DCSSs, ... (H02FR2NS)
	FRM2ELIG	Number of frames obtained with pass 2 from users in the eligible list (H02FR2EL)
	FRM2DISP	Number of frames obtained with pass 2 from users in the dispatch list (H02FR2DL)
	FRMEDORM	Number of frames obtained with the emergency pass from users in the dormant list (H02FREDM)
	FRMENSS	Number of frames obtained with the emergency pass from system VMDBK, NSSs, DCSSs, ... (H02FRENS)
	FRMEELIG	Number of frames obtained with the emergency pass from users in the eligible list (H02FREEL)

Display	Variable Name	Variable Description and Derivation
	FRMEDISP	Number of frames obtained with the emergency pass from users in the dispatch list (H02FREDL)

Performance Variables of Trend Records X'FC03'

Trend record X'FC03' contains data describing logical partition load and performance.

The selection format for record 03 variables is:

lparname
is the name of the logical partition for which data are to be extracted. Overall load values for the whole system will be calculated if the LPAR name is specified as an asterisk '*'.

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
For the physical load values we add the load values obtained for each of the involved logical processors, and finally divide the total by the number of physical processors in the complex.		
LPAR	%LOAD	Overall logical partition load, in percent of total system capacity. The formula for calculating the load for a *single* LPAR is: ((sum of H03ACTM) * 100 / TRNDRELT / H03NRPRC) For overall totals ('*' selection) the general LPAR management overhead is also added, as follows: + (H03MGMTM * 100 / H03MGMEL / H03NRPRC)
For all of the remaining variables we calculate the average load for a logical processor, i.e. where values from multiple logical logical processors are to be considered we first build the sum of the values obtained for each logical processor and finally divide it by the number of logical processors we obtained data for. The formula shown indicates only how the values per logical processor are obtained.		
LPAR	%BUSY	Logical processor busy percentage (H03ACTM * 100 / TRNDRELT)
	%OVHD	Logical processor LPAR management overhead, in percent ((H03ACTM-H03NETT)* 100 / TRNDRELT)
	%SUSP	Logical processor suspended percentage ((TRNDRELT-H03UTIM-H03STIM -H03WTIM) * 100 / TRNDRELT)
	%VMLD	Logical processor load as seen by guest ((H03UTIM+H03STIM) * 100 / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	%LOGLD	'Logical' load of logical processor, based on non-suspended elapsed time ((H03UTIM+H03STIM) * 100 / (H03UTIM+H03STIM+H03WTIM))

Performance Variables of Trend Records X'FC04'

Trend record X'FC04' contains data describing full-track cache (or minidisk cache) performance.

The selection format for record 04 variables is

```
├─MDC(─varname─)──────────────────────────────────────────────────────────────┤
```

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. The same names have been chosen as for the equivalent variables defined for HISTLOG and HISTSUM files, i.e. they usually *do not* correspond directly to part of the header line of the MDCACHE or MDCSTOR performance display. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
MDC	MNIDEAL	FTC main storage frames count, ideal (H04IDLMN)
	MNACT	FTC main storage frames count, actual (H04ACTMN)
	MN>2GB	FTC main storage frames count, actual frames used above 2GB line (H04G2GMN)
	MNMIN	FTC main storage frames, minimum set (H04MINMN)
	MNMAX	FTC main storage frames, maximum set (H04MAXMN)
	MNDEL/S	FTC main storage page delete rate/s (H04MNDEL / TRNDRELT)
	MNSTL/S	FTC main storage page steal rate/s (H04MNSTL / TRNDRELT)
	MNBIAS	FTC main storage bias (H04BIAMN / 100)
	XSTAV	Nr. of XSTORE blocks, CP partition size (H04CPPAR)
	XSIDEAL	FTC expanded storage blocks, ideal (H04IDLXS)
	XSACT	FTC expanded storage blocks, actual (H04MDCNE)
	MDNE	FTC total nr. of blocks (main & XSTORE) (H04ACTMN + H04MDCNE)
	XSMIN	FTC exp. storage blocks, minimum set (H04MINXS)
	XSMAX	FTC exp. storage blocks, maximum set (H04MDCAC)
	FAIRSHR	Fair share limit (max. FTC blocks per user) (H04FSHAR)
	XSDEL/S	FTC XSTORE page delete rate per sec. (H04XSREL / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	XSSTL/S	FTC XSTORE page steal rate per second (H04XSSTL / TRNDRELT)
	XSBIAS	FTC expanded storage bias (H04BIAXS / 100)
	MDR/S	Minidisk cache read request rate/s (H04RDREQ / TRNDRELT)
	MDH/S	Minidisk cache read request hits/s (H04AVOID / TRNDRELT)
	%MDH	Percent minidisk cache read hits (H04AVOID * 100 / H04RDREQ)
	MDPIN/S	FTC XSTORE block PGIN rate per second (H04PGIN / TRNDRELT)
	MDPOUT/S	FTC XSTORE block PGOUT rate per second (H04PGOUT / TRNDRELT)
	MDAVAGE	Average age of FTC XSTORE blocks, in sec. (H04AGEXS)
	FSEX/S	FTC fair share exceeded rate per second (H04FSEXC / TRNDRELT)
	BKINS/S	'In transit' inserts into waiting queue (H04WQINS / TRNDRELT)
	INVR/S	Invalidation request rate per second (H04INVRQ / TRNDRELT)
	INVB/S	Blocks invalidated per second (H04INVBK / TRNDRELT)
	MDUS	Users with MDC inserts (H04USRIN)

Performance Variables of Trend Records X'FC05'

Trend record X'FC05' contains data describing CP system services' activity.

The selection format for record 05 variables is:

cpuno is the number of the processor for which data are to be extracted.

Totals for the values from all processors will be calculated if the processor number is specified as an asterisk '*'.

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. The same names have been chosen as for the equivalent variables defined for HISTLOG and HISTSUM files, i.e. they usually *do not* correspond directly to part of the header line of a performance display. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
CP Services (ALL), Rates per Second		
CPSERV	IUVM_T	Total IUCV and VMCF activity per second ((H05ISEND+H05IRECV+H05IFAIL+H05VMCFS +H05VMCFR+H05VMCFF) / TRNDRELT)
	IUCV_T	Total IUCV activity per second ((H05ISEND+H05IRECV+H05IFAIL) / TRNDRELT)
	VMCF_T	Total VMCF activity per second ((H05VMCFS+H05VMCFR+H05VMCFF) / TRNDRELT)
	*TOT_T	Total system services activity per second ((H05IMSAS+H05IMSGS+H05IRPIS +H05IBIOS+H05IMONS+H05ISIGS +H05ICCSS+H05ISPLS+H05ISYMS +H05IACCS+H05ILOGS+H05ICRMS +H05IIDES+H05ICNFS+H05ISEVS +H05ISEAS+H05ISESC+H05ISEVE +H05IMSAR+H05IMSGR+H05IRPIR +H05IBIOR+H05IMONR+H05ISIGR +H05ICCSR+H05ISPLR+H05ISYMR +H05IACCR+H05ILOGR+H05ICRMR +H05IIDER+H05ICNFR+H05ISTVS +H05ISTAS+H05ISTSC+H05ISTVEVE +H05IMSAF+H05IMSGF+H05IRPIF +H05IBIOF+H05IMONF+H05ISIGF +H05ICCSF+H05ISPLF+H05ISYMF +H05IACCF+H05ILOGF+H05ICRMF +H05IIDEF+H05ICNFF+H05ISUVS +H05ISUAS+H05ISUSC+H05ISUVE) / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	*MSA_T	Total *MSGALL IUCV activity per second ((H05IMSAS+H05IMSAR+H05IMSAF) / TRNDRELT)
	*MSG_T	Total *MSG IUCV activity per second ((H05IMSGS+H05IMSGR+H05IMSGF) / TRNDRELT)
	*RPI_T	Total *RPI IUCV activity per second ((H05IRPIS+H05IRPIR+H05IRPIF) / TRNDRELT)
	*BLK_T	Total *BLOCKIO IUCV activity per second ((H05IBIOS+H05IBIOR+H05IBIOF) / TRNDRELT)
	*MON_T	Total *MONITOR IUCV activity per second ((H05IMONS+H05IMONR+H05IMONF) / TRNDRELT)
	*SIG_T	Total *SIGNAL IUCV activity per second ((H05ISIGS+H05ISIGR+H05ISIGF) / TRNDRELT)
	*CCS_T	Total *CCS IUCV activity per second ((H05ICCSS+H05ICCSR+H05ICCSF) / TRNDRELT)
	*SPL_T	Total *SPL IUCV activity per second ((H05ISPLS+H05ISPLR+H05ISPLF) / TRNDRELT)
	*SYM_T	Total *SYMPTOM IUCV activity per second ((H05ISYMS+H05ISYMR+H05ISYMF) / TRNDRELT)
	*ACC_T	Total *ACCOUNT IUCV activity per second ((H05IACCS+H05IACCR+H05IACCF) / TRNDRELT)
	*LOG_T	Total *LOGREC IUCV activity per second ((H05ILOGS+H05ILOGR+H05ILOGF) / TRNDRELT)
	*CRM_T	Total *CRM IUCV activity per second ((H05ICRMS+H05ICRMR+H05ICRMF) / TRNDRELT)
	*IDE_T	Total *IDENT IUCV activity per second ((H05IIDES+H05IIDER+H05IIDEF) / TRNDRELT)
	*CNF_T	Total *CONFIG IUCV activity per second ((H05ICNFS+H05ICNFR+H05ICNFF) / TRNDRELT)
CP Services from CP to Virtual Machines, Rates per Second		
CPSERV	IUVM>V	Total IUCV and VMCF rate/s, CP to VM ((H05ISEND+H05VMCFS) / TRNDRELT)
	IUCV>V	Total IUCV activity/s, CP to VM (H05ISEND / TRNDRELT)
	VMCF>V	Total VMCF activity/s, CP to VM (H05VMCFS / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	*TOT>V	Total system services rate/s, CP to VM ((H05IMSAS+H05IMSGS+H05IRPIS +H05IBIOS+H05IMONS+H05ISIGS +H05ICCSS+H05ISPLS+H05ISYMS +H05IACCS+H05ILOGS+H05ICRMS +H05IIDES+H05ICNFS+H05ISEVS +H05ISEAS+H05ISESC+H05ISEVE) / TRNDRELT)
	*MSA>V	Total *MSGALL IUCV rate/s, CP to VM (H05IMSAS / TRNDRELT)
	*MSG>V	Total *MSG IUCV rate/s, CP to VM (H05IMSGS / TRNDRELT)
	*RPI>V	Total *RPI IUCV rate/s, CP to VM (H05IRPIS / TRNDRELT)
	*BLK>V	Total *BLOCKIO IUCV rate/s, CP to VM (H05IBIOS / TRNDRELT)
	*MON>V	Total *MONITOR IUCV rate/s, CP to VM (H05IMONS / TRNDRELT)
	*SIG>V	Total *SIGNAL IUCV rate/s, CP to VM (H05ISIGS / TRNDRELT)
	*CCS>V	Total *CCS IUCV rate/s, CP to VM (H05ICCSS / TRNDRELT)
	*SPL>V	Total *SPL IUCV rate/s, CP to VM (H05ISPLS / TRNDRELT)
	*SYM>V	Total *SYMPTOM IUCV rate/s, CP to VM (H05ISYMS / TRNDRELT)
	*ACC>V	Total *ACCOUNT IUCV rate/s, CP to VM (H05IACCS / TRNDRELT)
	*LOG>V	Total *LOGREC IUCV rate/s, CP to VM (H05ILOGS / TRNDRELT)
	*CRM>V	Total *CRM IUCV rate/s, CP to VM (H05ICRMS / TRNDRELT)
	*IDE>V	Total *IDENT IUCV rate/s, CP to VM (H05IIDES / TRNDRELT)
	*CNF>V	Total *CONFIG IUCV rate/s, CP to VM (H05ICNFS / TRNDRELT)

