

Version 2 Release 4

*IBM IMS Problem Investigator for z/OS
User's Guide*



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User's Guide*



Note:

Before using this information and the product it supports, read the "Notices" topic at the end of this information.

First Edition (October 2014)

This edition applies to Version 2 Release 4 of IMS Problem Investigator for z/OS (product number 5655-R02) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this information

IMS™ Problem Investigator for z/OS® (also referred to as IMS Problem Investigator) is a problem analysis tool for Information Management System Database (IMS DB) and Transaction Manager (IMS TM) systems.

These topics are designed to help database administrators, system programmers, application programmers, and system operators perform the following tasks:

- Plan for the installation of IMS Problem Investigator
- Install the IMS Problem Investigator ISPF dialog
- Use IMS Problem Investigator to assist with analyzing and resolving IMS transaction related problems

To use these topics, you should have a working knowledge of:

- The z/OS operating system
- ISPF
- IMS Database and Transaction Manager systems

Always check the IMS Tools Product Documentation page for the most current version of this information:

<http://www.ibm.com/software/data/db2imstools/imstools-library.html>

Part 1. Getting started

This part provides an overview of IMS Problem Investigator, describes how to install it, set up the dialog, and start using it.

Topics:

- Chapter 1, “IMS Problem Investigator overview,” on page 3
- Chapter 2, “Tour of product features,” on page 29
- Chapter 3, “Installation and setup,” on page 49
- Chapter 4, “Using the ISPF user interface,” on page 59

Chapter 1. IMS Problem Investigator overview

IBM® IMS Problem Investigator for z/OS (also referred to as IMS Problem Investigator, or by the abbreviation IMS PI) is a problem analysis tool for Information Management System Database (IMS DB) and Transaction Manager (IMS TM).

IMS Problem Investigator is an investigative tool to help IMS systems and application programmers determine the cause of problems and trace the flow of events end-to-end. IMS Problem Investigator can help identify the cause of IMS database system problems by providing crucial information such as who or what incorrectly updated a database, when the database was updated, and how to reverse the changes. It can also help diagnose IMS transaction management system performance issues by tracking IMS transactions end-to-end through IMS and related systems, determining transaction times and event latencies to help identify bottlenecks.

What's new in IMS Problem Investigator

This topic summarizes the technical changes for this edition.

New and changed information is indicated by a vertical bar (|) to the left of a change. Editorial changes that have no technical significance are not noted.

IMS Problem Investigator Version 2 Release 4

This edition SC19-4367-00 includes the following new and changed features:

IMS Version 13 and Version 14 support

Supports new and changed log record types introduced in IMS V13 and V14.

DB2® Version 11 support

- Support for DB2 logs in extended 10-byte RBA and LRSN format
- Improved DB2 log record type recognition. UR events (previously all identified as x'0020') are now split into control (x'0020') and undo/redo (x'0600').

IMS Connect enhancements for IMS Version 13

IMS Connect events codes are extended from one byte to two to support the new IMS Version 13 Connect events related to CICS®, ISC, health-check and security.

ISPF dialog usability enhancements

For additional information on the following enhancements, see "Formatting log files" on page 76.

Timeout setting in the log browser

To avoid long delays caused by the log browser reading log files to locate all records required for display, you can now set a timeout using the TIMEOUT primary command. You can set a timeout value of 1 - 99 seconds, or 0 for no timeout.

Reasons for bottom of data

If the log browser reaches the end of the selected log files,

the bottom of data marker after the last displayed record is a line of asterisks with the label Bottom of Data. If the log browser does not reach the end of the selected files, the label now offers one of the following reasons:

- FINDLIM reached (*find limit*)
- ATTN interrupt
- TIMEOUT reached (*timeout value*)
- DURATION reached (*time slice duration*)

Time of day remembered for each file in the Process list

Each log file in the process list now remembers its last date and time position in the log file. When log file analysis resumes, it is quicker to relocate back to where you were.

MOD option for EXTRACT primary command

Append new records to an existing extract data set using the EXTRACT primary command and the MOD option.

Control the visibility of the expanded view record separator line

To control the visibility of the expanded view record separator line, enter DISPLAY or select **Options > Display**, and then set the **Show separation line between log records** option.

Control the display and format of the log sequence number

(LSN) To prepend the LSN with the log record type, or to remove the LSN altogether, enter DISPLAY or select **Options > Display**, and then set the **Display LSN** option.

Set color and highlighting according to log type

To customize the color and highlighting of records according to their log type, enter HILITE or select **Options > Color highlighting**.

IMS log type x'50' database update enhancements

The IMS type x'50' database update record is now split into 3 subtypes to improve understanding of the update taking place:

- x'5050' database update
- x'5051' database change unsuccessful
- x'5052' database insert into KSDS

Scheduling tracking from a CA01 for a non-message driven BMP

Tracking initiated using line action TX or TU from a CA01 for a non-message driven BMP invokes "scheduling tracking". See "Tracking" on page 93.

Detect unsorted Transaction Index and issue warning message

A warning message is displayed when log file processing detects transaction index records out of sequence.

Time zone checking

When selected, this option issues a message when the time zone detected in the log file differs from the time zone being used to process the file. See "Time settings" on page 87.

IMS Problem Investigator Version 2 Release 3

The SC19-3635-00 edition accompanying the general availability of IMS Problem Investigator Version 2 Release 3 included the following new and changed features which are not marked in the body of this book.

IMS Version 10, 11, and 12 support

IMS PI supports all the new instrumentation in the IMS log and monitor:

- IMS V10: Transaction accounting record 56FA containing accurate transaction CPU time, DLI call, database I/O, and ESAF usage
- IMS V11: Synchronous call-out (ICAL) and Open Database
- IMS V12:
 - 4517 User Exit statistics
 - Improved MSC statistics
 - Repository Audit log stream

In addition, IMS PI supports all new IMS V12 Connect event records collected by IMS Connect Extensions event journaling, including A071 to A07E.

OMEGAMON® ATF support

Support for OMEGAMON for IMS Application Trace Facility (ATF):

- Investigate IMS and DBCTL applications and their DLI calls using the interactive dialog, reading directly from the online ATF journals
- Use tracking to see all the application calls associated with a single transaction and identify bottlenecks
- Merge the ATF journal with the IMS (and DB2) logs to see the complete end-to-end picture of the transaction lifecycle
- A new IMS system view (6) added to System Definitions to define the ATF journal data sets

Open Database DRDA® analysis using IMS Connect Extensions

IMS Connect Extensions for z/OS event journaling provides a comprehensive trace of every Distributed Relational Database Architecture™ (DRDA) call issued by the application. Use IMS PI to:

- Provide easy-to-read formatting of all DRDA code-points, for both the open-standard and IMS-specific
- Show how relational model SQL calls are converted to DLI calls
- Analyze DLI call results including I/O and feedback areas
- Track application calls associated with a single thread and identifies bottlenecks
- Merge the CEX journal with the IMS log to see the complete end-to-end picture of the session thread of a distributed transaction

Scrub The Scrub utility removes sensitive or confidential user data from IMS log records, preparing them for sending off-site or making them available in-house for problem analysis. IMS PI provides two ways of implementing Scrub:

1. A batch utility that creates a scrubbed extract data set; invoked by the SCRUB command
2. An exit to enforce scrubbing of IMS log records prior to display in the dialog or batch reporting; no log file preparation is required

Enhanced trace record formatting

Enhanced formatting of the IMS log trace records (log codes 67FA and 67FF) generated by the /TRACE command.

ISPF dialog usability enhancements

Dialog enhancements include:

- Insert comments in the process list by starting the file name field with * (asterisk)
- Insert, repeat, or delete multiple rows in the process list by entering line actions *Inn*, *Rnn*, *Dnn* where *nn* is the number of rows
- Line action XT to exclude the record type
- FIND command for selection prompt lists
- EXTRACT command to retain the log records from a tracked transaction in a separate small file for later analysis
- Session exit confirmation to help guard against accidental exit during interactive log analysis which would lose location in the file and active filtering criteria

New batch reporting option, BRIEF

The BRIEF batch reporting option provides a concise way of reporting log records in batch. Only general and high-level information is reported, similar to the way records are browsed in the dialog, including:

- Log code and description
- High-level identification information, via global fields
- Time stamps and delta elapsed time between log record events

New Log Information report, LOGINFO

The Log Information report provides a synopsis of the log record types in the IMS log, including record count, lengths, rate per second, and volume. Selected record types are broken down further to provide additional information about transaction arrival and processing rates.

IMS V12 MSC enhancement using IMS Connect

IMS version 12 can use IMS Connect to provide MSC connectivity. IMS Connect Extensions, via its event journaling, provides comprehensive detail about the Connect-to-Connect events associated with MSC transaction processing. IMS Problem Investigator then provides the usual interactive event formatting and tracking across the front and back-end systems.

IMS Connect Transaction Index

The IMS Connect Transaction Index, created by IMS Performance Analyzer, contains a CA20 record for each IMS Connect transaction recorded in the IMS Connect Extensions journal, and includes all the cumulative information from the IMS Connect Extensions journal about that transaction. IMS Problem Investigator uses the index, either on its own or merged with associated IMS Connect Extensions journals and IMS log files, to streamline problem detection. By tracking against the index record for a transaction, you can see all the associated Connect events.

IMS Version 12 Repository Audit log stream

IMS V12 introduces its repository for resource definitions. The IMS repository server (optionally) keeps an audit log in a log stream.

IMS Problem Investigator allows you to analyze the repository events, including server control and client unit-of-work requests that impacted IMS resource definition changes.

IMS Problem Investigator Version 2 Release 2

The SC19-2757-00 edition accompanying the general availability of IMS Problem Investigator Version 2 Release 2 included the following new and changed features which are not marked in the body of this book.

Support for IMS versions 9, 10, 11

IMS Problem Investigator supports IMS versions 9, 10, and 11.

- IMS Version 10 log records include:
 - 4511 general storage statistics
 - 4512 IMODULE statistics
 - 4513 MSC statistics
 - 4514 EWLM statistics
 - 56FA transaction-level statistics, providing detailed performance and resource usage metrics, including CPU time, DLI call, database I/O and ESAF usage, and is fully exploited by IMS Problem Investigator in terms of reporting, tracking, and filtering
- IMS Version 11 log records include:
 - 4515 64-bit cache storage manager
 - 4516 Fast Path 64-bit buffer manager

Support for additional event collection by IMS Connect Extensions

IMS Problem Investigator supports IMS Connect Extensions event collection for new IMS version 10 and 11 workloads.

- IMS Connect Extensions event collection includes additional information about:
 - Datastore flood notification
 - XML adapter
 - ODBM
 - Port Exit activity
 - RRS

Multiple file merge

Select multiple files to merge for dialog viewing (S) or batch reporting (SUB). Use = to represent the previous line action to select multiple files more quickly.