CP Services from Virtual Machines to CP, Rates per Second

CPSERV	IUVM>C	Total IUCV and VMCF activity/s, VM to CP ((H05IRECV+H05VMCFR) / TRNDRELT)
	IUCV>C	Total IUCV activity/s, VM to CP (H05IRECV / TRNDRELT)
	VMCF>C	Total VMCF activity/s, VM to CP (H05VMCFR / TRNDRELT)
	*TOT>C	Total system services rate/s, VM to CP ((H05IMSAR+H05IMSGR+H05IRPIR +H05IBIOR+H05IMONR+H05ISIGR +H05ICCSR+H05ISPLR+H05ISYMR +H05IACCR+H05ILOGR+H05ICRMR +H05IIDER+H05ICNFR+H05ISTVS +H05ISTAS+H05ISTSC+H05ISTVE) / TRNDRELT)
	*MSA>C	Total *MSGALL IUCV rate/s, VM to CP (H05IMSAR / TRNDRELT)
	*MSG>C	Total *MSG IUCV rate/s, VM to CP (H05IMSGR / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	*RPI>C	Total *RPI IUCV rate/s, VM to CP (H05IRPIR / TRNDRELT)
	*BLK>C	Total *BLOCKIO IUCV rate/s, VM to CP (H05IBIOR / TRNDRELT)
	*MON>C	Total *MONITOR IUCV rate/s, VM to CP (H05IMONR / TRNDRELT)
	*SIG>C	Total *SIGNAL IUCV rate/s, VM to CP (H05ISIGR / TRNDRELT)
	*CCS>C	Total *CCS IUCV rate/s, VM to CP (H05ICCSR / TRNDRELT)
	*SPL>C	Total *SPL IUCV rate/s, VM to CP (H05ISPLR / TRNDRELT)
	*SYM>C	Total *SYMPTOM IUCV rate/s, VM to CP (H05ISYMR / TRNDRELT)
	*ACC>C	Total *ACCOUNT IUCV rate/s, VM to CP (H05IACCR / TRNDRELT)
	*LOG>C	Total *LOGREC IUCV rate/s, VM to CP (H05ILOGR / TRNDRELT)
	*CRM>C	Total *CRM IUCV rate/s, VM to CP (H05ICRMR / TRNDRELT)
	*IDE>C	Total *IDENT IUCV rate/s, VM to CP (H05IIDER / TRNDRELT)
	*CNF>C	Total *CONFIG IUCV rate/s, VM to CP (H05ICNFR / TRNDRELT)
CP Services, Failure Rates per Second		
CPSERV	IUVM_F	Total IUCV and VMCF failures per second ((H05IFAIL+H05VMCFF) / TRNDRELT)
	IUCV_F	Total IUCV failures per second (H05IFAIL / TRNDRELT)
	VMCF_F	Total VMCF failures per second (H05VMCFF / TRNDRELT)
	*TOT_F	Total system services failures per second ((H05IMSAF+H05IMSGF+H05IRPIF +H05IBIOF+H05IMONF+H05ISIGF +H05ICCSF+H05ISPLF+H05ISYMF +H05IACCF+H05ILOGF+H05ICRMF +H05IIDEF+H05ICNFF+H05ISUVS +H05ISUAS+H05ISUSC+H05ISUVE) / TRNDRELT)
	*MSA_F	Total *MSGALL IUCV failures per second (H05IMSAF / TRNDRELT)
	*MSG_F	Total *MSG IUCV failures per second (H05IMSGF / TRNDRELT)
	*RPI_F	Total *RPI IUCV failures per second (H05IRPIF / TRNDRELT)
	*BLK_F	Total *BLOCKIO IUCV failures per second (H05IBIOF / TRNDRELT)
	*MON_F	Total *MONITOR IUCV failures per second (H05IMONF / TRNDRELT)
	*SIG_F	Total *SIGNAL IUCV failures per second (H05ISIGF / TRNDRELT)
	*CCS_F	Total *CCS IUCV failures per second (H05ICCSF / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	*SPL_F	Total *SPL IUCV failures per second (H05ISPLF / TRNDRELT)
	*SYM_F	Total *SYMPTOM IUCV failures per second (H05ISYMF / TRNDRELT)
	*ACC_F	Total *ACCOUNT IUCV failures per second (H05IACCF / TRNDRELT)
	*LOG_F	Total *LOGREC IUCV failures per second (H05ILOGF / TRNDRELT)
	*CRM_F	Total *CRM IUCV failures per second (H05ICRMF / TRNDRELT)
	*IDE_F	Total *IDENT IUCV failures per second (H05IIDEF / TRNDRELT)
	*CNF_F	Total *CONFIG IUCV failures per second (H05ICNFF / TRNDRELT)
CP Services (ALL), Rates per Second		
CPSERV	*VSW_T	Total *VSWITCH IUCV activity per second ((H05ISEVS+H05ISTVS+H05ISUVS) / TRNDRELT)
	*ASY_T	Total *ASYNCMD IUCV activity per second ((H05ISEAS+H05ISTAS+H05ISUAS) / TRNDRELT)
	*SCL_T	Total *SCLP IUCV activity per second ((H05ISESC+H05ISTSC+H05ISUSC) / TRNDRELT)
	*VME_T	Total *VMEVENT IUCV activity per second ((H05ISEVE+H05ISTVE+H05ISUVE) / TRNDRELT)
CP Services from CP to Virtual Machines, Rates per Second		
	*VSW>V	Total *VSWITCH IUCV rate/s, CP to VM (H05ISEVS / TRNDRELT)
	*ASY>V	Total *ASYNCMD IUCV rate/s, CP to VM (H05ISEAS / TRNDRELT
	*SCL>V	Total *SCLP IUCV rate/s, CP to VM (H05ISESC / TRNDRELT)
	*VME>V	Total *VMEVENT IUCV rate/s, CP to VM (H05ISEVE / TRNDRELT)
CP Services from Virtual Machines to CP, Rates per Second		
	*VSW>C	Total *VSWITCH IUCV rate/s, VM to CP (H05ISTVS / TRNDRELT)
	*ASY>C	Total *ASYNCMD IUCV rate/s, VM to CP (H05ISTAS / TRNDRELT)
	*SCL>C	Total *SCLP IUCV rate/s, VM to CP (H05ISTSC / TRNDRELT)
	*VME>C	Total *VMEVENT IUCV rate/s, VM to CP (H05ISTVE / TRNDRELT)
CP Services, Failure Rates per Second		
	*VSW_F	Total *VSWITCH IUCV failures per second (H05ISUVS / TRNDRELT)
	*ASY_F	Total *ASYNCMD IUCV failures per second (H05ISUAS / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	*SCL_F	Total *SCLP IUCV failures per second (H05ISUSC / TRNDRELT)
	*VME_F	Total *VMEVENT IUCV failures per second (H05ISUVE / TRNDRELT)

Performance Variables of Trend Records X'FC06'

Trend record X'FC06' contains data describing channel utilization, based on HF sampling data. The values refer to the overall (physical) utilization of the channel, regardless of whether data collection was from a system running in an LPAR or not.

The selection format for record 06 variables is

chpid is the hexadecimal channel path identifier (two hexadecimal digits) of the channel for which data are to be extracted.

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variable shown in the following table has been pre-defined. The description also includes the formula used to calculate the value from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
CHANNEL	AVE	Average channel busy percentage (H06HFBSY * 100 / H06HFCNT)

Performance Variables of Trend Records X'FC07'

Trend record X'FC07' contains data describing channel utilization, based on information collected by the Channel Measurement Facility. When collected by a system running in an LPAR, the values describe 'logical' channel utilization, i.e. the utilization by the system that also collected the data.

The selection format for record 07 variables is

chpid is the hexadecimal channel path identifier (two hexadecimal digits) of the channel for which data are to be extracted.

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variable shown in the following table has been pre-defined. The description also includes the formula used to calculate the value from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
LCHANNEL	AVE	Average logical channel busy percentage (H07TOTBS / H07SAMPS)

Performance Variables of Trend Records X'FC08'

Trend record X'FC08' contains data describing channel utilization, based on information collected by the Extended Channel Measurement Facility.

The selection format for record 08 variables is

```
├──display(──chpid──varname──)──────────────────────────────────────────────────────────────┤
```

*display***(**
: is the name of a performance display that contains the variable, shown under the heading 'Display' in the following table of selectable variables, and immediately followed by a left parenthesis.

chpid
: is the hexadecimal channel path identifier (two hexadecimal digits) of the channel for which data are to be extracted.

varname
: is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. The descriptions also include the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
FICON Channel Utilization Data		
FCHANNEL	%BUSY	Average total channel busy percentage (H08TOTBS / H08SAMPS)
	%LBUSY	Average logical channel busy percentage, with channel load by the own partition (H08LPABS / H08SAMPS)
	The following fields are defined for FICON channels only; they are not valid for other channels.	
	T_BCY	Average total internal bus cycle utilization, in percent (H08TBCYC * 100 * 1000000 / H08MXIBC / H08TSTMP / 128)
	T_WUN	Average total channel work units utilization, in percent (H08TWUNI * 100 * 1000000 / H08MXWUN / H08TSTMP / 128)
	T_DUW	Average total data unit writes utilization, in percent (H08TDUWR * 100 * 1000000 / H08MXDUW / H08TSTMP / 128)
	T_DUR	Average total data unit reads utilization, in percent (H08TDURD * 100 * 1000000 / H08MXDUR / H08TSTMP / 128)
	L_WUN	Average logical channel work units utilization by the own partition, in percent (H08LWUNI * 100 * 1000000 / H08MXWUN / H08TSTMP / 128)

Display	Variable Name	Variable Description and Derivation
	L_DUW	Average logical data unit writes utilization by the own partition, in percent (H08LDUWR * 100 * 1000000 / H08MXDUW / H08TSTMP / 128)
	L_DUR	Average logical data unit reads utilization by the own partition, in percent (H08LDURD * 100 * 1000000 / H08MXDUR / H08TSTMP / 128)
	WRITE/S	Average total bytes written per second (H08TDUWR * H08BYTES * 1000000 / H08TSTMP / 128)
	READ/S	Average total bytes read per second (H08TDURD * H08BYTES * 1000000 / H08TSTMP / 128)

Hipersocket Channel Activity Data

HIPSOCK	T_MSGS	Average total messages sent rate per second. (H08TMSNT * 1000000 / H08TSTMP / 128)
	T_DUNITS	Average total data units sent rate per second. (H08TDUSN * 1000000 / H08TSTMP / 128)
	T_NOBUFF	Average total unsuccessful send rate due to insufficient receive buffers, per second. (H08TUNBF * 1000000 / H08TSTMP / 128)
	L_MSGS	Average messages sent rate per second for the own partition. (H08LMSNT * 1000000 / H08TSTMP / 128)
	L_DUNITS	Average data units sent rate per second for the own partition. (H08LDUSN * 1000000 / H08TSTMP / 128)
	L_NOBUFF	Average unsuccessful send rate per second due to insufficient receive buffers, for the own partition. (H08LUNBF * 1000000 / H08TSTMP / 128)
	L_OTHER	Average unsuccessful send rate per second due to other reasons, for the own partition. (H08LUNSS * 1000000 / H08TSTMP / 128)

Performance Variables of Trend Records X'FC3A'

Trend record X'FC3A' contains overall transaction and response time data statistics for all users, as shown on the SYSTRANS display.