Time Slicing

Use W to view large log files with the efficiencies of a small extract. See “Time Slicing” on page 43 for details.

Track with TX or TU

Display only those records that are in the same transaction (TX) or the same unit of recovery (TU). See “Track records from a single transaction” on page 35 for details.

IMS Transaction Index support

IMS Performance Analyzer creates X'CA01' IMS Transaction Index records. When merged with the IMS log, they enhance problem identification capability. See Chapter 10, “Streamlining analysis using the IMS Transaction Index,” on page 149 for details.

Extract to a CSV file

Create a delimited text file for import to spreadsheet applications.

The dialog allows you to request a CSV file in addition to an extract or report. See “ALZCSV: CSV extract” on page 414 for details.

Export/import filters and forms

A batch export/import facility enables filters, forms and object lists to be copied from one complex to another. See “ALZEXPIM: Export/Import” on page 419 for details.

OMEGAMON TRF support

Format and analyze OMEGAMON for IMS Transaction Reporting Facility (TRF) records providing useful monitoring statistics such as DLI and DB2 call response times. See Chapter 14, “Analyzing OMEGAMON TRF statistics,” on page 189 for details.

DB2 log support

Format and analyze DB2 versions 8, 9, and 10 log records providing useful information on DB2 database accesses from your IMS TM system. Both offline and active DB2 logs are supported. See Chapter 16, “Analyzing DB2 activity in IMS transactions,” on page 209 for details.

WebSphere® MQ log extract file support

Format and analyze WebSphere MQ version 6+ log extracts to assist diagnosis of IMS transactions driven through WebSphere MQ. See Chapter 17, “Analyzing WebSphere MQ activity in IMS transactions,” on page 225 for details.

SMF record support for IRLM Long Locks

Format and analyze IRLM Long Lock records (SMF 4F0F - decimal 79.15) to assist in analysis of transaction delays. See Chapter 18, “Investigating IRLM Long Lock events,” on page 251 for details.

IMS Connect Journal File Selection support for active journals

When batch report, extract or CSV processing is requested for a system or group, automated file selection now selects relevant IMS Connect Extensions active journal data sets as well as archive data sets. To acknowledge this enhanced capability, the terminology has changed from “Archive File Selection” to “Journal File Selection”, and the Archive File Selection utility ALZCEXAS is deprecated by the enhanced ALZDBRC utility. See “Automated file selection” on page 95 for details.

System and file definition usability enhancements

The following improvements help make IMS Problem Investigator more efficient, dynamic, and easier to use:

- **Shared System Definitions** – the system and group definition facility allows concurrent access by multiple users and can share the definitions with IMS Performance Analyzer.
- **Standalone IMS Connect systems and files** – define and report standalone Connect system definitions independent of the IMS Connect Extensions for z/OS definitions repository.
- **DBRC API READONLY option** – used by DBRC Log Selection (IMS V10+) to avoid contention on the RECON data sets as reporting now requires only read access to the RECON data sets.
- **Request Authorization** – for DBRC log selection to prevent accidental disabling of the RECON data sets due to incorrect

IMSPLEX specification. See “ALZUAUTH: Request Authorization exit” on page 435 for details.

- **DBRCGRP Shared Group option** – for multiple RECONs using the same IMSPLEX.
- **Secondary SLDS files** – optionally used to relieve availability constraint on primary copies.

Batch reporting enhancements

Enhancements to batch reporting include:

- **Elapsed time** – show elapsed time between records with microsecond or nanosecond precision. See “ELAPSED command” on page 399 for details.

Other enhancements

Other enhancements include:

- **LARGE file format** – support for LARGE file format introduced in z/OS V1.7.
- **Improved record formatting** – including type 67FF deadlock events.
- **FIND command** – repeat find persists across log records.
- **FINDLIM** – set the maximum number of records to search using FIND and TRACK commands.
- **Filter ALL for a specified log type** – specify filtering criteria for all records of a particular log type.
- **Connect and TRF log codes** – specify the log code prefix in profile options, or change dynamically during an interactive analysis session by using the OMC primary command for OMEGAMON TRF Collector records in the IMS log, or ICC for IMS Connect Extensions journal records. This is useful for identifying each log type when examining files from multiple sources.
- **Attention interrupt handling** – log file processing in the dialog now supports attention interrupt handling. When processing large log files, scrolling and filtering may require a lot of I/O processing that can lock your ISPF session for extended periods. Pressing the ATTN key will halt I/O processing and cause IMS PI to display where it is up to. You can then choose to resume or investigate somewhere else.

What does IMS Problem Investigator do?

IMS Problem Investigator allows interrogation of log files from a variety of sources to assist in the analysis of performance problems associated with your IMS system environment.

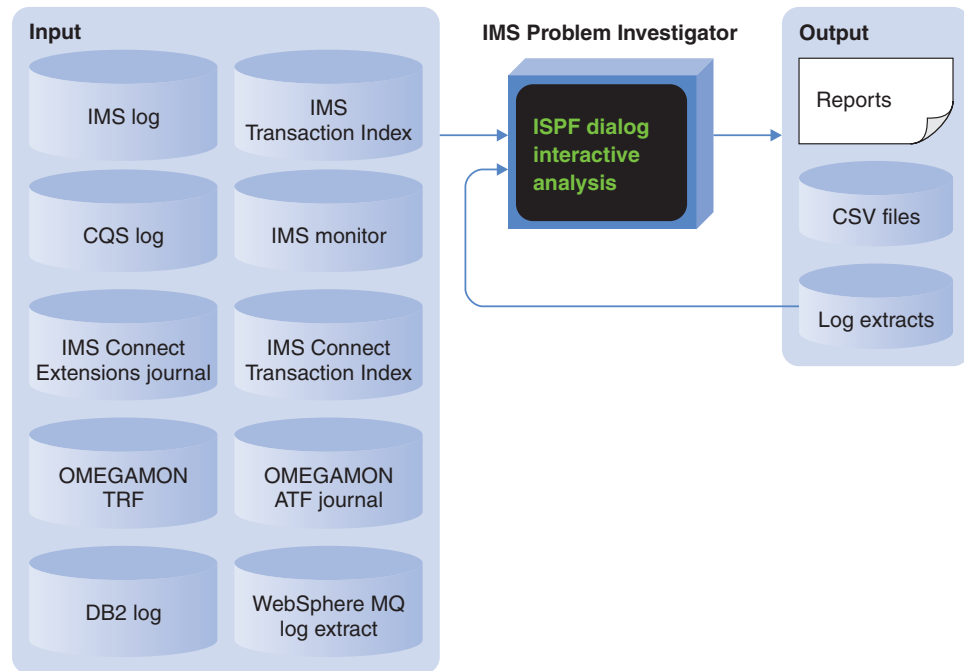


Figure 1. IMS Problem Investigator process overview

IMS Problem Investigator enables IMS administrators and programmers to interactively explore formatted, interpreted, and easily customizable views of log records; identifying and analyzing problems quickly, without requiring an expert understanding of log data structures and the relationships between log records.

IMS Problem Investigator supports the following types of log record:

- IMS log
- IMS Transaction Index created by IMS Performance Analyzer
- IMS TM and IMS DB monitor data sets
- Common Queue Server (CQS) log stream and extracts
- IMS Connect event data collected by IMS Connect Extensions
- IMS Connect Transaction Index created by IMS Performance Analyzer
- OMEGAMON Transaction Reporting Facility (TRF) log and extract
- OMEGAMON Application Trace Facility (ATF) journal
- DB2 log
- WebSphere MQ log extract
- SMF - IRLM Long Lock records
- IMS trace table records (67FA, 67FF) in the IMS log
- IMS Repository Audit log stream and extracts (introduced in IMS V12)

You can analyze these records through an ISPF dialog, batch reports, and REXX programming services, and you can create filtered extracts and CSV files to aid

problem investigation. Smaller extract files are easier to analyze, but similar efficiencies can be obtained with the original large log files by using time slicing.

You can submit batch requests to format CQS and FRP log streams or create extracts and CSV files. The dialog can format extract files, but not the CQS and FRP log streams directly.

Through the IMS Problem Investigator ISPF dialog, you can:

- View formatted logs with detailed field descriptions.
- Navigate to an exact point in time within a log file.
- Investigate specific problem areas. For example, transaction, database, security, or checkpoint processing.
- Merge log files to combine different aspects of IMS processing into a single view.
- Track the flow of a transaction in a single system or across a sysplex.
- Track entire transactions, including program switches, and drill down to isolate an individual unit of recovery.
- Determine response times and latencies.
- Extract the current result set (of log records from filtering and tracking) into a data set for later analysis.

The IMS logs are a rich source of information about your IMS environment, providing essential data for many business functions. While the logs supply data for business functions, they were not primarily designed for such purposes. Without IMS Problem Investigator, much of the valuable information in the logs is hard to access and understand.

Utility programs such as DFSERA10 can assist in the examination and display of log records. However, such utilities require an intimate knowledge of IMS logs and the relationship between the records in them. Even expert users find the process of log analysis with such utilities difficult and time consuming.

In contrast, through its emphasis on interactive analysis and easy customization, IMS Problem Investigator speeds and simplifies log analysis, allowing you to efficiently use IMS and related logs for tasks such as debugging, performance tuning, tracing, and creating audit trails.

Related concepts:

Chapter 31, “Log record types and codes,” on page 387

IMS Problem Investigator can analyze log records from a variety of sources.

IMS Problem Investigator features and benefits

IMS Problem Investigator exposes and interprets the valuable information contained in IMS logs and the log files of related systems.

IMS Problem Investigator offers several unique and significant features to assist problem investigation by making the log data easier to understand and analyze:

Log file selection and extraction

You can either explicitly select the log files you want to browse or automatically select and extract data from multiple IMS and IMS Connect systems.

- Type the name of the log file and start browsing it.
- Select logs from specific IMS and IMS Connect systems.

- Request log data for a time period.
- Request log data matching filtering criteria.
- Get log data from a group of systems in a single extract or CSV file.
- Use time slicing to analyze large log files more expediently.

Scrub The Scrub utility removes sensitive or confidential user data from IMS log records, preparing them for sending off-site or making them available in-house for problem analysis. IMS Problem Investigator provides two ways of implementing Scrub:

- A batch utility that creates a scrubbed extract data set; invoked by the SCRUB command
- An exit to enforce scrubbing of IMS log records prior to display in the dialog or batch reporting; no log file preparation is required

Log file merge and navigation

To make navigating within a log file easier, you can:

- Process records from multiple files, merged in time sequence.
- Go to an exact point of time in a log file with microsecond precision.
- Navigate forwards and backwards in the record using time increments.
- Set labels to remember positions within a file.
- Merge multiple files to process as a single file.
- Find particular character strings.

Log record presentation

To access and interpret the information in the log files, you can:

- List records with or without a brief summary of their contents.
- View extensive details of log records, with descriptions of every field.
- View the description and state of individual bits in flag fields.
- Show time in GMT, local, or fixed offsets.
- Apply a leap second offset to synchronize time with the MVS™ system log.
- View dump fields with both hexadecimal and EBCDIC character translation.
- View additional information relating to APPC, OTMA, WebSphere MQ, and IMS Connect.
- Customize which fields are shown by using forms.
- Toggle between formatted presentation and ISPF-browse presentation.

Log analysis

To streamline log analysis, you can:

- Show those records that are in the same transaction logged across multiple log files of various types.
- Isolate the log records associated with a single syncpoint (unit of recovery).
- Display event latencies between records.
- Use advanced filters to find records matching selection criteria. Criteria can include:
 - Global field names. For example, transaction code, user ID, or database name.
 - Field names from the IMS macros. For example, MSGODSTN.

- Masking and character offsets. For example, show records where the string "UNAUTHORIZED" appears within the message text field MSGTXT.

- Perform advanced analysis and customization using REXX execs.

REXX The REXX application programming interface (API) allows you to develop REXX execs to automate common investigative tasks. You can:

- Read log records.
- Fetch fields in the records.
- Customize how IMS Problem Investigator displays information in the dialog.
- Save information to an external data set.
- Extend batch capabilities by writing and then running REXX execs that perform analysis in batch.

Batch You can use the batch interface to create reports, log extracts and CSV files. For example, produce daily reports of security violations, database updates, and irregular transactions.

The benefits of IMS Problem Investigator include:

Faster problem determination

Efficiently identify and resolve problems with terminals, applications, transactions, and IMS systems. You no longer need to look at dumps or calculate hexadecimal offsets. Instead, you select the system or group of systems on which the problem occurred, enter the approximate time of the problem, and view log records from that period. Information in the records is easy to access and understand, and you can use advanced features to analyze the logs and understand the cause of the problem.

Reduced time-to-market for new IMS applications and transactions

IMS Problem Investigator makes debugging new applications and transactions quicker and easier. You can execute a new application and quickly view and understand its effect. Combined with IMS Connect Extensions event collection, IMS Problem Investigator also makes it quicker and easier to implement TCP/IP connectivity for existing applications.

Improved transaction response times

Pinpoint exactly where and why a transaction was delayed by viewing all events for that transaction and the time it took each event to occur. For long-running transactions with program switches, drill down from the transaction to a single unit of recovery (UOR).

Streamlined system audits; assistance with regulatory compliance

Create filters, extracts, CSV files and reports of security violations, database updates, and irregular transactions.

A better understanding of your IMS environment

Explore IMS, and the transactions and applications running in your IMS environment. IMS Problem Investigator provides helpful information on most log record types and allows you to track complex transactions.

Increased automation

You can reduce the time and resources needed to maintain your IMS environment by automating analysis tasks.

Performance management solutions

IBM solutions help IT organizations maximize their investment in DB2 and IMS databases while staying on top of some of today's toughest IT challenges. Performance Management solutions can help maximize the productivity and profitability of your DB2 and IMS databases.

IMS Problem Investigator is one of several IMS Tools products that help maximize database performance to support service level agreements (SLA), drive higher transaction rates, and ultimately increase profitability.

The following additional IMS Tools products also provide Performance Management solutions:

- IMS Performance Analyzer for z/OS
- IMS Buffer Pool Analyzer for z/OS
- IMS Network Compression Facility
- Tivoli® OMEGAMON XE for IMS on z/OS

IMS Problem Investigator provides an enhanced level of problem determination services for IMS Transaction Manager (IMS TM) and IMS Database Manager (IMS DB) systems.

IMS Problem Investigator complements IMS Performance Analyzer for z/OS and IMS Connect Extensions for z/OS making the end-to-end analysis of IMS transactions quicker and easier than ever before. The result is improved productivity for problem analysts, more efficient IMS application performance, improved IMS resource utilization, and higher system availability.

Hardware and software prerequisites

IMS Problem Investigator for z/OS is installed by using SMP/E and standard RECEIVE, APPLY, and ACCEPT processing.

Complete information about installation requirements, prerequisites, and procedures is located in the *Program Directory for IMS Problem Investigator for z/OS*, GI10-8704-02.

Hardware prerequisites

IMS Problem Investigator V2.4 operates on any hardware configuration that supports the required versions of IMS.

Software prerequisites

Before installing and configuring IMS Problem Investigator V2.4, ensure that the following software requirements are fulfilled.

Installation requirements and operating system

- z/OS V1.11 (5694-A01) or later

Mandatory operational requirements

IMS Problem Investigator operates with any of the following IMS versions:

- IMS V12.1 (5635-A03)

- IMS V13.1 (5635-A04)
- IMS V14.1 (5635-A05)

Conditional operational requirements

For sharing system and group definitions with IMS Performance Analyzer, or to utilize the IMS Transaction Index to streamline transaction analysis, IMS Problem Investigator requires:

- IBM IMS Performance Analyzer for z/OS, V4.3 (5655-R03) or later

To utilize the IMS Connect Transaction Index to track transactions and see the IMS Connect events, IMS Problem Investigator requires:

- IBM IMS Performance Analyzer for z/OS, V4.3 (5655-R03) or later

To analyze IMS Connect event data or utilize the IMS Connect Transaction Index, IMS Problem Investigator requires event information collected by:

- IBM IMS Connect Extensions for z/OS, V2.3 (5655-S56) or later

To analyze OMEGAMON TRF data, IMS Problem Investigator requires statistics collected by:

- IBM Tivoli OMEGAMON XE for IMS on z/OS, V4.2 (5698-A34) or later, Transaction Reporting Facility

To analyze OMEGAMON ATF data, IMS Problem Investigator requires statistics collected by:

- IBM Tivoli OMEGAMON XE for IMS on z/OS, V4.2 (5698-A34) or later, Application Trace Facility

IMS Problem Investigator architecture

IMS Problem Investigator employs Knowledge Modules to format log records from a variety of data sources. Log analysis is best done interactively using the ISPF dialog, but reports of formatted log records can also be produced. Filtered extracts of merged log files from multiple systems can be created and then analyzed using the dialog browsing, navigating and tracking functions to assist problem determination and resolution.

The components of IMS Problem Investigator architecture and process flow include:

Data sources

IMS Problem Investigator can format and analyze log records of different types:

IMS log files

You can analyze your IMS system logs by entering their data set name or using DBRC Log Selection to locate them automatically. If the data is on tape, you must extract records first or analyze the data in batch reports.

IMS Transaction Index

IMS Performance Analyzer creates X'CA01' IMS Transaction Index records. Use IMS Problem Investigator to merge the IMS Transaction Index with the IMS log to streamline transaction analysis and diagnosis of IMS-related problems.

User log records

You can process user-defined log records by first defining them to IMS Problem Investigator. See Chapter 28, “Defining User Log records,” on page 335 for details.

IMS monitor files

You can analyze your IMS monitor files by just entering their data set name.

CQS log files

You can analyze your CQS log streams in batch reports, or by first extracting them to a file suitable for dialog processing.

IMS Connect event data

You can analyze IMS Connect events by processing the data collected in IMS Connect Extensions journal data sets. You can list the archive journals in the IMS Connect Extensions definitions repository and explicitly select the files for analysis. Alternatively, you can let IMS Problem Investigator Journal File Selection automatically select the files for a specified IMS Connect system and time period. Journal File Selection includes both archive journals and active journals.

IMS Connect Transaction Index

IMS Performance Analyzer creates X'CA20' IMS Connect Transaction Index records for transactions that are sent to OTMA (event record 41). Use IMS Problem Investigator to merge the IMS Connect Transaction Index with the original IMS Connect Extensions journal to track transactions with their associated IMS Connect events.

OMEGAMON TRF statistics data

OMEGAMON for IMS Transaction Reporting Facility (TRF) data provides useful monitoring statistics such as DLI and DB2 call response times. IMS Problem Investigator can process both TRF Collector records in the IMS log and TRF Extractor output records.

OMEGAMON ATF journal data

OMEGAMON for IMS Application Trace Facility (ATF) data provides application-level accounting statistics such as DLI call times and CPU utilization.

DB2 log files

DB2 log records provide information on DB2 database activity from your IMS TM system. IMS Problem Investigator can process both offline and active DB2 logs.

WebSphere MQ log extract file

WebSphere MQ log data assists analysis of IMS transactions driven through WebSphere MQ. IMS Problem Investigator processes both offline and active DB2 logs.

IRLM Long Lock records from SMF

SMF 79.15 (X'4F0F') IRLM Long Lock records provide information on transaction delays.

IMS Trace

IMS trace table entries (X'67FA', X'67FF') reside in the IMS Log.

IMS Repository Audit log

You can analyze IMS Repository Audit log streams in batch reports, or by first extracting them to a file suitable for dialog processing.

Systems and groups

These are definitions of IMS and IMS Connect systems, which can be shared with IMS Performance Analyzer. The main purpose of defining systems is to register their DBRC information so that you can use DBRC log selection to select required log files for extracts and batch reports.

Your systems and groups store the RECON or MDA specifications for DBRC log selection. Because you can group IMS and IMS Connect systems, you can easily extract records for a specific time range from multiple IMS and IMS Connect systems into a single file.

DBRC Log Selection

Provides automated log file selection for batch reports and extracts, bypassing the labor-intensive process of determining which SLDS or OLDS data sets contain the relevant log data. Simply specify a date and time, and then DBRC log selection will use the DBRC API to extract the SLDS and OLDS data set information for the required time period.

Control data set (CDS)

IMS Problem Investigator saves filters, forms, user log specifications, and object lists (lists of items that you can use in filters) in a control data set, so that you can share them with other users.

Knowledge modules

These are internal to IMS Problem Investigator. They contain the information IMS Problem Investigator needs to format and interpret log records. If you are defining user log records, you need to create a Knowledge Module.

IMS Problem Investigator concepts

The fundamental concept of IMS Problem Investigator is its knowledge of log records, making the wealth of information in log records accessible for problem investigation.

Log file processing

“Looking inside” log files of IMS and related systems.

IMS Problem Investigator can process log files to display them in the ISPF dialog, produce batch reports, or generate an extract or CSV file.

Log file formatting

IMS Problem Investigator formats the contents of log files from various sources such as IMS log and monitor files, CQS log streams, IMS Connect events recorded in IMS Connect Extensions journals, OMEGAMON TRF and ATF files, DB2 logs, WebSphere MQ extract logs, SMF Long Lock records, IMS trace table entries, and the IMS Repository Audit log.