The selection format for record 3A variables is:

```
├─SYSTRANS(─varname─)──────────────────────────────────────────────────────────┤
```

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

Transaction counts are provided for the number of transactions falling below one of twelve thresholds for a specific variable, or above the highest one, i.e. 13 values are available for each group of trivial and non-trivial transaction counts. The percentage of transactions for which the value of the selected variable fell below a particular threshold can thus be calculated as

```
(sum of transaction counts below threshold) * 100
-------------------------------------------------
  (sum of transaction counts for all 13 fields)
```

The variables shown in the following table have been pre-defined. Since the full formulas for all variables would take up a lot of space, they have not been included here.

Display	Variable Name	Variable Description and Derivation
Transaction Response Times:		
SYSTRANS	%TTM*n.nn*	Percentage of trivial transactions with a response time lower than *n.nn*
	%NTM*n.nn*	Percentage of non-trivial transactions with a response time lower than *n.nn* The string *n.nn* must be specified as one of the following threshold values: 0.01, 0.02, 0.04, 0.06, 0.10, 0.20, 0.40, 0.60, 1.00, 2.00, 4.00, or 6.00. The values must be entered exactly as shown, i.e. as three digits with a decimal point after the first digit. Example: Specify SYSTRANS(%TTM0.20) to select the percentage of trivial transactions that had a response time of less than 0.20 seconds.
CPU Usage per Transaction:		
SYSTRANS	%TCP*nnnn*	Percentage of trivial transactions with a CPU usage lower than *nnnn* milliseconds
	%NCP*nnnn*	Percentage of non-trivial transactions with a CPU usage lower than *nnnn* milliseconds The string *nnnn* must be specified as one of the following threshold values, exactly as shown: 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000 or 5000.

Display	Variable Name	Variable Description and Derivation
Disk I/Os per Transaction:		
SYSTRANS	%TIO*nnn*	Percentage of trivial transactions with less than *nnn* disk I/O operations
	%NIO*nnn*	Percentage of non-trivial transactions with less than *nnn* disk I/O operations The string *nnn* must be specified as one of the following threshold values, exactly as shown: 1, 2, 4, 6, 10, 20, 40, 60, 100, 200, 400 or 600.
Page Faults per Transaction:		
SYSTRANS	%TPF*nnn*	Percentage of trivial transactions with less than *nnn* page faults
	%NPF*nnn*	Percentage of non-trivial transactions with less than *nnn* page faults The string *nnn* must be specified as one of the following threshold values, exactly as shown: 1, 2, 4, 6, 10, 20, 40, 60, 100, 200, 400 or 600.
XSTORE Page Reads per Transaction:		
SYSTRANS	%TXR*nnn*	Percentage of trivial transactions with less than *nnn* XSTORE page reads
	%NXR*nnn*	Percentage of non-trivial transactions with less than *nnn* XSTORE page reads The string *nnn* must be specified as one of the following threshold values, exactly as shown: 1, 2, 4, 6, 10, 20, 40, 60, 100, 200, 400 or 600.
IUCV Messages per Transaction:		
SYSTRANS	%TIU*nnn*	Percentage of trivial transactions with less than *nnn* IUCV interactions
	%NIU*nnn*	Percentage of non-trivial transactions with less than *nnn* IUCV interactions The string *nnn* must be specified as one of the following threshold values, exactly as shown: 1, 2, 4, 6, 10, 20, 40, 60, 100, 200, 400 or 600.
VMCF Messages per Transaction:		
SYSTRANS	%TVM*nnn*	Percentage of trivial transactions with less than *nnn* VMCF interactions
	%NVM*nnn*	Percentage of non-trivial transactions with less than *nnn* VMCF interactions The string *nnn* must be specified as one of the following threshold values, exactly as shown: 1, 2, 4, 6, 10, 20, 40, 60, 100, 200, 400 or 600.
Spool Reads per Transaction:		
SYSTRANS	%TSR*nnn*	Percentage of trivial transactions with less than *nnn* spool reads

Display	Variable Name	Variable Description and Derivation
	%NSR*nnn*	Percentage of non-trivial transactions with less than *nnn* spool reads The string *nnn* must be specified as one of the following threshold values, exactly as shown: 1, 2, 4, 6, 10, 20, 40, 60, 100, 200, 400 or 600.
Spool Writes per Transaction:		
SYSTRANS	%TSW*nnn*	Percentage of trivial transactions with less than *nnn* spool writes
	%NSW*nnn*	Percentage of non-trivial transactions with less than *nnn* spool writes The string *nnn* must be specified as one of the following threshold values, exactly as shown: 1, 2, 4, 6, 10, 20, 40, 60, 100, 200, 400 or 600.

Performance Variables of Trend Records X'FC3C'

Trend record X'FC3C' contains data describing NSS performance for individual shared segments.

The selection format for record 3C variables is:

```
├──NSS(─segno──varname─)──────────────────────────────────────────────────────────────────────┤
```

segno is the spool file number of a shared segment for which data are to be extracted, in up to four decimal digits. Note that shared segment data cannot be extracted by segment name because multiple segments with the same name may be active concurrently.

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
NSS	SHARE	Number of users accessing the segment in shared mode (H3CUSHRD / TRNDRSMP)
	N-SHR	Number of users accessing the segment in non-shared mode (H3CUSNSH / TRNDRSMP)
	SAVD	Number of pages saved in this segment (H3CPGSAV)
	NDAT	Number of pages defined with a 'no data saved' page descriptor (H3CPGNSV)
	RES.	Number of private resident pages in the segment (H3CPGRES / TRNDRSMP)
	XSTOR	Number of expanded storage blocks occupied (H3CXSPGS / TRNDRSMP)
	TRANS	Page translation rate, per second (H3CPGTRN / TRNDRELT)
	STEAL	Page frame steal rate, per second (H3CPGSTL / TRNDRELT)
	PGRDS	Page read rate, per second (H3CPGRDS / TRNDRELT)
	PGWRT	Page write rate, per second (H3CPGWRT / TRNDRELT)
	X-RDS	Page-in rate per second from expanded storage (H3CXPGRD / TRNDRELT)
	X-WRT	Page-out rate per second to expanded storage (H3CXPGWR / TRNDRELT)
	X-MIG	Page migration rate per second from expanded storage to disk (H3CXMIGR / TRNDRELT)

Performance Variables of Trend Records X'FC41', X'FC42' & X'FC43'

Trend record X'FC41' contains data describing user resource utilization and wait states for individual users. The same information is available for user classes in record X'FC42' and as totals for all users on the system in record X'FC43'.

The selection format for record 41/42/43 variables is:

*display***(**
Is the name of a performance display that contains the variable, shown under the heading 'Display' in the following table of selectable variables, and immediately followed by a left parenthesis.

userid Is the user identification of a virtual machine, i.e. data will be extracted from trend records X'FC41'.

'*user class***'**
Is the user class name, i.e. data will be extracted from user class trend records X'FC42'. The string may contain up to 8 characters including blanks, and it *must* be enclosed by single quotes.

ALL Indicates data extraction from trend record X'FC43', for system totals of all users.

varname
Is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields. When processing user class records X'FC42' or user totals records X'FC43' the values will also be divided by the number of users (H41USRCT) to obtain averages per user, where appropriate.

Display	Variable Name	Variable Description and Derivation
General User Load Data		
USER	%CPU	Total CPU load, in percent (H41TCPU * 100 / TRNDRELT)
	TCPU	Total CPU time used, in seconds (H41TCPU)
	VCPU	Virtual CPU time used, in seconds (H41VCPU)
	RATIO	Total/virtual CPU time ratio (H41TCPU / H41VCPU)
	%VEC	Vector facility load, in percent ((H41VVEC+H41OVEC) * 100 / TRNDRELT)
	TOTAL	Total virtual I/O activity, in IOs per sec. ((H41IOCON+H41IOCTC+H41IODSD +H41IOUR+H41IOOTH+H41IOD98) / TRNERELT)

Display	Variable Name	Variable Description and Derivation
	DASD	I/O activity to DASD, in IOs per second (H41IODSD / TRNDRELT)
	AVOID	DASD I/O rate avoided due to minidisk cache ((H41IOAVO+H41IOVDI) / TRNDRELT)
	DIAG98	Diagnose X'98' I/O rate, diagnoses per sec. (H41IOD98 / TRNDRELT)
	UR	I/O activity to UR devices, in IOs per sec. (H41IOUR / TRNDRELT)
	PG/S	Pages read and written per second ((H41PGRD+H41PGWRT) / TRNDRELT)
	LOGGED	Minutes logged on (H41TIMLG / 60)
	ACTIVE	Minutes active (H41TIMAC / 60)
	PAGES	Total spool pages processed (H41SPPGS)
	SPG/S	Spool pages processed per second (H41SPPGS / TRNDRELT)
	MDC/S	Minidisk cache inserts per second (H41MDCIN / TRNDRELT)
User Paging and Storage Utilization Data		
UPAGE	OWNED	Non-base address spaces owned (H41DSOWN / TRNDRSMP)
	READS	Page read rate per second (H41PGRD / TRNDRELT)
	WRITE	Page write rate per second (H41PGWRT / TRNDRELT)
	STEALS	Page steal rate per second (H41PGSTL / TRNDRELT)
	>2GB>	Pages moved/s below 2GB for translation (H41PGB2G / TRNDRELT)
	X>MS	XSTORE to main PGIN rate per second (H41XTOMN / TRNDRELT)
	MS>X	Main to XSTORE PGOUT rate per second (H41MNTOX / TRNDRELT)
	X>DS	XSTORE to DASD migrations per second (H41XTODS / TRNDRELT)
	WSS	Average nr. of pages in working set (H41PGWSS / TRNDRSMP)
	L<2GB	Average pages locked below 2GB (H41PGLCK / TRNDRSMP)
	L>2GB	Average pages locked above 2GB (H41PGLCG / TRNDRSMP)
	RESRVD	Average number of reserved pages (H41PGRSV / TRNDRSMP)
	R<2GB	Average pages resident below 2GB (H41PGRES / TRNDRSMP)
	R>2GB	Average pages resident above 2GB (H41PGRS2 / TRNDRSMP)
	XSTOR	Average nr. of expanded storage pages (H41PGXST / TRNDRSMP)
	DASD	Average nr. of pages on DASD (H41PGDSD / TRNDRSMP)

Display	Variable Name	Variable Description and Derivation
	SIZE	Virtual storage size, in bytes (H41STSIZ)
User Communication Data		
UCOMM	MSG/S	Total message rate per second, for IUCV and VMCF communication ((H41IUSND+H41IURCV+H41IUFAI +H41VMSND+H41VMRCV+H41VMFAI) / TRNDRELT)
	ISEND	IUCV messages sent per second (H41IUSND / TRNDRELT)
	IRECV	IUCV messages received per second (H41IURCV / TRNDRELT)
	IFAIL	IUCV messages failed per second (H41IUFAI / TRNDRELT)
	VSEND	VMCF messages sent per second (H41VMSND / TRNDRELT)
	VRECV	VMCF messages received per second (H41VMRCV / TRNDRELT)
	VFAIL	VMCF messages failed per second (H41VMFAI / TRNDRELT)
	SENDQ	Average IUCV msgs. in send queue (H41IUSNQ / TRNDRSMP)
	RECVQ	Average IUCV msgs. in receive queue (H41IURCQ / TRNDRSMP)
	REPLQ	Average IUCV msgs. in reply queue (H41IURPQ / TRNDRSMP)
	QUEUE	Average VMCF messages queued (H41VMCFQ / TRNDRSMP)
	TOTAL	Average number of IUCV connections (H41IUCON / TRNDRSMP)
	MAX.	Maximum number of IUCV connections allowed (H41MXCON / TRNDRSMP)
User Wait States		
USTAT	%ACT	Percent of time user was found to be active (not dormant) ((H41HFSMP+H41HFSVD-H41HFDRM) * 100 / H41HFSMP)
	%RUN	Percent of active time user was found running (H41HFRUN * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%CPU	Percent of active time user was in CPU wait (H41HFCPU * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%LDG	Percent of active time user was loading (H41HFLDG * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%PGW	Percent of active time user was in page wait (H41HFPGW * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%IOW	Percent of active time user was in I/O wait (H41HFIOW * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))

Display	Variable Name	Variable Description and Derivation
	%SIM	% of active time user was in inst. simul. wait (H41HFSIM * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%TIW	Percent of active time user was in test-idle wait (H41HFTIW * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%CFW	Percent of active time user was in CF wait (H41HFCFW * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%TI	Percent of active time user was in SVM & TI wait (H41HFSVT * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%EL	Percent of active time user was in SVM wait and in the eligible list (H41HFSVE * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%DM	Percent of active time user was in SVM wait and dormant (H41HFSVD * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%IOA	% of active time user was in 'I/O active' wait (H41HFIOA * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%PGA	% of active time user was in 'page active' wait (H41HFPGA * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%LIM	Percent of active time user was in limit list wait (H41HFLIM * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	%OTH	% of active time user was in another wait state (H41HFOTH * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	Q0	Percent of active time user was in queue 0 (H41HFQU0 * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	Q1	Percent of active time user was in queue 1 (H41HFQU1 * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	Q2	Percent of active time user was in queue 2 (H41HFQU2 * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	Q3	Percent of active time user was in queue 3 (H41HFQU3 * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
	E0-3	Percent of active time user was in elig. list ((H41HFEL0+H41HFEL1+H41HFEL2+H41HFEL3) * 100 / (H41HFSMP+H41HFSVD-H41HFDRM))
User QDIO Related Activity Data		
UQDIO	TVS	TVS instruction intercept rate per second (H41QDTVS / TRNDRSMP)
	SVS	SVS instruction intercept rate per second (H41QDSVS / TRNDRELT)
	/SEC	Alert interrupt rate per second (H41QDALE / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	VIATPI	Adapter interrupts delivered/s to guest via TPI (H41QDTPI / TRNDRELT)
	INSIE	Adapter interrupts delivered/s to guest in SIE (H41QDHDW / TRNDRELT)
	BYCP	Adapter interrupts stacked per secondn by CP (H41QDVIR / TRNDRELT)

Performance Variables of Trend Records X'FC44', X'FC45' & X'FC46'

Trend record X'FC44' contains transaction and response time data for individual users. The same information is available for user classes in record X'FC45' and as totals for all users on the system in record X'FC46'.

The selection format for record 44/45/46 variables is:

*display***(**
Is the name of a performance display that contains the variable, shown under the heading 'Display' in the following table of selectable variables, and immediately followed by a left parenthesis.

userid Is the user identification of a virtual machine, i.e. data will be extracted from trend records X'FC44'.

'*user class*'
Is the user class name, i.e. data will be extracted from user class trend records X'FC45'. The string may contain up to 8 characters including blanks, and it *must* be enclosed by single quotes.

ALL Indicates data extraction from trend record X'FC46', for system totals of all users.

varname
Is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. The variable description also includes the formula used to calculate the values from the original trend record data fields. When processing user class records X'FC45' or user totals records X'FC46' the values will also be divided by the number of users (H44USRCT) to obtain averages per user, where appropriate.

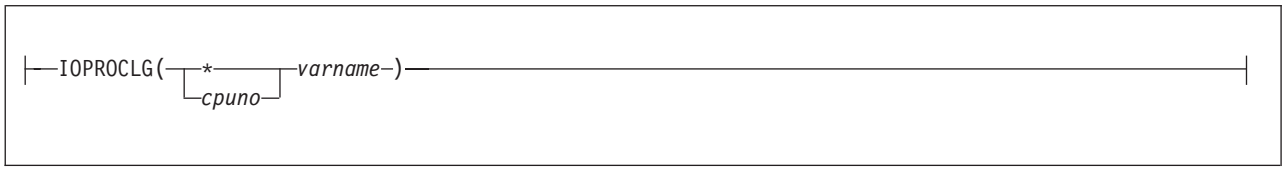
Display	Variable Name	Variable Description and Derivation
User Transaction Data		
UTRANS	COUNT	Total number of transactions (H44TRNCT)
	/HOUR	Number of transactions per hour (H44TRNCT * 3600 / TRNDRELT)
	MSEC	Total CPU time per transaction, in msec (H44CPU * 1000 / H44TRNCT)
	I/O	Number of disk I/Os per transaction (H44DSKIO / H44TRNCT)
	FLTS	Number of page faults per transaction (H44PGFLT / H44TRNCT)
	READS	Number of PGINs per transaction (H44XTOMN / H44TRNCT)
	SP_RD	Number of spool pages read per transaction (H44SPRDS / H44TRNCT)

Display	Variable Name	Variable Description and Derivation
	SP_WR	Number of spool pages written per transaction (H44SPWRT / H44TRNCT)
	IU_BY	Number of IUCV & VMCF sends per transaction ((H44IUCBY+H44VMCBY) / H44TRNCT)
	IU_TO	Number of IUCV & VMCF receives per transaction ((H44IUCTO+H44VMCTO) / H44TRNCT)
User Response Time Data		
URESP	TIME	Think time between transactions, in seconds (H44THNK / H44THCNT)
	TRIV.	Trivial response time, in seconds (H44TRVTM / H44TRVCT / 1000)
	NTRIV	Non-trivial response time, in seconds (H44NTRTM / H44NTRCT / 1000)
	MEAN	Average response time for all transactions ((H44TRVTM+H44NTRTM) / (H44TRVCT+H44NTRCT) / 1000)
	TRV/H	Trivial transaction rate per hour (H44TRVCT * 3600 / TRNDRELT)
	NTRV/H	Non-trivial transaction rate per hour (H44NTRCT * 3600 / TRNDRELT)
	TOTL/H	Total transaction rate per hour ((H44TRVCT+H44NTRCT) * 3600 / TRNDRELT)
	TRV-T	Trivial transaction count (H44TRVCT)
	NTRV-T	Non-trivial transaction count (H44NTRCT)
	TOTL-T	Total transaction count (H44TRVCT + H44NTRCT)

Performance Variables of Trend Records X'FC51'

Trend record X'FC51' contains data describing I/O processor utilization and performance.

The selection format for record 51 variables is:



cpuno is the number of the I/O processor for which data are to be extracted. Totals for the values from all I/O processors will be calculated if the processor number is specified as an asterisk '*'.

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
IOPROCLG	BEG_SSCH	Begin SSCH rate per second (H51BSSCH / TRNDRELT)
	I/O_INT	I/O interrupts generated per second (H51IOINT / TRNDRELT)
	%BUSY	I/O processor busy percentage (H51PRBSY * 100 / (H51PRBSY+H51PRIDL))
	CHANNEL	Percentage of 'begin SSCH' which found a channel to be already busy (H51CHBSY * 100 / H51BSSCH)
	SWITCH	Percentage of 'begin SSCH' which found a switch to be already busy (H51SWBSY * 100 / H51BSSCH)
	CU	Percentage of 'begin SSCH' which found a ctl. unit to be already busy (H51CUBSY * 100 / H51BSSCH)
	DEVICE	Percentage of 'begin SSCH' which found the target device to be already busy (H51DVBSY * 100 / H51BSSCH)

Performance Variables of Trend Records X'FC61'

Trend record X'FC61' contains data describing DASD performance for individual disks.

The selection format for record 61 variables is:

```
├─DEVICE(─devno─varname─)─────────────────────────────────────────────────────────┤
```

devno is the device number of the disk for which data are to be extracted, in normal hexadecimal notation.

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
DEVICE	LINKS	Number of minidisk links to the disk (H61LINKS)
	I/O	Total SSCH & RSCH rate per second (H61SSCH / TRNDRELT)
	AVOID	I/Os avoided rate per second (H61AVOID / TRNDRELT)
	PEND	Average 'function pending' time, in msec. (H61FPNT * 128 / 1000 / H61SSCH)
	DISC	Average 'disconnected' time, in msec. ((H61DSCT+H61DAOT) * 128 / 1000 / H61SSCH)
	CONN	Average 'connected' time, in msec. (H61CONT * 128 / 1000 / H61SSCH)
	SERV	Average I/O service time, in msec. (PEND + DISC + CONN)
	RESP	Average I/O response time, in msec. ((H61HFQUD * TRNDRELT / H61HFCNT / H61SSCH) + SERV)
	CUWT	Average control unit queueing time, in msec. (H61CUBSY * 128 / 1000 / H61SSCH)
	QUED	Average IO request block queue length (H61HFQUD / H61HFCNT)
	BUSY	Percentage of elapsed time that DASD was busy ((H61FPNT+H61DSCT+H61CAOT+H61CONT) * 128 / 10000 / TRNDRELT)
	READ	Percentage of I/O requests that were for READ operations only (H61READS * 100 / (H61READS+H61WRITE))
	CYLS	Average nr. of cylinders skipped per SEEK order (H61SKCYL / H61SKCNT)
	SSCH	Number of SSCHs executed for error recovery purposes (H61RECOV)
	SET/S	Throttle I/O rate set for the disk (I/Os per sec.) (H61THRRT)

Display	Variable Name	Variable Description and Derivation
	DLY/S	Throttle I/O delay rate, per second (H61THRDL / TRNDRELT)

Performance Variables of Trend Records X'FC65'

Trend record X'FC65' contains data describing DASD cache activity and performance for individual disks.

The selection format for record 65 variables is:

```
├──display(──devno──varname──)──────────────────────────────────────────────────────┤
```

*display***(**
: is the name of a performance display that contains the variable, shown under the heading 'Display' in the following table of selectable variables, and immediately followed by a left parenthesis.

devno is the device number of the disk for which data are to be extracted, in normal hex. notation.