It displays the contents of these records in an ISPF session, or in a report, using information from the IMS mapping DSECTs as well as additional information built into IMS Problem Investigator. This additional information:

- Identifies the relationship between similar fields in different record types and presents those fields as global fields.
- Gives enhanced descriptions for many fields.
- Interprets values in some fields. For example, converts the hexadecimal CPU timer-unit field DLREXTIM to the transaction CPU time in seconds (with microsecond precision).
- Formats segments not described in the IMS DSECTs, such as APPC, OTMA, WebSphere MQ, and IMS Connect segments.

The following figure illustrates an interactive ISPF session in which you drill down from the formatted contents of a file, to the formatted contents of a record, to view the contents of a field with its value explained.

1 Select a record to view all of its fields

Forwards / Backwards . . 00.00.00.000100
Time of Day . . 01.10.30.000000

Code Description
Date 2014-02-16 Sunday
Time (Local)

S 01
Input Message
01.10.56.574109

UTC=17.10.56.568088 TranCode=ATMWDRAW Userid=NEWYORK LTerm=NEWYORK
 Terminal=NYATM001 OrgUOWID=I9DE/BE8300F4C92D4A23

08
Application Start
01.10.56.574110

UTC=17.10.56.574100 TranCode=ATMWDRAW Region=0002
 RecToken=I9DF/0000000300000000 RegTyp=MPP TClass=01 TPrtY=08

31
DLI
Form ==> _____ +
Format ==> [FORM](#)

***** Top of data *****
 +0004 Code... 01 Input Message
 +0166 STCK... BE8300EDBF897D01 LSN...
 Date... 2014-02-16 Sunday Time...

03
Outp

+0000 MSGLRLL... 0176 MSGLRZZ... 0000 MSGLCODE... 01
 +0005 MSGFLGS... C1 MSGDFLG2... 81 MSGFPADL... 94
 +0008 MSGMDRRN... 08000009 MSGRDRRN... 08000009 MSGPRFL... 0166
 +0012 MSGCSW on MSGDFLG3... 02

Field Zoom

+0007 MSGFPADL... 94 Prefix Additional Info Flag
 On MSGFPRSP... 80 Response Mode
 Off MSGSACMD... 40 Scheduled APPL issued ©CMD©
 Off MSGAOIUE... 20 Message generated by AOI user exit
 On MSGSYSEG... 10 System Segment exists
 Off MSGSSPND... 08 Message is on SMB Suspend queue
 On MSGFPINR... 04 Input message is non-recoverable

2 Zoom on a field to view a detailed description of its value

Figure 2. View formatted files, records, and fields

Global fields

Global fields are information fields that mean the same thing in different types of records. They help identify the resources used in transaction processing.

For example, TRANCODE identifies the transaction code in all applicable log record types, recognizing that in an IMS type 01 record this information is stored in the MSGODSTN field and in an IMS type 07 record this information is stored in the DLRTRNCD field.

You can use global fields to view a brief summary of the contents of records and in filtering conditions. In filtering conditions, you can use global fields to display records matching global conditions. For example, show all records where:

- Transaction code is "ATMWDRAW"
- User ID is "John"

You can see all global fields by pressing the Prompt function key (F4) in a filter definition for the list of fields for the ALL log code conditions.

Related reference:

"Specifying global field values" on page 293

For log code ALL, specified with or without a log type, conditions can be set for any or all global fields.

Time stamps and UTC

IMS Problem Investigator formats log file records to show the time at which each record was created.

The time is presented in *hh:mm:ss...* format with microsecond accuracy. The time is derived from the store clock (STCK) value of the log record suffix present in all IMS log records, or otherwise, from the contents of the record. You can adjust this time to GMT, local time, or a fixed offset. To synchronize time with the MVS system log, you can also apply a leap second offset to the time display.

In addition to formatting and displaying the STCK time when the log record was created, IMS Problem Investigator also shows the time at which the event occurred (if it is stored in the record). This information is usually a Coordinated Universal Time (UTC) time stamp. The UTC appears as one of the global fields.

Log file merging

Log file merging refers to the ability to process files from multiple systems and sources as one file. You can do this by extracting records from multiple systems into a single file, or by selecting multiple files and viewing their records *as if* they are merged into a single logical file.

For example, you can view:

- System-wide activity, by merging log files from all IMS systems in a sysplex; optionally, including the CQS logs.
- Monitored transaction activity by merging IMS log and monitor files.
- End-to-end activity for TCP/IP transactions, by merging IMS log files with IMS Connect events recorded in IMS Connect Extensions journals.
- Comprehensive application activity, by merging the IMS log with the DB2 and MQ logs.

Filters

A filter selects which records to display in the ISPF dialog, output to an extract file, or write to a report.

Filters can be simple, for example:

- Select only records related to security violations (IMS 10).
- Select only DB2 unit of recovery records (0020) from a DB2 log.
- Select only records with the transaction code ATMWDRAW.

You can make filters gradually more complex by modelling on an existing filter. For example, “select only records related to security violations with the ATMWDRAW transaction code”.

Potentially, you can define powerful and advanced filters with conditions including:

- Field names from the IMS mapping DSECTs
- Offsets
- Bit flag values
- Masking characters
- Position-dependent strings

You can also use filters to automatically apply a form or run a REXX exec when a user selects a matching record. For example, automatically apply a REXX exec that derives and displays TRANSACT macro parameters when a user browses an SMB segment in an IMS type 4004 checkpoint record.

Related concepts:

“REXX customized formatting” on page 22

You can use REXX programming services to customize log record and field formatting. You can write REXX execs to read log files, fetch fields in records, and then display the formatted results or save the output to a data set.

Forms

A form controls which fields from a given record type to display.

You can use forms to customize the display for certain problem scenarios. For example, in an IMS 01 record, show only the transaction code, User ID, terminal, and message text.

A form is also used to specify the record format of a CSV file.

Transaction tracking

Tracking highlights events in the life of an individual transaction by skipping records not associated with that transaction.

Because IMS serially processes large workloads, records from the same transaction can be separated by thousands of records from other transactions, making it difficult to trace the flow of only one of those transactions. Moreover, different record types will have different fields that relate them to a transaction, making conventional filtering and searching impossible.

With IMS Problem Investigator you can find a record from the relevant transaction, and then use a single line action to display just the records from that transaction. IMS Problem Investigator tracks all the records for the transaction across all types of input file. Records that are not in the transaction are hidden from view.

IMS Problem Investigator finds records in the same transaction by matching any global field that identifies the transaction; such as:

- Originating tracking unit-of-work identifier
- Recovery token (RecToken)

- Monitor record ITASK number
- Dependent region partition specification table (PST) number
- IMS Connect assigned logon token

For long-running IMS transactions with program switches, you can drill down to isolate events in a single unit of recovery (UOR).

1 Enter TX line action next to a log record

	Code	Description	Time (Local)
/			
TX	01	Input Message TranCode=ATMWDDR Source=Connect	01.31.09.598962
___	35	Input Message Enqueue TranCode=ATMWDDR	01.31.09.598970
___	01	Input Message TranCode=EFTWDDRSource=Connect	01.31.09.598989
___	35	Input Message Enqueue TranCode=EFTWDDR	01.31.09.598994
___	03	Output Message Response LTerm=ATMT Source=Connect	01.31.09.599008
___	07	Application Terminate TranCode=EFTWDDR Region=005E	01.31.09.599015
___	08	Application Start TranCode=EFTWDDR Region=005E	01.31.09.599017
___	5607	Start of UOR Program=EFPROGA Region=005E	01.31.09.599017
___	31	DLI GU TranCode=DSFFPS2B Region=007E	01.31.09.599022
___	31	DLI GU TranCode=EFTWDDR Region=005E	01.31.09.599026
___	33	Free	
___	5610	Start	
___	37	Syncp	
___	33	Free	
___	5612	End o	
___	5612	End o	
___	07	Appli	
___	08	Appli	
___	5607	Start	
___	31	DLI G	
___	01	Input	
___	35	Input	
___	01	Input	
___	35	Input	

	Code	Description	Time (Local)
/			
___	01	Input Message TranCode=ATMWDDR Source=Connect	01.31.09.598962
___	35	Input Message Enqueue TranCode=ATMWDDR	01.31.09.598970
___	08	Application Start TranCode=ATMWDDR Region=0012	01.31.09.599221
___	5607	Start of UOR Program=ATMPROG Region=0012	01.31.09.599221
___	31	DLI GU TranCode=ATMWDDR Region=0012	01.31.09.599227
___	50	Database Update Database=ATMDBASE Region=0012	01.31.09.599982
___	50	Database Update Database=ATMDBASE Region=0012	01.31.09.600041
___	03	Output Message Response LTerm=ATMT Source=Connect	01.31.09.600109
___	31	DLI GU TranCode=ATMWDDR Region=0012	01.31.09.600116
___	33	Free Message	01.31.09.600156
___	5610	Start Phase 1 Syncpoint Region=0012	01.31.09.600164
___	37	Syncpoint Region=0012	01.31.09.606148
___	33	Free Message	01.31.09.606179
___	5612	End of Phase 2 Syncpoint Program=ATMPROG	01.31.09.611863
___	07	Application Terminate TranCode=ATMWDDR Region=0012	01.31.10.003503
***** Bottom of Data *****			

2 View records from the same transaction

Figure 3. View records from a transaction

The following example shows how IMS Problem Investigator links records that have different identifying fields to the same transaction. In this simple example, linking an IMS type 01 record (which does not have a recovery token) with a database update (which does not have a tracking unit-of-work identifier) by using an IMS type 31 record, which contains global fields from both record types.

Log Code	Description	OrgUOWID	RecToken
01	Incoming transaction	IMSA/B783071E1C865102	No RecToken
		↓	
31	Transaction processed by region	IMSA/B783071E1C865102	IMSA/0000000600000000
			↓
50	Database update	No OrgUOWID	IMSA/0000000600000000

Figure 4. How tracking selects records that are part of the same transaction

REXX customized formatting

You can use REXX programming services to customize log record and field formatting. You can write REXX execs to read log files, fetch fields in records, and then display the formatted results or save the output to a data set.

The following example shows the supplied sample REXX exec ALZTRANS. The exec derives and displays the SYSGEN TRANSACT macro parameters from fields in IMS 4004 Checkpoint SMB segments. Defining the exec in a filter means the exec automatically runs when a user selects a matching log record or zooms on the fields of the record.

1 This filter runs a REXX exec when you select an IMS type 4004 record or zoom on its fields

Filter ALZSAMP +
Description . . . Display SYSGEN macros from segments _ Activate Tracking

/ Log Code + Exc Description
IMS 4004 Checkpoint SMB
Level 1 Conditions No Form _____ + REXX ALZTRANS

Form ==> _____ + _ Use Form in Filter Format ==> FORM
***** Top of data *****

+0004 Code... 4004 Checkpoint SMB
+0F40 STCK... BE82FF4641C70020 LSN... 0000000000000031
Date... 2006-03-17 Friday Time... 01.03.25.125744.007

+0000	CHKRLNG... 0F50	CHKZZ..... 0000	CHKLC...
+0005	CHKTYPE... 04	CHKNO..... 0001	CHKBL...
+000A	CHKLL..... 0090	CHKNN..... 00000057	
+0010	<u>SMB..... SMB</u>	3 The exec analyzes the SMB segment, and then displays it as SYSGEN TRANSACT macro parameters	
+0010	SMBQEBP... 00000000		
+001			
+002			
+002C	SMBNAME... 'ADDINV'		
+0034	SMBFLAGA... SMB Flags		
+0034	SMBSTATS... 45		
+0037	SMBFLAG3... 00		
+0038	SMBQCBPR... 07		
+003C	SMBCTMP... FFFF		
+0042	SMBLMTCT... +2	APPLCTN PSB=DFSSAM04, TRANSACT CODE=(ADDINV), DCLWA=YES, EDIT=UC, FPATH=NO, INQUIRY=(YES,RECOVER), MODE=SNGL, MSGTYPE=(MULTSEG,NONRESPONSE,1), PARLIM=65535, PROCLIM=(65535,65535), PRTY=(7,10,2), ROUTING=NO, SCHD=4, SEGNO=0, SEGSIZE=0, SERIAL=NO	
+0048	SMBSAVPR... 00		
+004C	SMBPDIR... 07572780		
+0054	SMBRGNS... +0		
+0058	SMBFLAGB... SMB Flag wo		
+0058	SMBAOIFL... 00		
+005C	SMBSSPND... 00000000	SMBSMBPT... 07567FA0 SMBFNDCT... +0	

2 Zoom on the SMB segment field

Figure 5. Displaying SYSGEN macro statements using a REXX exec

Related concepts:

“Filters” on page 19

A filter selects which records to display in the ISPF dialog, output to an extract file, or write to a report.

Complementary IBM products

IMS Problem Investigator complements the following IBM products. Together they provide an integrated suite of tools for analyzing the performance of z/OS-based transactions.

IBM Transaction Analysis Workbench for z/OS

Transaction Analysis Workbench is a tool for analyzing problems with the performance or behavior of z/OS-based transactions. Transaction Analysis Workbench provides a platform for investigating logs and other historical data collected during transaction processing and system operations. Transaction processing is often complex. Modern applications frequently interact with external subsystems and use system services. Pinpointing the

cause of a problem can be difficult. Transaction Analysis Workbench extends the scope of traditional transaction analysis techniques, enabling you to more easily identify problems caused by external events.

Transaction Analysis Workbench extends the reach of analysis to:

- SMF, in particular DB2 performance trace and CICS Monitoring Facility
- DB2 and WebSphere MQ logs
- Log streams, including SMF, OPERLOG and CQS

IBM IMS Performance Analyzer for z/OS

IMS Performance Analyzer gives you an overall picture of transaction throughput and performance. The product highlights performance problems, which you can then analyze in more detail and solve with IMS Problem Investigator. To make the products easier to use together, they share definitions for systems and groups: you only need to maintain the definitions in one of the tools.

IBM IMS Connect Extensions for z/OS

IMS Connect Extensions provides instrumentation for IMS Connect, and the IMS Connect function of IMS. The tool continuously records IMS Connect events in journal data sets. IMS Problem Investigator can analyze the IMS Connect Extensions journals to format and interpret the IMS Connect event data.

The following diagram illustrates the cooperation between IMS Problem Investigator, IMS Performance Analyzer, and IMS Connect Extensions. When IMS Connect event details in IMS Connect Extensions journals are merged with IMS (and related) logs, IMS PI and IMS Performance Analyzer can provide a comprehensive insight into the lifecycle of IMS transactions.

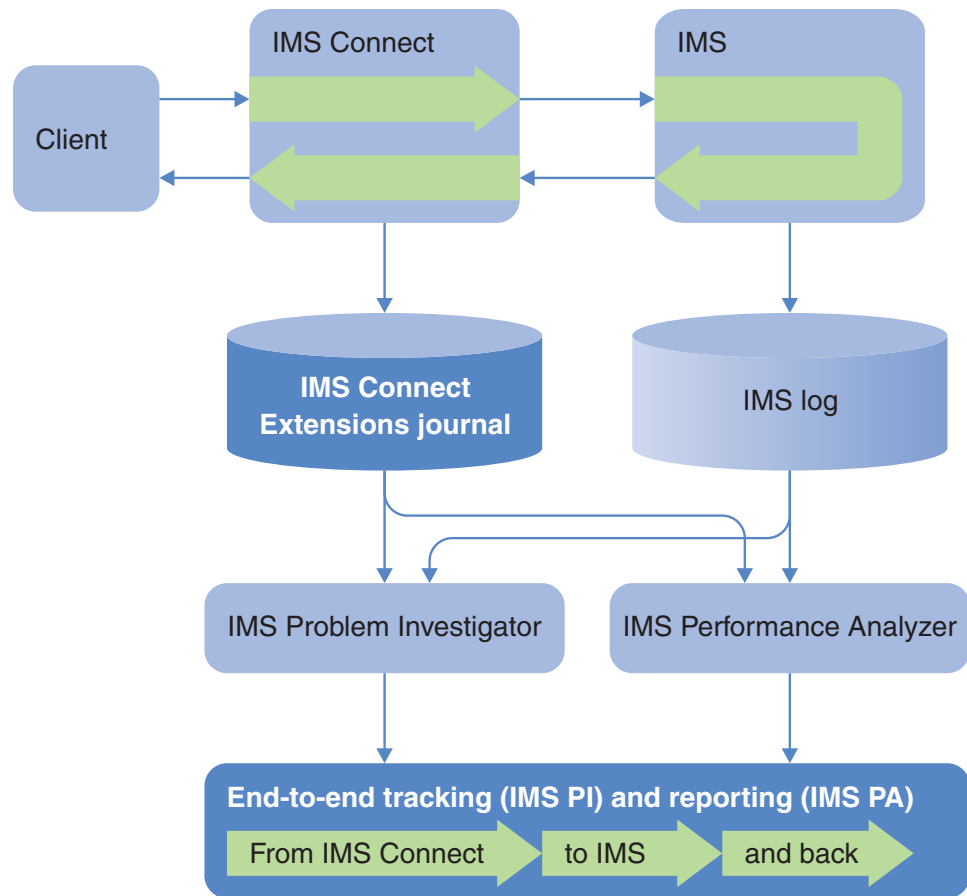


Figure 6. IMS PI, IMS PA, and IMS Connect Extensions cooperation

Service updates and support information

Service updates and support information for this product, including software fix packs, PTFs, frequently asked questions (FAQs), technical notes, troubleshooting information, and downloads, are available from the web.

To find service updates and support information, see the following website:

http://www.ibm.com/support/entry/portal/Overview/Software/Information_Management/IMS_Tools

Product documentation and updates

IMS Tools information is available at multiple places on the web. You can receive updates to IMS Tools information automatically by registering with the IBM My Notifications service.

Information on the web

The IMS Tools Product Documentation web page provides current product documentation that you can view, print, and download. To locate publications with the most up-to-date information, refer to the following web page:

<http://www.ibm.com/software/data/db2imstools/imstools-library.html>

You can also access documentation for many IMS Tools from IBM Knowledge Center:

<http://www.ibm.com/support/knowledgecenter>

IBM Redbooks® publications that cover IMS Tools are available from the following web page:

<http://www.redbooks.ibm.com>

The Data Management Tools Solutions website shows how IBM solutions can help IT organizations maximize their investment in IMS databases while staying ahead of today's top data management challenges:

<http://www.ibm.com/software/data/db2imstools/solutions/index.html>

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To automatically receive emails that notify you when new technote documents are released, when existing product documentation is updated, and when new product documentation is available, you can register with the IBM My Notifications service. You can customize the service so that you receive information about only those IBM products that you specify.

To register with the My Notifications service:

1. Go to <http://www.ibm.com/support/mysupport>
2. Enter your IBM ID and password, or create one by clicking **register now**.
3. When the My Notifications page is displayed, click **Subscribe** to select those products that you want to receive information updates about. The IMS Tools option is located under **Software > Information Management**.
4. Click **Continue** to specify the types of updates that you want to receive.
5. Click **Submit** to save your profile.

How to send your comments

Your feedback is important in helping to provide the most accurate and high-quality information. If you have any comments about this book or any other IBM product documentation, use one of the following options:

- Use the online reader comment form, which is located at <http://www.ibm.com/software/data/rcf/>.
- Send your comments by email to comments@us.ibm.com. Include the name of the book, the part number of the book, the version of the product that you are using, and, if applicable, the specific location of the text you are commenting on, for example, a page number or table number.

Accessibility features

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use a software product successfully.

The major accessibility features in this product enable users to perform the following activities:

- Use assistive technologies such as screen readers and screen magnifier software. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.
- Customize display attributes such as color, contrast, and font size.
- Operate specific or equivalent features by using only the keyboard. See the following publications for information about accessing ISPF interfaces:
 - *z/OS ISPF User's Guide, Volume 1*
 - *z/OS TSO/E Primer*
 - *z/OS TSO/E User's Guide*

These guides describe how to use the ISPF interface, including the use of keyboard shortcuts or function keys (PF keys), include the default settings for the PF keys, and explain how to modify their functions.

Chapter 2. Tour of product features

IMS Problem Investigator provides a toolkit of features to help you analyze IMS transaction activity.

View an IMS log file

When you select log files to analyze, IMS Problem Investigator formats and displays the records contained in them.

- The log records appear with their code and description.
- You can choose to view detailed descriptions (as shown in Figure 7 on page 30) or brief descriptions (as shown in “Track records from a single transaction” on page 35).
- The detailed description contains information from global fields. Such as, transaction code, LTERM, program name, database, tracking unit of work ID, recovery token, as well as performance and status information.
- You can choose to show the time when the record was created, or the log record sequence number (LSN) which uniquely identifies the record in the file. For merged files, the LSN is prefixed by a number to identify the file that the record came from.