varname
: is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
General CU-Cached Disks Data		
CACHDBSE	IO/S	Total I/O rate per second seen by cache CU ((H65RNORR+H65WNORR+H65RSEQR+H65WSEQR +H65RCFWR+H65WCFWR+H65ICREQ+H65BYREQ) / TRNDRELT)
	%READ	Percent cachable read operations, out of total cache I/O activity ((H65RNORR+H65RSEQR+H65RCFWR) * 100 / (H65RNORR+H65RSEQR+H65RCFWR +H65WNORR+H65WSEQR+H65WCFWR)) +H65ICREQ+H65BYREQ))
	%RDHIT	Overall read hit percentage ((H65RNORH+H65RSEQH+H65RCFWH) * 100 / (H65RNORR+H65RSEQR+H65RCFWR))
	%WRHIT	Overall write hit percentage ((H65WNORH+H65WSFWH+H65WCFWH) * 100 / (H65WNORR+H65WSEQR+H65WCFWR))
	ICL/S	Inhibit cache load rate, per second (H65ICREQ / TRNDRELT)
	BYP/S	Bypass cache rate, per second (H65BYREQ / TRNDRELT)
Cache Extended Function Data		
CACHEXT	CACHE	Total I/O rate per second seen by cache CU ((H65RNORR+H65WNORR+H65RSEQR+H65WSEQR +H65RCFWR+H65WCFWR+H65ICREQ+H65BYREQ) / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	SCMBK	Total I/O rate per second by our system (H**61**SSCH / TRNDRELT)
	N-SEQ	Non-sequential read rate per second ((H65RNORR+H65RCFWR) / TRNDRELT)
	SEQ	Sequential read rate per second (H65RSEQR / TRNDRELT)
	FW	Total 'fast write' rate (cache FW & DASD FW) ((H65WCFWR+H65WNFWR+H65WSFWR) / TRNDRELT)
	READ	Percent cachable read operations ((H65RNORR+H65RSEQR+H65RCFWR) * 100 / (H65RNORR+H65RSEQR+H65RCFWR +H65WNORR+H65WSEQR+H65WCFWR))
	TOT	Overall read and write hit percentage ((H65RNORH+H65RSEQH+H65RCFWH +H65WNORH+H65WSFWH+H65WCFWH) * 100 / (H65RNORR+H65RSEQR+H65RCFWR +H65WNFWR+H65WSFWR+H65WCFWR))
	RDHT	Overall read hit percentage ((H65RNORH+H65RSEQH+H65RCFWH) * 100 / (H65RNORR+H65RSEQR+H65RCFWR))
	WRT	Overall write hit percentage ((H65WNORH+H65WSFWH+H65WCFWH) * 100 / (H65WNFWR+H65WSFWR+H65WCFWR))
	DFW	DASD 'fast write' hit percentage ((H65WNORH+H65WSFWH) * 100 / (H65WNFWR+H65WSFWR))
	CFW	Cache 'fast write' write hit percentage (H65WCFWH * 100 / H65WCFWR)
	%DFW	Percent of DASD fast writes, out of total writes ((H65WNFWR+H65WSFWR) * 100 / (H65WNORR+H65WSEQR+H65WCFWR))
	%CFW	Percent of write cache fast writes, out of total writes (H65WCFWR * 100 / (H65WNORR+H65WSEQR+H65WCFWR))
	NORM	Percent of normal (non-sequential) stage trans- fers, out of total cache transfer operations (H65NDACA * 100 / (H65RNORR+H65WNORR+H65RSEQR+H65WSEQR +H65RCFWR+H65WCFWR+H65ICREQ+H65BYREQ)
	%SEQ	Percent of sequential stage transfers, out of total cache transfer operations (H65SDACA * 100 / (H65RNORR+H65WNORR+H65RSEQR+H65WSEQR +H65RCFWR+H65WCFWR+H65ICREQ+H65BYREQ)
	DEST	Percent of destage (cache to DASD) transfers, out of total cache transfer operations (H65DESTA * 100 / (H65RNORR+H65WNORR+H65RSEQR+H65WSEQR +H65RCFWR+H65WCFWR+H65ICREQ+H65BYREQ)

Display	Variable Name	Variable Description and Derivation
	BYPS	Percentage of DASD FW requests bypassed (forced destages to DASD because of nonvolatile space constraints) (H65NCADA * 100 / (H65RNORR+H65WNORR+H65RSEQR+H65WSEQR +H65RCFWR+H65WCFWR+H65ICREQ+H65BYREQ)
	+ICL	Percentage of 'bypass cache' and 'inhibit cache load' requests, out of total cache transfer operations ((H65BYREQ+H65ICREQ) * 100 / (H65RNORR+H65WNORR+H65RSEQR+H65WSEQR +H65RCFWR+H65WCFWR+H65ICREQ+H65BYREQ)

Performance Variables of Trend Records X'FC68'

Trend record X'FC68' contains data describing utilization and performance for system areas on CP owned disks.

The selection format for record 68 variables is:

```
├─CPOWNED(─devno─varname─)─────────────────────────────────────────────────────────────┤
```

devno is the device number of the disk for which data are to be extracted, in normal hexadecimal notation.

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
CPOWNED	P-RDS	Page read rate from the disk, per second (H68PAGRD / TRNDRELT)
	P-WRT	Page write rate to the disk, per second (H68PAGWR / TRNDRELT)
	S-RDS	Spool read rate from the disk, per second (H68SPLRD / TRNDRELT)
	S-WRT	Spool write rate to the disk, per second (H68SPLWR / TRNDRELT)
	TOTAL	Total spool and page read and write rate ((H68PAGRD+H68PAGWR+H68SPLRD +H68SPLWR) / TRNDRELT)
	+RSCH	I/O rate per second (SSCH plus RSCH oper.) (H68SSCH / TRNDRELT)
	FERES	Total user interferes (user I/Os interferring with CP I/O activity) per mon. sample interval (H68USINT / TRNDRSMP)
	LNGTH	Average I/O queue length for paging and spooling I/Os (H68RWQUD / TRNDRSMP)
	/PAGE	I/O service time per page, in msec. (H68SERV * 16 / 1000 / TRNDRSMP)
	TIME	MLOAD time (smoothed I/O response time per page) in msec. (H68MLOAD * 16 / 1000 / TRNDRSMP)
	SIZE	Average paging block size (H68BKSIZ * H68BKIOS / H68BKIOS) Note that a multiplication and division by H68BKIOS is done to force a 'zero divide' condition, and an invalid SIZE value, when no page block I/Os were executed.
	ALLOC	Percentage device was used for allocation after being looked at (H68CHOSN * 100 / H68LOKAT)

Performance Variables of Trend Records X'FC6D'

Trend record X'FC6D' contains QDIO device activity data.

The selection format for record 6D variables is:

```
├─QDIO(─devno─varname─)─────────────────────────────────────────────────────────┤
```

devno is the device number of the QDIO device for which data are to be extracted.

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
QDIO Device Activity Data		
QDIO	IN	Number of input queues (H6DINPQU)
	OUT	Number of output queues (H6DOUTQU)
	GST-R	Guest SIGA-r instruction rate (H6DGSIGR / TRNDRELT)
	GST-W	Guest SIGA-w instruction rate (H6DGSIGW / TRNDRELT)
	GST-S	Guest SIGA-s instruction rate (H6DGSIGS / TRNDRELT)
	CP-R	CP SIGA-r instruction rate (H6DCSIGR / TRNDRELT)
	CP-W	CP SIGA-w instruction rate (H6DCSIGW / TRNDRELT)
	CP-S	CP SIGA-s instruction rate (H6DCSIGS / TRNDRELT)
	WBUFFER	QDIO buffers written to adapter rate (H6DBUFWR / TRNDRELT)
	WBYTES	Bytes written to adapter per second (H6DBYTWR / TRNDRELT)
	RBUFFER	QDIO buffers read from adapter rate (H6DBUFRD / TRNDRELT)
	RBYTES	Bytes read from adapter per second (H6DBYTRD / TRNDRELT)
	TOTAL	Total PCI interrupt rate per second (H6DPCITO / TRNDRELT)
	REQD	PCI interrupt rate requiring a response (H6DPCIRR / TRNDRELT)
	CARDED	PCI interrupts discarded per second (H6DPCIDS / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
QEBSM Specific Device Activity Data		
QDIO	SCOMPL	SQBS instr/s completely processed by CP (H6DSQVM / TRNDRELT)
	SPARTL	SQBS instr/s partially processed by CP (H6DSQVMP / TRNDRELT)
	ECOMPL	EQBS instr/s completely processed by CP (H6DEQVM / TRNDRELT)
	EPARTL	EQBS instr/s partially processed by CP (H6DEQVMP / TRNDRELT)
	SIGA-WT	SIGA-wt instructions executed/s by CP (H6DSIGWT / TRNDRELT)
	SIGA-RT	SIGA-rt instructions executed/s by CP (H6DSIGRT / TRNDRELT)
	SIGA-LT	SIGA-lt instructions executed/s by CP (H6DSIGLT / TRNDRELT)
	GENERAL	Unsuccessful attempts per second to obtain a general QIOBD/QSD lock for serializing input or output (H6DQLKF / TRNDRELT)
	OUTPUT	The number of unsuccessful attempts per second to obtain a QIOBD/QSD output lock. (H6DQOLKF / TRNDRELT)
	PIN	'Pin' requests per second processed by CP (H6DPPIN / TRNDRELT)
	UNPIN	'Unpin' requests per second processed by CP (H6DPUPIN / TRNDRELT)
	EXH/S	FOBLK resources exhausted rate per second (H6DRESEX / TRNDRELT)

Performance Variables of Trend Records X'FC6F'

Trend record X'FC6F' contains SCSI device activity data.

The selection format for record 6F variables is:

```
├──SCSI(──devno──varname──)──────────────────────────────────────────────────────┤
```

devno is the device number of the SCSI device for which data are to be extracted.

varname
is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
SCSI Device Activity Data		
SCSI	BLOCK	Number of bytes in a block (H6ZDNB)
	KBYTE	Kilobytes transferred per second (H6ZDXR)
	FERS	Transfers per second (H6ZDNX / TRNDRELT)
	SEEKS	Number of seek operations per second (H6ZDNS / TRNDRELT)
	READ	Number of blocks read per second (H6ZDNR / TRNDRELT)
	WRITTEN	Number of blocks written per second (H6ZDNW / TRNDRELT)
	CONNECT	Percent of time connected (device busy) (H6ZDTM * 128 / 10000 / TRNDRELT)

Performance Variables of Trend Records X'FC71'

Trend record X'FC71' contains data describing DASD SEEK activity for individual disks.

The selection format for record 71 variables is:

display(
: is the name of a performance display that contains the variable, shown under the heading 'Display' in the following table of selectable variables, and immediately followed by a left parenthesis.

devno is the device number of the disk for which data are to be extracted, in normal hexadecimal notation.

varname
: is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
SEEK Distances Data		
SEEKDIST	MSEC	Device disconnected time, in msec. ((H71DSCTM+H71DAOTM) * 128 / 1000 / H71SSCH)
	READ	Percentage of SEEKs with only read operations (H71RDS * 100 / H71SKCT)
	NON0	Percentage of SEEKs with a nonzero cylinder displacement ((H71SKCT-H71SKC0) * 100 / H71SKCT)
	DIST	Mean nonzero SEEKs distance (H71SKDI / (H71SKCT-H71SKC0))
	SEEKS	Total number of SEEK operations (H71SKCT)
	0	Percentage of SEEKs with a displacement of zero (H71DSP0 * 100 / H71TSMPS)
	5	Percentage of SEEKs with a displacement in the range of 1 to 5 cylinders (H71DSP1 * 100 / H71TSMPS)

Display	Variable Name	Variable Description and Derivation
	10	Percentage of SEEKs with a displacement in the range of 6 to 10 cylinders (H71DSP2 * 100 / H71TSMPS)
	20	Percentage of SEEKs with a displacement in the range of 11 to 20 cylinders (H71DSP3 * 100 / H71TSMPS)
	50	Percentage of SEEKs with a displacement in the range of 21 to 50 cylinders (H71DSP4 * 100 / H71TSMPS)
	100	Percentage of SEEKs with a displacement in the range of 51 to 100 cylinders (H71DSP5 * 100 / H71TSMPS)
	200	Percentage of SEEKs with a displacement in the range of 101 to 200 cylinders (H71DSP6 * 100 / H71TSMPS)
	400	Percentage of SEEKs with a displacement in the range of 201 to 400 cylinders (H71DSP7 * 100 / H71TSMPS)
	800	Percentage of SEEKs with a displacement in the range of 401 to 800 cylinders (H71DSP8 * 100 / H71TSMPS)
	>800	Percentage of SEEKs with a displacement exceeding 800 cylinders (H71DSP9 * 100 / H71TSMPS)
SEEK Locations Data		
SEEKLOC	MSEC	Device disconnected time, in msec. ((H71DSCTM+H71DAOTM) * 128 / 1000 / H71SSCH)
	READ	Percentage of SEEKs with only read operations (H71RDS * 100 / H71SKCT)
	NON0	Percentage of SEEKs with a nonzero cylinder displacement ((H71SKCT-H71SKC0) * 100 / H71SKCT)
	DIST	Mean nonzero SEEKs distance (H71SKDI / (H71SKCT-H71SKC0))
	SEEKS	Total number of SEEK operations (H71SKCT)

Display	Variable Name	Variable Description and Derivation
	<=10	Percentage of SEEKs with a target cylinder in the range of 0-10% (H71LOC0 * 100 / H71TSMPS)
	<=20	Percentage of SEEKs with a target cylinder in the range of 11-20% (H71LOC1 * 100 / H71TSMPS)
	<=30	Percentage of SEEKs with a target cylinder in the range of 21-30% (H71LOC2 * 100 / H71TSMPS)
	<=40	Percentage of SEEKs with a target cylinder in the range of 31-40% (H71LOC3 * 100 / H71TSMPS)
	<=50	Percentage of SEEKs with a target cylinder in the range of 41-50% (H71LOC4 * 100 / H71TSMPS)
	<=60	Percentage of SEEKs with a target cylinder in the range of 51-60% (H71LOC5 * 100 / H71TSMPS)
	<=70	Percentage of SEEKs with a target cylinder in the range of 61-70% (H71LOC6 * 100 / H71TSMPS)
	<=80	Percentage of SEEKs with a target cylinder in the range of 71-80% (H71LOC7 * 100 / H71TSMPS)
	<=90	Percentage of SEEKs with a target cylinder in the range of 81-90% (H71LOC8 * 100 / H71TSMPS)
	90<	Percentage of SEEKs with a target cylinder in the range of 91-100% (H71LOC9 * 100 / H71TSMPS)

Performance Variables of Trend Records X'FCA2'

Trend record X'FCA2' contains shared file system data for individual servers.