File Menu Edit Mode Navigate Filter Time Labels Options Help			
BROWSE	IMSPI.IZDF.SLDS	Record 00000203	More: < >
Command ==>		Scroll ==>	CSR
Forwards / Backwards . .	00.00.00.000100	Time of Day . .	01.10.59.143497
Code Description	Date 2009-03-17 Tuesday	Time (Local)	
/ -----			
— 07	Application Terminate	01.10.59.143497	
	UTC=17.10.59.143494 TranCode=ATMWDRAW Program=ATMPROG Region=0002		
	RecToken=IZDF/0000000300000001		
	RegTyp=MPP MCNT=1 DBDLI=5 DCDLI=3 CPU=29.634429		

— 5E	SB Handler requests Image Capture	01.10.59.143531	
	UTC=17.10.56.573952 Region=0002		

— 08	Application Start	01.11.22.024555	
	UTC=17.11.22.024548 TranCode=ATMWDRAW Region=0001		
	RecToken=IZDF/0000000500000000 RegTyp=MPP TClass=01 TPty=08		

— 5607	Start of UOR	01.11.22.024557	
	Program=ATMPROG Region=0001 IMSID=IZDF RecToken=IZDF/0000000500000000		

— 01	Input Message	01.11.22.028553	
	UTC=17.11.22.018766 TranCode=ATMWDRAW Userid=FUNTRM46 LTerm=FUNTRM46		
	Terminal=SC0TCP46 OrgUOWID=IZDE/BE83010D0EB91341		

— 31	DLI GU	01.11.22.028563	
	UTC=17.11.22.028559 TranCode=ATMWDRAW Region=0001		
	OrgUOWID=IZDE/BE83010D0EB91341 RecToken=IZDF/0000000500000000		

— 5616	Start of protected UOW	01.11.22.028826	
	Region=0001 IMSID=IZDF RecToken=IZDF/0000000500000000		

Figure 7. Formatted log file

Select and view an IMS type 01 log record

Select any record in the file to view formatted details of that record, including field names and content.

```
File Menu Format Help
BROWSE      IMSPI.IZDF.SLDS                      Record 00000680 Line 00000000
Command ==>                                     Scroll ==> CSR
Form      ==> + Use Form in Filter                Format ==> STD
***** Top of data *****
+0004 Code... 01      Input Message
+0198 STCK... BE8300F4C9322443      LSN.... 0000000000000203
      Date... 2009-03-17 Tuesday      Time... 01.10.56.568098.266

+0000 MSGLRLL.... 01A8      MSGLRZZ.... 0000      MSGLCODE... 01
+0005 MSGFLAGS... C1      MSGDFLG2... 81      MSGFPADL... 94
+0008 MSGMDRRN... 0800000D      MSGRDRRN... 0800000D      MSGPRFLL... 0166
+0012 MSGCSW.... 90      MSGDFLG3... 00
+0014 MSGUOW.... Unit of Work (UOW) - Tracking
+0014 MSGORGID... 'IZDE '      MSGORGTK... BE8300F4C92D4A23
+0024 MSGPROID... 'IZDE '      MSGPROTK... BE8300F4C92D4A23
+0034 MSGUFLG1... 80      MSGUFLG2... 00
+0036 MSGRSQTY... 01      MSGDOFS.... 0000      MSGDRBN.... 00000000

+0040 MSGSSEGM... Message Prefix System Segment; Item ID = 81
+0040 MSGSILL.... 0040      MSGSIID.... 81      MSGCFLG1... 00
+0044 MSGCFLG2... 88      MSGCFLG3... 00      MSGCQSF1... 00
+0047 MSGCQSF2... 00
+0048 MSGPTERM... Full Physical Input Terminal ID
+0048 MSGINODE... 'NYATM001'
+0050 MSGTISEQ... 000A      MSGPREFO... +0      MSGPREFI... +0
+0056 MSGSETS... 00      MSGRES01... 00      MSGRECCT... +1
+0060 MSGIDSTN... 'NEWYORK '      MSGODSTN... 'ATMWDRAW'
+0070 MSGIHSQN... 0000000000000000
+0078 MSGFMTNM... 'DFSM02 '
```

Figure 8. Formatted log record

All field names in the record are point-and-shoot: you can zoom on any field in the log record by placing your cursor on that field and pressing Enter.

When you zoom on a field, you get a detailed description of its contents.

Character, numeric, and hexadecimal fields appear with descriptions.

```
+0068 MSGODSTN... 'ATMWDRAW'

Destination CNT Name or SMB Name.
For APPC transaction, Dest field consists
of 2 parts: Dest Type and Dest address
- valid only if MSGC2APP flag on.
1. MSGOD62I APPC (LU6.2) Dest Type QAB/TIB
2. MSGOD62A APPC (LU6.2) Dest Addr QAB/TIB
```

Figure 9. Fields appear with description

Flag fields appear with the status and description of each flag bit.

```

+0005 MSGFLAGS... C1   Message Flags

On    MSGFFRST... 80   First record of message, full prefix
On    MSGFLAST... 40   Last DRRN (record) of message prefix
Off   MSGFCANC... 20   Message cancelled
Off   MSGFNRQU... 10   Non-recoverable Query message
Off   MSGFQNR.... 0F   L/O nibble has Logical Queue Number

```

Figure 10. Flag fields

Store clocks and UTC appear in familiar calendar format.

```

+001C MSGGORTK... BE8300F4C92D4A23

Time (LOCAL)... 2009-03-17 01.10.56.568020.633 Tuesday

Originating Token (STCK value)

```

Figure 11. Calendar format

Dump fields appear in hexadecimal and EBCDIC.

```

+016A MSGXSTXT...

Message Text

+0000 C1E3D4E6 C4D9C1E6 40C1C3C3 D6E4D5E3 *ATMWDRAW ACCOUNT*
+0010 7EF4F6F5 60F3F7F3 60F9F2F2 40C1D4D6 **=465-373-922 AMO*
+0020 E4D5E37E 5BF1F0F0 F04BF0F0 4040 *UNT=$1000.00 *

```

Figure 12. Dump fields

Apply a form to the record

A form tailors the presentation of log records for specific problem scenarios by selecting which fields from those records appear in the ISPF dialog and in reports.

For example, in Figure 8 on page 31 all the fields from the IMS type 01 records are shown so key fields for certain problem areas are hard to identify (some of the key fields do not even fit on the one screen). In contrast, the following example shows the same record with a form applied. The form shows only the VTAM® node, transaction code, RACF® user ID, and content of the message.


```

File Menu Format Help
-----
BROWSE      IMSPI.IZDF.SLDS                      Record 00000680 Line 00000000
Command ==>                                     Scroll ==> CSR
Form      ==> BRIEF + _ Use Form in Filter          Format ==> FORM
***** Top of data *****
+0004 Code... 01      Input Message
+0198 STCK... BE8300F4C9322443      LSN.... 0000000000000203
      Date... 2009-03-17 Tuesday      Time... 01.10.56.568098.266

+0048 MSGINODE... 'NYATM001' MSGODSTN... 'ATMWDRAW'
+0094 MSGRACUS... 'NEWYORK '
+016A MSGXSTXT... Message Text
      +0000 C1E3D4E6 C4D9C1E6 40C1C3C3 D6E4D5E3      *ATMWDRAW ACCOUNT*
      +0010 7EF4F6F5 60F3F7F3 60F9F2F2 40C1D4D6      *=465-373-922 AMO*
      +0020 E4D5E37E 5BF1F0F0 F04BF0F0 4040      *UNT=$1000.00      *
***** End of data *****

```

Figure 13. A formatted record with a form applied to it

Note: To apply forms, you must first change the Format option from STD to FORM.

Navigate to a point in time and then find a string from a record

You can easily navigate to a point-in-time within the log file, find a formatted string in the file, and set labels to return to specific positions.

```
File  Menu  Edit  Mode  Navigate  Filter  Time  Labels  Options  Help
BROWSE    IMSPI.IZDE.SLDS                                Record 00000 String found
Command ==> F NEWYORK word 1                                Scroll ==> CSR
Forwards / Backwards . . 00.00.00.000100 2 Time of Day . . 17.10.00.000000 3
Code Description                                Date 2010-01-31 Sunday Time (Local)
/ -----
01  Input Message                                17.10.56.568098
    UTC=17.10.56.568088 TranCode=ATMWDRAW Userid=NEWYORK LTerm=NEWYORK
    Terminal=NYATM001 OrgUOWID=IZDE/BE8300F4C92D4A23
-----
35  Input Message Enqueue                        17.10.56.568114
    UTC=17.10.56.568088 TranCode=ATMWDRAW OrgUOWID=IZDE/BE8300F4C92D4A23
-----
0702 CQSPUT COMMIT request completed            17.10.56.568200
    UTC=17.10.56.568088 TranCode=ATMWDRAW Userid=NEWYORK LTerm=NEWYORK
    Terminal=NYATM001 OrgUOWID=IZDE/BE8300F4C92D4A23
-----
33  Free Message                                17.10.56.572620
    OrgUOWID=IZDE/BE8300F4C92D4A23
-----
4E15 Scheduling IWAIT end                        17.10.56.573688
    Region=0002 ITASK=00000009E
-----
08  Application Start                            17.10.56.574109
    UTC=17.10.56.574100 TranCode=ATMWDRAW Region=0002
    RecToken=IZDF/0000000300000000 RegTyp=MPP TClass=01 TPrtY=08
-----
5607 Start of a Unit-of-Recovery                 17.10.56.574110
    UTC=17.03.25.116264 Program=ATMPROG Region=0002 IMSID=IZDF
    RecToken=IZDF/0000000300000000
-----
```

Figure 14. Navigating a log file to a point in time

1 You can use primary commands such as:

FIND Finds the characters you specify. For example:

FIND NEWYORK

Finds the string 'NEWYORK'.

FIND 03 WORD

Searches whole words only; '03' in this case.

Labels (LOCATE and .label)

Set labels to remember positions within the file by entering *.label_name* (a period followed by the label name), and then return to that position with the command:

LOCATE *label_name*

2 You can navigate forwards (or backwards) in time by specifying a time interval, then tab to the **Forwards** (or **Backwards**) point-and-shoot field and press Enter. The display scrolls to the record at that time distance later (or earlier).

3 You can navigate to a time-of-day by specifying the required time, then tab

to the **Time of Day** point-and-shoot field and press Enter. The display scrolls to the first record on or after the time you specified.

Track records from a single transaction

Tracking isolates records in a single transaction, or a single unit of recovery.

Transaction tracking (line action **TX**) shows only records associated with the same transaction as the selected record. For IMS log files, you could alternatively use line action **TU** to show only those records from the same unit of recovery (UOR).

In this example, you can clearly identify when message processing began, the unit of recovery, database updates, and when the application finished processing the transaction. IMS Problem Investigator will track all the records from that transaction, finding the related records of any type from across the sysplex.

<u>F</u> ile	<u>M</u> enu	<u>E</u> dit	<u>M</u> ode	<u>N</u> avigate	<u>F</u> ilter	<u>T</u> ime	<u>L</u> abels	<u>O</u> ptions	<u>H</u> elp
BROWSE	IALZ.IMS101.OLDS							Tracking active	
Command ==>								Scroll ==> CSR	
	Forwards / Backwards . .		00.00.00.000100		Time of Day . .		01.31.09.598989		
	Code Description				Date 2009-10-05 Monday		Time (Local)		
/	----	Search limit reached (+5000)	-----						
TX 01	Input Message	TranCode=EFTWDRAW	Source=Connect				01.31.09.598962		
— 35	Input Message	Enqueue	TranCode=EFTWDRAW				01.31.09.598970		
— 08	Application Start	TranCode=EFTWDRAW	Region=0012				01.31.09.599221		
— 5607	Start of UOR	Program=EFTSPROG	Region=0012				01.31.09.599221		
— 31	DLI GU	TranCode=EFTWDRAW	Region=0012				01.31.09.599227		
— 50	Database Update	Database=EFTDBASE	Region=0012				01.31.09.599982		
— 50	Database Update	Database=EFTDBASE	Region=0012				01.31.09.600000		
— 50	Database Update	Database=EFTDBASE	Region=0012				01.31.09.600032		
— 50	Database Update	Database=EFTDBASE	Region=0012				01.31.09.600036		
— 50	Database Update	Database=EFTDBASE	Region=0012				01.31.09.600041		
— 03	Output Message	Response LTerm=EFT1	Source=Connect				01.31.09.600109		
— 31	DLI GU	TranCode=EFTWDRAW	Region=0012				01.31.09.600116		
— 33	Free Message						01.31.09.600156		
— 5610	Start Phase 1	Syncpoint	Region=0012				01.31.09.600164		
— 37	Syncpoint	Region=0012					01.31.09.606148		
— 33	Free Message						01.31.09.606179		
— 5612	End of Phase 2	Syncpoint	Program=EFTSPROG				01.31.09.611863		
— 07	Application Terminate	TranCode=EFTWDRAW	Region=0012				01.31.10.003503		
***** Bottom of Data *****									

Figure 15. Tracking (TX): shows records from the same transaction

Track an IMS unit of recovery

The **TU** line action tracks a single transaction or unit of recovery (UOR) in a program switch sequence. The global field LogToken contains the UOR tracking token.

The **TX** line action tracks the entire message and processing flow of the originating IMS transaction, including associated program switches. However, for long running transactions, such as the MQ trigger monitor, a BMP that continuously spawns (independent) transaction requests, **TX** tracks the monitor and all the spawned transactions. Consequently, individual transaction diagnosis is not possible. In this scenario, you can use **TU** to isolate the records of a spawned transaction by tracking the unit of recovery.

In the following example, the transaction TCMENU2 program switches to transaction FYMEN001. You might analyze events by a succession of line actions, such as:

- **TX** against any record. This tracks both transactions, displaying records 1 to 32.
- **TU** against records 1 to 5, or 8 to 13. This tracks the first transaction only, displaying records 1 to 13 (including 6 and 7).
- **TU** against records 6 or 7, or 14 to 32. This tracks the second transaction only, displaying records 6 and 7, and 14 to 32.

	Code	Description	Date 2007-06-26 Tuesday	Time (Relative)
1	01	Input Message TranCode=TCMENU2		07.06.52.802623
2	35	Input Message Enqueue TranCode=TCMENU2		+0.000007
3	08	Application Start TranCode=TCMENU2 Region=0018		+0.000060
4	5607	Start of UOR Program=TCMENU2 Region=0018		+0.000061
5	31	DLI GU TranCode=TCMENU2 Region=0018		+0.000106
6	03	Input Message TranCode=FYMEN001		+0.000832
7	35	Input Message Enqueue TranCode=FYMEN001 Region=0018		+0.000840
8	37	Syncpoint Region=0018		+0.000850
9	37	Syncpoint message transfer Region=0018		+0.000867
10	33	Free Message		+0.000877
11	5600	Commit found no work to do Region=0018 SSID=DB22		+0.000940
12	5612	End of Phase 2 Syncpoint Program=TCMENU2		+0.000942
13	07	Application Terminate TranCode=TCMENU2 Region=0018		+0.000911
14	08	Application Start TranCode=FYMEN001 Region=0019		+0.010952
15	5607	Start of UOR Program=FYMEN00 Region=0019		+0.010953
16	31	DLI GU TranCode=FYMEN001 Region=0019		+0.010961
17	5600	Sign-on to ESAF Region=0019 SSID=DB22		+0.020371
18	5600	Thread created for ESAF SSID=DB22		+0.020383
19	03	Output Message Response LTerm=QT40506		+0.021357
20	30	Additional Message Prefix Information		+0.021362
21	5600	Commit Prepare starting Region=0019 SSID=DB22		+0.021373
22	03	Message Continuation		+0.022672
23	30	Additional Message Prefix Information		+0.022677
24	35	Output Message Enqueue LTerm=QT40506 Region=0019		+0.022680
25	37	Syncpoint Region=0019		+0.022688
26	37	Syncpoint message transfer Region=0019		+0.022707
27	33	Free Message		+0.022712
28	31	Communications GU LTerm=QT40506		+0.022731
29	5600	Commit Continue completed Region=0019 SSID=DB22		+0.024672
30	5612	End of Phase 2 Syncpoint Program=FYMEN00		+0.024673
31	07	Application Terminate TranCode=FYMEN001 Region=0019		+0.046423
32	36	Output Message Dequeue LTerm=QT40506		+0.052004
***** Bottom of Data *****				

Figure 16. Tracking (TU): shows records from a single unit of recovery (UOR)

Dissect IMS transaction response times

You can toggle the time display to show the elapsed time between each record (line action **E**) or elapsed time relative to a base record (line action **R**). Though you can use these line actions at any time, they are particularly useful when combined with tracking: by using **TX**, and then the **E** or **R** line actions, you can dissect transactional performance and identify exactly where and why transactional delays occurred.

Elapsed times can be displayed in microsecond or nanosecond precision.

The following example shows that 0.404541 seconds elapsed from the time the input message was received to when the application terminated.

By merging files from other sources, such as IMS monitor and IMS Connect, you can gain an end-to-end view of transactional performance.

File	Menu	Edit	Mode	Navigate	Filter	Time	Labels	Options	Help
ALZPRBRF IMS101.OLDS						Record 00000012 More: < >			
Command ==>						Scroll ==> CSR			
Forwards / Backwards . . 00.00.00.000100						Time of Day . . 01.31.09.598962			
Code Description						Date 2009-10-05 Monday		Time (Relative)	
/ ---- Search limit reached (+10000) -----									
R	01	Input Message TranCode=DSFFSC6C Source=Connect					01.31.09.598962		
—	35	Input Message Enqueue TranCode=DSFFSC6C					+0.000008		
—	08	Application Start TranCode=DSFFSC6C Region=0012					+0.000258		
—	5607	Start of UOR Program=PDSFSC6C Region=0012					+0.000259		
—	31	DLI GU TranCode=DSFFSC6C Region=0012					+0.000265		
—	50	Database Update Database=INVENTRC Region=0012					+0.001020		
—	50	Database Update Database=INVENTRC Region=0012					+0.001038		
—	50	Database Update Database=INVENTRC Region=0012					+0.001070		
—	50	Database Update Database=INVENTRC Region=0012					+0.001074		
—	50	Database Update Database=INVENTRC Region=0012					+0.001079		
—	03	Output Message Response LTerm=9993 Source=Connect					+0.001147		
—	31	DLI GU TranCode=DSFFSC6C Region=0012					+0.001154		
—	33	Free Message					+0.001193		
—	5610	Start Phase 1 Syncpoint Region=0012					+0.001202		
—	37	Syncpoint Region=0012					+0.007186		
—	33	Free Message					+0.007217		
—	5612	End of Phase 2 Syncpoint Program=PDSFSC6C					+0.012901		
—	07	Application Terminate TranCode=DSFFSC6C Region=0012					+0.404541		
***** Bottom of Data *****									

Figure 17. By showing relative and elapsed times you can pinpoint transactional delays

Merge IMS log files from multiple systems in a sysplex

IMS PI can merge data from multiple log input files from multiple IMS and IMS Connect systems.

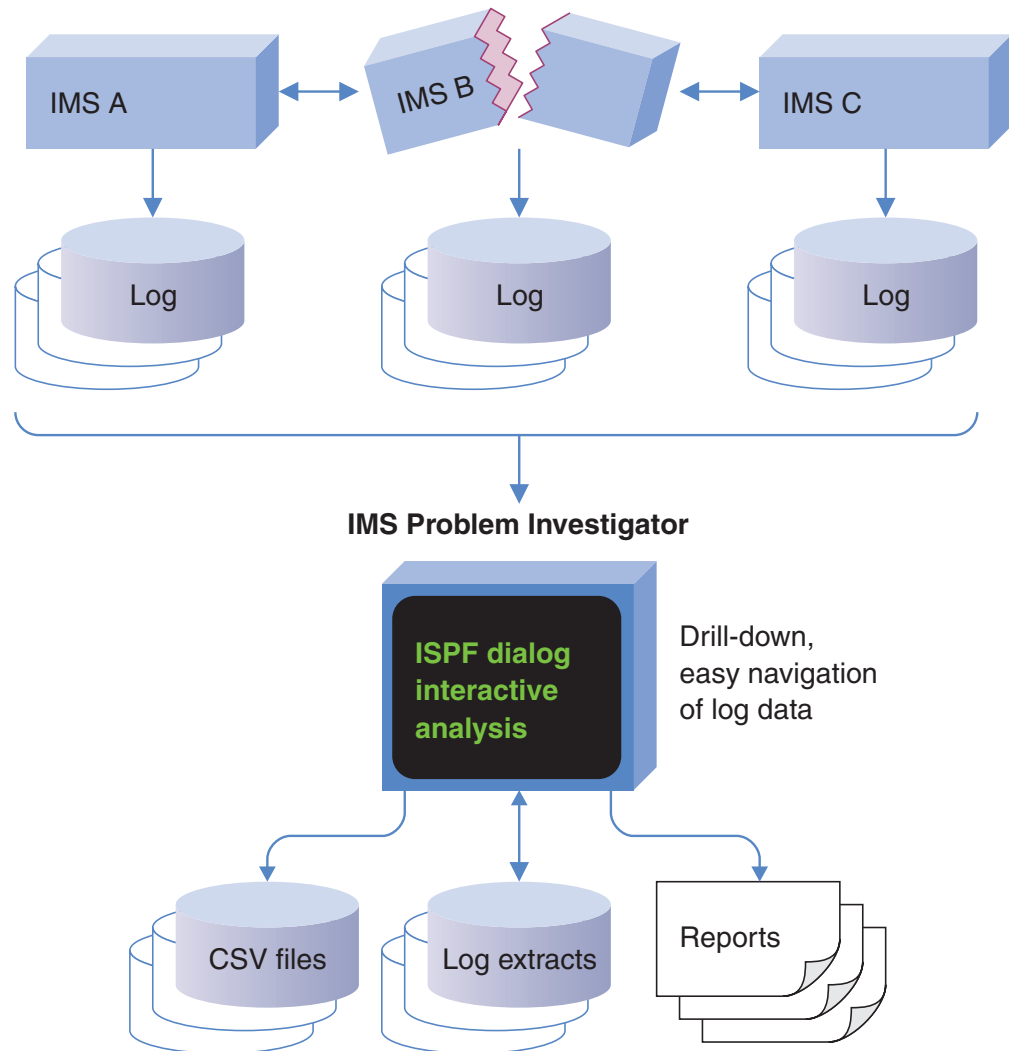


Figure 18. IMS PI can process IMS logs from multiple systems in a sysplex

Records are processed (reported or extracted) in time sequence as if they were read from a single log file. The time sequence is determined by the STCK time stamp in the log record suffix.