The selection format for record A2 variables is:

*display***(**
: Is the name of a performance display that contains the variable, shown under the heading 'Display' in the following table of selectable variables, and immediately followed by a left parenthesis.

userid Is the user identification of the SFS server for which data are to be extracted.

varname
: Is the name of the selected variable, as indicated under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
Overall SFS performance:		
SFSLOG	FPRCOUNT	Number of file pool requests (sum of HA2CF010 to HA2CF054 + sum of HA2CF097 to HA2CF101 + sum of HA2CF103 to HA2CF109 + sum of HA2CF117 to HA2CF121 + sum of HA2CF124 to HA2CF130 + sum of HA2CF139 to HA2CF142 + sum of HA2CF145 to HA2CF146) This value is referenced as 'total file pool requests' in many of the formulas for calculating the remaining variables.
	FPRRATE	File pool requests rate per second ((total file pool requests) / TRNDRELT)
	FPRSERV	Service time per file pool request ((HA2CF055+HA2CF110) / 10000 / (total file pool requests))
	FPRCPU	CPU time per file pool request (HA2TTIME / (total file pool requests))
	FPRLOCK	Lock wait time per file pool request (HA2CF072 / 10000 / (total file pool requests))
	FPRBLKIO	Block I/O time per file pool request ((HA2CF090+HA2CF116) / 10000 / (total file pool requests))

Display	Variable Name	Variable Description and Derivation
	FPRESM	Ext. security manager wait time per FPR (HA2CF009 / 10000 / (total file pool requests))
	FPROTH	Other time needed per file pool request, calculated as (FPRSERV - FPRCPU - FPRLOCK - FPRBLKIO - FPRESM)
	%BUSY	Total server busy percentage (%CPU + %PGWT + %CKPT + %QSAM)
	%CPU	Percentage of time using CPU (HA2TTIME * 100 / TRNDRELT)
	%PGWT	Percentage of time spent in page wait (HA2HFPGW * 100 / HA2HFSMP)
	%CKPT	Percentage of time spent in checkpoint wait (HA2CF005 / 100 / TRNDRELT)
	%QSAM	Percentage of time waiting for QSAM I/O (HA2CF075 / 100 / TRNDRELT)
	AGNTACT	Average number of agents that were active (HA2CF055 / 100000 / TRNDRELT)
	AGNTHELD	Average number of agents that were held (HA2CF060 / 100000 / TRNDRELT)
	ROLLBACK	Number of deadlocks with roll-backs (HA2CF123)

Display	Variable Name	Variable Description and Derivation
SFS I/O Activity per File Pool Request:		
SFSIOLOG	FPRCOUNT	Number of file pool requests (sum of HA2CF010 to HA2CF054 + sum of HA2CF097 to HA2CF101 + sum of HA2CF103 to HA2CF109 + sum of HA2CF117 to HA2CF121 + sum of HA2CF124 to HA2CF130 + sum of HA2CF139 to HA2CF142 + sum of HA2CF145 to HA2CF146)
	IOTOTAL	Total I/O requests per file pool request ((HA2CF082+HA2CF115+HA2CF144 +(sum of HA2CF091 to HA2CF096)) / (total file pool requests))
	IOREAD	File read requests per file pool request (HA2CF091 / (tot. file pool req.))
	IOWRITE	File write requests per file pool request (HA2CF092 / (tot. file pool req.))
	IOCATRD	Catalog read requests per file pool request (HA2CF093 / (tot. file pool req.))
	IOCATWR	Catalog write requests per file pool request (HA2CF094 / (tot. file pool req.))
	IOCMDRD	Control minidisk read requests per file pool req. (HA2CF095 / (tot. file pool req.))
	IOCMDWR	Control minidisk write requests per file pool request (HA2CF096 / (tot. file pool req.))

Display	Variable Name	Variable Description and Derivation
	IOLOGRD	Log read requests per file pool request (HA2CF082 / (tot. file pool req.))
	IOLOGWR	Log write requests per file pool request ((HA2CF115+HA2CF144) / (total file pool requests))
	BLK/BIO	Average number of blocks transferred per block I/O request ((sum of HA2CF076 to HA2CF083) / ((sum of HA2CF084 to HA2CF089) +HA2CF082+HA2CF143)
	BLK/IO	Average number of blocks transferred per I/O request ((sum of HA2CF076 to HA2CF083) / ((sum of HA2CF091 to HA2CF096) +HA2CF082+HA2CF144)
	SACCALL	Average Storage Access Component calls per file pool request (HA2CF062 / (tot. file pool req.))
	BIOTIME	Average time per block I/O request ((HA2CF090+HA2CF116) / ((sum of HA2CF084 to HA2CF089) +HA2CF082+HA2CF143) / 10000)
	LOCKTIME	Average time per lock wait (HA2CF072 / ((sum of HA2CF063 to HA2CF071) +HA2CF122) / 10000)
	CKPTTIME	Average time spent processing a checkpoint (HA2CF005 / HA2CF004 / 10000)
	ESMTIME	Average time spent per ESM exit call (HA2CF009 / HA2CF008 / 10000)

SFS Requests Percentages:

Variables indicating the relative frequency of selected request types, compared to the total of all file pool requests.

SFSREQ	FPRCOUNT	Number of file pool requests (sum of HA2CF010 to HA2CF054 + sum of HA2CF097 to HA2CF101 + sum of HA2CF103 to HA2CF109 + sum of HA2CF117 to HA2CF121 + sum of HA2CF124 to HA2CF130 + sum of HA2CF139 to HA2CF142 + sum of HA2CF145 to HA2CF146)
	OPENRD	Percentage of open file read requests (HA2CF031 * 100 / (total file pool requests))
	OPENUPD	Percentage of open update requests ((HA2CF030+HA2CF032+HA2CF033) * 100 / (total file pool requests))
	READ	Percentage of read file requests (HA2CF040 * 100 / (total file pool requests))

Display	Variable Name	Variable Description and Derivation
	WRITE	Percentage of write file requests (HA2CF054 * 100 / (total file pool requests))
	CLOSE	Percentage of close file requests (HA2CF014 * 100 / (total file pool requests))
	DELETE	Percentage of delete file requests (HA2CF020 * 100 / (total file pool requests))
	GETDIR	Percentage of get directory entry requests (HA2CF024 * 100 / (total file pool requests))
	RENAME	Percentage of rename requests (HA2CF047 * 100 / (total file pool requests))
	CRALIAS	Percentage of create alias requests (HA2CF017 * 100 / (total file pool requests))
	CRDELDIR	Percentage of create and delete directory req. ((HA2CF018+HA2CF019) * 100 / (total file pool requests))
	OGCDIR	Percentage of open/get/close directory requests ((HA2CF013+HA2CF023+HA2CF029) * 100 / (total file pool requests))
	AUTH	Percentage of grant and revoke authorization req. ((HA2CF026+HA2CF049) * 100 / (total file pool requests))
	LOCK	Percentage of lock and unlock requests ((HA2CF028+HA2CF052) * 100 / (total file pool requests))
	QUERY	Percentage of query requests (((sum of HA2CF034 to HA2CF039) +HA2CF119+HACF0120) * 100 / (total file pool requests))
	REFRESH	Percentage of refresh directory requests (HA2CF045 * 100 / (total file pool requests))
	OTHER	Percentage of all other requests, i.e. (100 -OPENRD -OPENUPD -READ - WRITE -CLOSE -DELETE -GETDIR - RENAME-CRALIAS-CRDELDIR-OGCDIR - AUTH -LOCK -QUERY -REFRESH)

Performance Variables of Trend Records X'FCA4'

Trend record X'FCA4' contains multitasking user data for individual users.

The selection format for record A4 variables is:

```
├─MTUSERS(─userid─varname─)─┤
```

userid Is the user identification of the virtual machine for which data are to be extracted.

varname
Is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
MTUSERS	CRE/S	Thread create rate per second (HA4CRCNT / TRNDRELT)
	MS/CRE	Average elapsed time per thread creation, in milliseconds (HA4CRTIM * 1000 / HA4CRCNT)
	DEL/S	Thread delete rate per second (HA4DLCNT / TRNDRELT)
	MS/DEL	Average elapsed time per thread deletion, in milliseconds (HA4DLTIM * 1000 / HA4DLCNT)
	SLOW	Regular path switch rate per second (HA4SLWSW / TRNDRELT)
	FAST	Fast path switch rate per second (HA4FSTSW / TRNDRELT)
	BLOCKED	Average number of threads blocked (HA4BLOKD / TRNDRSMP)
	PROC.	Highest number of processes that were concurrently defined (HA4MXPRC)
	THRDS	Highest number of threads that were concurrently defined (HA4MXTHR)
	FAILS	Number of POSIX create failures during the period covered by the trend record (HA4CRFAI)

Performance Variables of Trend Records X'FCA6'

Trend record X'FCA6' contains data describing overall TCP/IP server activity and performance for individual servers.

The selection format for record A6 variables is:

*display***(**
Is the name of a performance display that contains the variable, shown under the heading 'Display' in the following table of selectable variables, and immediately followed by a left parenthesis.

userid Is the user identification of the TCP/IP server for which data are to be extracted.

varname
Is the name of the selected variable, as indicated under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
TCP/IP Activity Log Data		
TCPACTLG	CONINI	TCP connection opens initiated per second (HA6COPI / TRNDRELT)
	CONACC	TCP connection opens accepted per second (HA6COPA / TRNDRELT)
	CONFAIL	TCP connection open failures per second (HA6COPF / TRNDRELT)
	CONRESET	TCP connections resets per second (HA6CRST / TRNDRELT)
	SEGRECVD	TCP segments received per second (HA6SRCV / TRNDRELT)
	SEGXMIT	TCP segments transmitted per second (HA6STRN / TRNDRELT)
	SEGRXMIT	TCP segments re-transmitted per second (HA6SRTR / TRNDRELT)
	SEGRCERR	TCP segments received with errors per second (HA6SRCE / TRNDRELT)
	SEGXRST	TCP segments transmitted with reset per second (HA6STRR / TRNDRELT)
	ARPREQRC	ARP requests received per second (HA6ARCV / TRNDRELT)
	ARPREPXM	ARP replies transmitted per second (HA6ARPL / TRNDRELT)
	ARPREQXM	ARP requests transmitted per second (HA6AREQ / TRNDRELT)
TCP/IP Buffer Pool Data		

Display	Variable Name	Variable Description and Derivation
Average buffer pool levels:		
TCPBPLOG	AVEACB	Average number of free activity control blocks (HA6RACBL)
	AVECCB	Average number of free client control blocks (HA6RCCBL)
	AVEENV	Average number of free envelope control blocks (HA6RENVL)
	AVELENV	Average number of free large envelope ctl. blks (HA6RLEVL)
	AVERCB	Average number of raw IP control blocks (HA6RRCBL)
	AVESCB	Average number of socket control blocks (HA6RSCBL)
	AVEBSD	Average number of BSD style socket ctl. blocks (HA6RBSDL)
	AVETCB	Average number of TCP control blocks (HA6RTCBL)
	AVEUCB	Average number of UDP control blocks (HA6RUCBL)
	AVEDBF	Average number of regular data buffers (HA6RDBFL)
	AVESDB	Average number of small data buffers (HA6RSDBL)
	AVETDB	Average number of tiny data buffers (HA6RTDBL)
	AVESGA	Average number of segment acknowledgment control blocks (HA6RSAPL)
	AVEFPSP	Average number of fixed page storage pool pages (HA6RFPSL)
Allocated buffer pool numbers:		
TCPBPLOG	AVEFPAVL	Average locked fixed page storage pool pages that are available (not in use) (HA6RFPLA)
	AVEFPUSE	Average locked fixed page storage pool pages that are allocated to users (HA6RFPLU)
	ALLACB	Allocated activity control blocks (HA6IACB)
	ALLCCB	Allocated client control blocks (HA6ICCB)
	ALLENV	Allocated envelope control blocks (HA6IENV)
	ALLLENV	Allocated large envelope control blocks (HA6ILEV)
	ALLRCB	Allocated raw IP control blocks (HA6IRCB)
	ALLSCB	Allocated socket control blocks (HA6ISCB)

Display	Variable Name	Variable Description and Derivation
	ALLBSD	Allocated BSD-style socket control blocks (HA6IBSD)
	ALLTCB	Allocated TCP control blocks (HA6ITCB)
	ALLUCB	Allocated UDP control blocks (HA6IUCB)
	ALLDBF	Allocated regular data buffers (HA6IDBF)
	ALLSDB	Allocated small data buffers (HA6ISDB)
	ALLTDB	Allocated tiny data buffers (HA6ITDB)
	ALLSGA	Allocated segment acknowledgment control blocks (HA6ISGA)
	ALLHOST	Allocated host pool blocks (HA6IHOS)
	ALLATR	Allocated address translation control blocks (HA6IATR)
	ALLIPR	Allocated IP routing control blocks (HA6IIPR)
	ALLFPSP	Allocated fixed page storage pool pages (HA6IFPSP)

Minimum buffer pool levels found:

For most buffer pools this is the actual minimum level, updated with each monitor sample interval, but for some pools the information is only available from the initial configuration data: these are marked with (I).

TCPBPLOG	MINACB	Minimum activity control blocks level (HA6NACBM)
	MINCCB	Minimum client control blocks level (HA6NCCBM)
	MINENV	Minimum regular envelope control blocks level (HA6NENVM)
	MINLENV	Minimum large envelope control blocks level (HA6NLEVM)
	MINRCB	Minimum raw IP control blocks level (HA6NRCBM)
	MINSCB	Minimum socket control blocks level (HA6NSCBM)
	MINBSD	Minimum BSD-style socket control blocks level (HA6NBSDM)
	MINTCB	Minimum TCP control blocks level (HA6NTCBM)
	MINUCB	Minimum UDP control blocks level (HA6NUCBM)
	MINDBF	Minimum regular data buffers level (HA6NDBFM)
	MINSDB	Minimum small data buffers level (HA6NSDBM)
	MINTDB	Minimum tiny data buffers level (HA6NTDBM)

Display	Variable Name	Variable Description and Derivation
	MINSGA	Minimum segment acknowledgment control blocks level (HA6NSAPM)
	MINHOST	Minimum host pool blocks level (I) (HA6IHOS+16)
	MINATR	Minimum address translation control blocks level (I) (HA6IATR+16)
	MINIPR	Minimum IP routing control blocks level (I) (HA6IIPR+16)
	MINFPSP	Minimum fixed page storage pool level (HA6NFPSM)
TCP/IP Data Transfer		
TCPDATLG	IPRECV	IP packets received per second (HA6PRRC / TRNDRELT)
	IPRCHDER	IP packets received with header errors per second (HA6PRHE / TRNDRELT)
	IPRCADER	IP packets received with address errors per second (HA6PRAE / TRNDRELT)
	DGFORW	Incoming IP datagrams forwarded per second (HA6DFOR / TRNDRELT)
	DGUKPROT	Incoming IP datagrams with unknown protocol received per second (HA6DUPR / TRNDRELT)
	DGINDISC	Incoming IP datagrams discarded per second (HA6DDIS / TRNDRELT)
	DGTOUSER	Incoming IP datagrams delivered to IP user protocols, per second (HA6DDUP / TRNDRELT)
	DGBYUSER	Outgoing IP datagrams supplied by IP user protocols, per second (HA6DSUP / TRNDRELT)
	DGOUTDSC	Outgoing IP datagrams discarded before delivery, per second (HA6DDBD / TRNDRELT)
	DGNOROUT	Outgoing IP datagrams that had no route to their destination, per second (HA6DNRT / TRNDRELT)
	DGFRAGRC	IP fragments received per second that required reassembly (HA6DFRR / TRNDRELT)
	DGREASS	IP datagrams reassembled per second (HA6DRAS / TRNDRELT)
	DGREAERR	IP datagram reassembly errors per second (HA6DRAE / TRNDRELT)
	DGFRAGM	IP datagrams fragmented per second (HA6DFRG / TRNDRELT)
	DGFRFAIL	IP datagram fragmentation failures per second (HA6DFRF / TRNDRELT)
	DGFRAGCR	IP datagram fragments created per second (HA6DFRC / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	UDPRECV	UDP datagrams received per second (HA6URCV / TRNDRELT)
	UDPNOLST	UDP datagrams received per second for ports that had no listener (HA6URNL / TRNDRELT)
	UDPRCERR	UDP datagrams received per second that had errors (HA6URER / TRNDRELT)
	UDPXMIT	UDP datagrams transmitted per second (HA6UTRN / TRNDRELT)
TCP/IP I/O Denial of Service Data		
TCPDOSLG	DOSSMURF	Smurf denial of service packet discard/s (HA6SMDOS / TRNDRELT)
	DOSFRAGL	Fraggle denial of service packet discard/s (HA6FRDOS / TRNDRELT)
	DOSPODEA	Ping-o-Death den. of serv. packet discard/s (HA6FDDOS / TRNDRELT)
	DOSBLAT	BLAT denial of service packet discard/s (HA6BLDOS / TRNDRELT)
	DOSSTRM	Stream denial of service packet discard/s (HA6STDOS / TRNDRELT)
	DOSR4P3D	R4P3D denial of service packet discard/s (HA6R4DOS / TRNDRELT)
	DOSKOD	KOD denial of service packet discard/s (HA6KDDOS / TRNDRELT)
	DOSKOX	KOX denial of service packet discard/s (HA6KXDOS / TRNDRELT)
	DOSFLOOD	SynFlood denial of service packet discard/s (HA6SFDOS / TRNDRELT)
TCP/IP I/O Activity Data		
TCPIOLOG	READREQ	Read I/O requests executed per second (HA6READ / TRNDRELT)
	WRITEREQ	Write I/O requests executed per second (HA6WRIT / TRNDRELT)
	BYTERCV	Number of bytes received per second (HA6BRCV / TRNDRELT)
	BYTEXMIT	Number of bytes transmitted per second (HA6BTRN / TRNDRELT)
	QDIOIN	QDIO inbound data transfers per second (HA6QDIN / TRNDRELT)
	QDIOOUT	QDIO outbound data transfers per second (HA6QDOUT / TRNDRELT)
	QDIOPCI	QDIO PCI interrupts received per second (HA6QDPCI / TRNDRELT)
	QDIOTPOL	QDIO total poll rate per second (HA6QDPOL / TRNDRELT)
	QDIOIPOL	QDIO idle poll rate per second (HA6QDIPO / TRNDRELT)
	IUCVRECV	IUCV receive operations per second (HA6IURC / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	IUCVRJCT	IUCV reject operations per second (HA6IURJ / TRNDRELT)
	IUCVREP	IUCV reply operations per second (HA6IURP / TRNDRELT)
	IUCVSEND	IUCV send operations per second (HA6IUSN / TRNDRELT)
	VMCFSEND	VMCF send operations per second (HA6VMCS / TRNDRELT)
	VMCFASND	VMCF abnormal sends and send failures per second ((HA6VMCA+HA6VMCF) / TRNDRELT)

Performance Variables of Trend Records X'FCA8'

Trend record X'FCA8' contains data describing Reusable Server Kernel activity and performance for individual servers.

The selection format for record A8 variables is:

```
├──display(──userid──varname──)──────────────────────────────────────────────────────┤
```

display(
: Is the name of a performance display that contains the variable, shown under the heading 'Display' in the following table of selectable variables, and immediately followed by a left parenthesis.

userid
: Is the user identification of the RSK server for which data are to be extracted.

varname
: Is the name of the selected variable, as shown under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
RSK Disk Performance Log Data		
RSKDISK	AUTPERM	Authorize function permit rate per second (HA8AUPER / TRNDRELT)
	AUTINQ	Authorize function inquire rate per second (HA8AUINQ / TRNDRELT)
	AUTROWS	Authorize function rows retrieval rate per second (HA8AURET / TRNDRELT)
	AUTRHIT	Authorize function row retrieval hit percentage (HA8AUHIT * 100 / HA8AURET)
	ENRACT	Average enrollment sets active (HA8ERROW / HA8SAMPS)
	ENRREC	Total enrollment sets records (HA8ERREC / HA8SAMPS)
	ENRBYTE	Total enrollment sets bytes (HA8ERBYT / HA8SAMPS)
	ENRINS	Total enrollment sets insert rate per second (HA8ERINS / TRNDRELT)
	ENRREM	Total enrollment sets remove rate per second (HA8ERREM / TRNDRELT)
	ENRRET	Total enrollment sets retrieve rate per second (HA8ERRET / TRNDRELT)
	CACACT	Average caches active (HA8CAROW / HA8SAMPS)
	CACBYTE	Total cache bytes (HA8CABYT / HA8SAMPS)
	CACUSED	Total cache bytes used percentage (HA8CAUSE * 100 / HA8CABYT)

Display	Variable Name	Variable Description and Derivation
	CACFILE	Total cached files (HA8CAFIL / HA8SAMPS)
	CACOPEN	Total files opened rate per second (HA8CAOPN / TRNDRELT)
	CACHIT	Percentage of hits out of all opens (HA8CAHIT * 100 / HA8CAOPN)
	CACDSCRD	Total files discarded rate per second (HA8CADSC / TRNDRELT)
RSK Performance Log Data		
RSKLOG	SRVACT	Average number of active services (HA8SRROW / HA8SAMPS)
	SRVTRANS	Total services transactions per second (HA8SRTRC / TRNDRELT)
	SRVBYREC	Total services bytes received per second (HA8SRBRC / TRNDRELT)
	SRVBYSNT	Total services bytes sent per second (HA8SRBSN / TRNDRELT)
	DRVACT	Average number of active line drivers (HA8LDROW / HA8SAMPS)
	DRVTRANS	Total line drivers transactions per second (HA8LDTRC / TRNDRELT)
	DRVBYREC	Total line drivers bytes received per second (HA8LDBRC / TRNDRELT)
	DRVBYSNT	Total line drivers bytes sent per second (HA8LDBSN / TRNDRELT)
	TRIACT	Average number of active tries (HA8TRROW / HA8SAMPS)
	TRIMBYT	Total data space storage defined by tries (MB) (HA8TRSIZ / HA8SAMPS / 1048576)
	TRIUSED	Data space storage utilization percentage (HA8TRUSE * 100 / HA8TRSIZ)
	TRIREC	Total records indexed (HA8TRREC / HA8SAMPS)
	TRINODE	Total nodes (HA8TRNOD / HA8SAMPS)
	TRILUP	Total trie lookups per second (HA8TRLUP / TRNDRELT)
	TRIRRET	Total records returned per second (HA8TRRRT / TRNDRELT)
RSK Storage Log Data		
RSKSTOR	SGPACT	Average number of active storage groups (HA8SGROW / HA8SAMPS)
	SGPRDIO	Total storage group page read I/Os per second (HA8SGRDS / TRNDRELT)
	SGPPGRD	Total storage group page reads per second ((HA8SGPRD+HA8SGPR2) / TRNDRELT)
	SGPPGRTM	Average time per page read, in msec (HA8SGPRT / HA8SGPR2 / 4096000)
	SGPWRIO	Total storage group page write I/Os per second (HA8SGWRT / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	SGPPGWR	Total storage group page writes per second ((HA8SGPWR+HA8SGPW2) / TRNDRELT)
	SGPPGWTM	Average time per page write, in msec (HA8SGPWT / HA8SGPW2 / 4096000)
	MEMACT	Average number of memory rows active (HA8MEROW / HA8SAMPS)
	MEMBYTE	Total storage size managed by memory ((HA8MEFRE+HA8MEUSE) / HA8SAMPS)
	MEMUSED	Memory managed storage utilization (HA8MEUSE * 100 / (HA8MEFRE+HA8MEUSE))
	MEMALO	Total ssMemoryAllocate calls per second (HA8MEALO / TRNDRELT)
	MEMALBYT	Total bytes taken through ssMemoryAllocate (HA8MEALB)
	MEMREL	Total ssMemoryRelease calls per second (HA8MEREL / TRNDRELT)
	MEMRLBYT	Total bytes returned through ssMemoryRelease (HA8MERLB)
	MEMEXT	Total times storage extended through CMSSTOR (HA8MEEXT)
	MEMEXBYT	Total bytes taken through CMSSTOR (HA8MEEXB)
	MEMDEP	Total times storage depleted through CMSSTOR (HA8MEDEP)
	MEMDPBYT	Total bytes returned through CMSSTOR (HA8MEDEB)

Performance Variables of Trend Records X'FCA9'

Trend record X'FCA9' contains internal summary data for Linux guest systems.

The selection format for record A9 variables is:

*display***(**
: Is the name of a performance display that contains the variable, shown under the heading 'Display' in the following table of selectable variables, and immediately folowed by a left parenthesis.

userid Is the user identification of the Linux guest system for which data are to be extracted.

varname
: Is the name of the selected variable, as indicated under the heading 'Variable Name' in the table below.

The variables shown in the following table have been pre-defined. Their description also includes the formula used to calculate the values from the original trend record data fields.

Display	Variable Name	Variable Description and Derivation
Linux CPU Utilization Data		
LXCPU	CPUS	The number of virtual CPUs used (HA9CPCNT)
	TOTCPU	Total CPU utilization (all CPUs) ((HA9CPUSR+HA9CPSYS+HA9CPNIC) * 100 * HA9CPCNT / (HA9CPUSR +HA9CPSYS+HA9CPNIC+HA9CPIDL))
	USER	User mode CPU util. (all CPUs) (HA9CPUSR * 100 * HA9CPCNT / (HA9CPUSR+HA9CPSYS +HA9CPNIC+HA9CPIDL))
	KERNEL	Kernel mode CPU util. (all CPUs) (HA9CPSYS * 100 * HA9CPCNT / (HA9CPUSR+HA9CPSYS +HA9CPNIC+HA9CPIDL))
	NICE	'Nice' mode CPU util. (all CPUs) (HA9CPNIC * 100 * HA9CPCNT / (HA9CPUSR+HA9CPSYS +HA9CPNIC+HA9CPIDL))
	IDLE	CPU percent idle (all CPUs) (HA9CPIDL * 100 * HA9CPCNT / (HA9CPUSR+HA9CPSYS +HA9CPNIC+HA9CPIDL))
	RUNABL	Number of runnable processes (HA9PROCR / HA9SAMPC)
	TOTAL	Total number of processes (HA9PROCT / HA9SAMPC)
	AVPROC1	Average processes running last minute (HA9AVR1 / 2048)

Display	Variable Name	Variable Description and Derivation
	AVPROC5	Average proc. running last 5 minutes (HA9AVR5 / 2048)
	AVPROC15	Average proc. running last 15 minutes (HA9AVR15 / 2048)
Linux Memory Data		
LXMEM	M_TOTAL	Total main memory size in MB (HA9TOTLM / HA9SAMPM / 1024)
	%MUSED	Percent main memory in use ((HA9TOTLM-HA9FREEM) * 100 / HA9TOTLM)
	H_TOTAL	Total high memory size in MB (HA9TOTLH / HA9SAMPM / 1024)
	%HUSED	Percent high memory in use ((HA9TOTLH-HA9FREEH) * 100 / HA9TOTLH)
	SHARED	Shared memory size in MB (HA9SHARD / HA9SAMPM / 1024)
	BUFFERS	Memory reserved for buffers and free cache (HA9TOTLC / HA9SAMPM / 1024)
	S_TOTAL	Total swap area size in MB (HA9TOTLS / HA9SAMPM / 1024)
	%SUSED	Percent swap area in use ((HA9TOTLS-HA9FREES) * 100 / HA9TOTLS)
	CACHE	Memory used for cache (HA9USEDC / HA9SAMPM / 1024)
	SWAPIN	Swap in rate, in 4kB pages per second (HA9SWIN / TRNDRELT)
	SWAPOUT	Swap out rate, in 4kB pages per second (HA9SWOUT / TRNDRELT)
	BLKREAD	Block I/O data read rate, in kB per second (HA9BLKRD / TRNDRELT)
	BLKWRITE	Block I/O data write rate, in kB per second (HA9BLKWR / TRNDRELT)
Linux Networking Activity Data		
LXNETWRK	INTFACES	Average number of network interfaces (HA9INTF / HA9SAMPN)
	PACKRECV	Packets received per second (HA9PKRCV / TRNDRELT)
	PACKXMIT	Packets transmitted per second (HA9PKSNT / TRNDRELT)
	BYTERECV	Bytes received per second (HA9BYRCV / TRNDRELT)
	BYTEXMIT	Bytes transmitted per second (HA9BYSNT / TRNDRELT)
	BADPACK	Bad packets received per second (HA9PKBAD / TRNDRELT)
	XMITERR	Packet transmit errors per second (HA9PKERR / TRNDRELT)
	NOBUFFER	No space found in buffers per second (HA9NOSPB / TRNDRELT)

Display	Variable Name	Variable Description and Derivation
	NOSPACE	No space found in Linux per second (HA9NOSPL / TRNDRELT)
	COLLISN	Transmit collisions per second (HA9COLSN / TRNDRELT)

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Glossary

For a list of z/VM terms and their definitions, see *z/VM: Glossary*.

The z/VM glossary is also available through the online z/VM HELP Facility, if HELP files are installed on your z/VM system. For example, to display the definition of the term "dedicated device", issue the following HELP command:

```
help glossary dedicated device
```

While you are in the glossary help file, you can do additional searches:

- To display the definition of a new term, type a new HELP command on the command line:

  ```
  help glossary newterm
  ```

  This command opens a new help file inside the previous help file. You can repeat this process many times. The status area in the lower right corner of the screen shows how many help files you have open. To close the current file, press the Quit key (PF3/F3). To exit from the HELP Facility, press the Return key (PF4/F4).
- To search for a word, phrase, or character string, type it on the command line and press the Clocate key (PF5/F5). To find other occurrences, press the key multiple times.

  The Clocate function searches from the current location to the end of the file. It does not wrap. To search the whole file, press the Top key (PF2/F2) to go to the top of the file before using Clocate.

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Bibliography

See the following publications for additional information about z/VM. For abstracts of the z/VM publications, see *z/VM: General Information*, GC24-6193

Where to Get z/VM Information

z/VM product information is available from the following sources:

- z/VM V6.3 Information Center (publib.boulder.ibm.com/infocenter/zvm/v6r3/)
- IBM: z/VM Internet Library (www.ibm.com/vm/library/)
- IBM Publications Center (www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss)
- *IBM Online Library: z/VM Collection*, SK5T-7054

z/VM Base Library

Overview

- *z/VM: General Information*, GC24-6193
- *z/VM: Glossary*, GC24-6195
- *z/VM: License Information*, GC24-6200

Installation, Migration, and Service

- *z/VM: Installation Guide*, GC24-6246
- *z/VM: Migration Guide*, GC24-6201
- *z/VM: Service Guide*, GC24-6247
- *z/VM: VMSES/E Introduction and Reference*, GC24-6243

Planning and Administration

- *z/VM: CMS File Pool Planning, Administration, and Operation*, SC24-6167
- *z/VM: CMS Planning and Administration*, SC24-6171
- *z/VM: Connectivity*, SC24-6174
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- *z/VM: Getting Started with Linux on System z*, SC24-6194
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- *z/VM: Secure Configuration Guide*, SC24-6230
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- *z/OS and z/VM: Hardware Configuration Manager User's Guide*, SC33-7989

Customization and Tuning

- *z/VM: CP Exit Customization*, SC24-6176
- *z/VM: Performance*, SC24-6208

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- *z/VM: CMS Commands and Utilities Reference*, SC24-6166
- *z/VM: CMS Pipelines Reference*, SC24-6169
- *z/VM: CMS Pipelines User's Guide*, SC24-6170
- *z/VM: CMS Primer*, SC24-6172
- *z/VM: CMS User's Guide*, SC24-6173
- *z/VM: CP Commands and Utilities Reference*, SC24-6175
- *z/VM: System Operation*, SC24-6233
- *z/VM: TCP/IP User's Guide*, SC24-6240
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- *z/VM: XEDIT Commands and Macros Reference*, SC24-6244
- *z/VM: XEDIT User's Guide*, SC24-6245
- *CMS/TSO Pipelines: Author's Edition*, SL26-0018

Application Programming

- *z/VM: CMS Application Development Guide*, SC24-6162
- *z/VM: CMS Application Development Guide for Assembler*, SC24-6163
- *z/VM: CMS Application Multitasking*, SC24-6164
- *z/VM: CMS Callable Services Reference*, SC24-6165
- *z/VM: CMS Macros and Functions Reference*, SC24-6168
- *z/VM: CP Programming Services*, SC24-6179
- *z/VM: CPI Communications User's Guide*, SC24-6180

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- *z/VM: Enterprise Systems Architecture/Extended Configuration Principles of Operation*, SC24-6192
- *z/VM: Language Environment User's Guide*, SC24-6199
- *z/VM: OpenExtensions Advanced Application Programming Tools*, SC24-6202
- *z/VM: OpenExtensions Callable Services Reference*, SC24-6203
- *z/VM: OpenExtensions Commands Reference*, SC24-6204
- *z/VM: OpenExtensions POSIX Conformance Document*, GC24-6205
- *z/VM: OpenExtensions User's Guide*, SC24-6206
- *z/VM: Program Management Binder for CMS*, SC24-6211
- *z/VM: Reusable Server Kernel Programmer's Guide and Reference*, SC24-6220
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