To process sysplex log data, it is recommended that you use automated file selection. This will ensure that the correct SLDS (and optionally OLDS) log files for all IMS systems, and the correct IMS Connect Extensions journals for all IMS Connect systems, are selected for your specified reporting interval. You can use automated file selection to select the required files, merge them, and write filtered records from the merged files to an extract data set.

The extract data set can then be merged with other files and analyzed using the dialog. This enables cross-system end-to-end transaction analysis.

Process Log Files

Row 1 of 4 More: < >

Command ==>

Scroll ==> CSR

Select a Log File to browse.

IMS Release 121 +

Zone

/	Log File	Rel	Filter	Zone
S	'PLEX1.EXTRACT'			
S	'PLEX2.EXTRACT'			
S	'DB2P.ARCHLOG1.A0001645'			
S	'PROD.MQ.EXTRACT'			

***** Bottom of data *****

Figure 19. Merge sysplex extracts with other logs for cross-system transaction analysis

Related concepts:

Chapter 7, “Creating reports, extracts and CSV files,” on page 95
You can generate batch reports, extract data sets and CSV files from input files of various types.

Merge IMS and IMS Connect log files

Processing IMS logs and IMS Connect Extensions journals together allows you to analyze transaction activity end-to-end.

The following example shows a transaction that arrived from TCP/IP, routed by IMS Connect, and then processed by IMS.

It shows the time it took from when IMS Connect received the transaction to when IMS began processing the transaction. The overall time it took the IMS application to process the transaction can be seen at the bottom of the figure.

File	Menu	Edit	Mode	Navigate	Filter	Time	Labels	Options	Help
BROWSE	CEX.ARCHIVE.JOURNAL					Record 00000055	More: < >		
Command ==>						Scroll ==>	CSR		
Forwards /	Backwards . .	00.00.00.000100		Time of Day . .	21.12.00.000000				
Code	Description	Date 2009-01-09	Friday		Time (Relative)				
/	-----								
	A03C Prepare READ Socket				-0.229771				
—	A049 READ Socket				-0.001539				
—	A049 READ Socket				-0.001486				
—	A03D Message Exit called for READ				-0.001468				
—	A03E Message Exit returned from READ TranCode=PART				-0.001423				
—	A041 Message sent to OTMA Datastore=XCFMI9D1				-0.001297				
R	01 Input Message TranCode=PART Source=Connect				21.13.21.255103				
—	35 Input Message Enqueue TranCode=PART				+0.000132				
—	08 Application Start TranCode=PART Region=0002				+0.000503				
—	5607 Start of UOR Program=DFSSAM02 Region=0002				+0.000503				
—	31 DLI GU TranCode=PART Region=0002				+0.000534				
—	5E SB Handler requests Image Capture Region=0002				+0.028829				
—	5E SB Handler requests Image Capture Region=0002				+0.028833				
—	03 Output Message Response LTerm=3101 Source=Connect				+0.050422				
—	31 DLI GU TranCode=PART Region=0002				+0.050442				
—	33 Free Message				+0.050652				
—	5610 Start Phase 1 Syncpoint Region=0002				+0.050679				
—	37 Syncpoint Region=0002				+0.050730				
—	33 Free Message				+0.050813				
—	A042 Message received from OTMA Datastore=XCFMI9D1				+0.051215				
—	A042 Message received from OTMA Datastore=XCFMI9D1				+0.051257				
—	5612 End of Phase 2 Syncpoint Program=DFSSAM02				+0.051280				
—	A03D Message Exit called for XMIT				+0.051375				
—	A03E Message Exit returned from XMIT				+0.051409				
—	07 Application Terminate TranCode=PART Region=0002				+0.051459				

Figure 20. A TCP/IP transaction: entering from IMS Connect and processed by IMS

Merge IMS log and monitor files

You can analyze IMS log and monitor files together to help isolate where problems occurred.

This example shows the IMS log and monitor records associated with a single transaction.

4E12	Dependent Region start Region=0002	01.08.45.838201
4E14	Scheduling IWAIT start Region=0002	0.000509
:	:	:
4E14	Scheduling IWAIT start Region=0002	0.000003
01	Input Message TranCode=ATMWDRAW	7.377191
35	Input Message Enqueue TranCode=ATMWDRAW	0.000016
33	Free Message	0.004505
4E15	Scheduling IWAIT end Region=0002	0.001067
:	:	:
5616	Start of protected UOW Region=0002	0.000609
4E60	DLI Call start Region=0002	0.004079
4E61	DLI Call end Region=0002	0.000003
4E60	DLI Call start Region=0002	0.000007
4E62	DLA00 start Database=ACCOUNTS Region=0002 Func=GU	0.000021
4E66	PI/IRLM ENQ IWAIT start Database=ACCOUNTS Region=0002	0.000189
4E67	PI/IRLM ENQ IWAIT end Region=0002	0.000554
4E24	VSAM IWAIT start Database=ACCOUNTS Region=0002	0.062948
:	:	:
20	Database Open Database=ACCOUNTS Region=0002	0.000030
5E	SB Handler requests Image Capture Region=0002	0.002982
:	:	:
4E66	PI/IRLM ENQ IWAIT start Database=ACCOUNTS Region=0002	0.000077
4E67	PI/IRLM ENQ IWAIT end Region=0002	0.001236
50	Database Update Database=ACCOUNTS Region=0002	0.000077
50	Database Update Database=ACCOUNTS Region=0002	0.000039
4E63	DLA00 end Region=0002 Seg=ACNTINFO SC=' '	0.000021
4E61	DLI Call end Region=0002	0.000004
:	:	:
03	Output Message Response LTerm=NEWYORK	0.004645
35	Output Message Enqueue LTerm=NEWYORK	0.000032
31	Communications GU LTerm=NEWYORK	0.000035
36	Output Message Dequeue LTerm=NEWYORK	0.003112
33	Free Message	0.000737
33	Free Message	0.324634
5612	End of Phase 2 Syncpoint Program=ATMPROG	0.001062
4E65	DLA30 end Region=0002 SC='QC'	0.002015
4E61	DLI Call end Region=0002	0.000003
07	Application Terminate TranCode=CEXTN0NC Region=0002	0.000673
:	:	:

Figure 21. Merging IMS log and monitor files

The time elapsed between each record is shown, highlighting where transactional delays are occurring:

Define a filter to examine Full Function Database processing

To examine Full Function Database processing, define a filter to focus your analysis only on the relevant records.

In the following example, the filter performs these functions:

- Selects records related to Full Function Database processing based on their log codes. You can use the filter to view all records with the relevant log code, extract those records, or generate a report about them.
- To display only the most relevant fields, the filter applies a different form to each type of log record.
- Runs REXX execs to automate analysis of database errors and I/O buffers. The execs run when a user selects an IMS 24 record or an IMS 26 record.

File Menu Edit View Help

VIEW Filter - FULLFUNC Row 1 of 9 More: < >
Command ==> Scroll ==> CSR

Description . . . Full function database processing Activate Tracking

/ Log Code + Exc	Description	Level	Conditions	No	Form	+ REXX	
IMS 20	Database Open	1		No	FULLF20	+ REXX	
IMS 21	Database Close	1		No	FULLF21	+ REXX	
IMS 24	Database Error	1		No	FULLF24	+ REXX	DBERRSH
IMS 25	EEQE	1		No	FULLF25	+ REXX	
IMS 26	I/O Toleration Buffer	1		No	FULLF24	+ REXX	IOERTEST
IMS 27	Database Extension	1		No	FULLF27	+ REXX	
IMS 49	RSR Tracker Control Structures; subtypes 11 and 12	1		No	FULLF49	+ REXX	

Figure 22. Filter for Full Function Database analysis

A filter can include conditions. Conditions specify what information the log record must contain to be included in selection. You can specify conditions that apply only to specific log codes or to global fields in all record types.

Filter conditions can include:

- Specialized field names
- Field names from the IMS macros
- Offsets similar to DFSERA10
- Flag bits
- Masking and substring positional matching
- Lists of values (stored in object lists)

File Menu Edit Object Lists Help			
Command ==>		Conditions	Row 1 to 7 of 7 Scroll ==> CSR
Code: ALL Global Criteria for all Log Record Codes			
/	Field Name +	Oper	Value +
-	TRANCODE	EQ	TRAN*
-	USERID	NE	ADMIN
-	LTERM	EQ	LT01
-	MSGXSTXT(*)	EQ	'UNAUTHORIZED'
-	MSGXSTXT(40)	EQ	'ERROR'
-	QDF2SMB	ON	
-	X'0A'	GE	1

Figure 23. Filter conditions

Time Slicing

Time Slicing allows you to process large log files with the speed and convenience of a small extract by viewing them through a small window of time.

The concept of time slicing is like looking through a small window into a section of the log file.

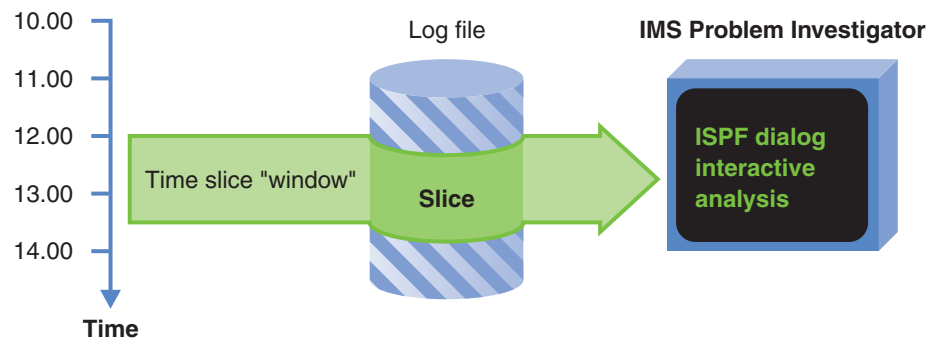


Figure 24. Time Slicing: Specify a window of time to analyze just that section of the log

A time slice is a window of time defined by specifying a time of day and duration. IMS Problem Investigator indicates the extent to which the data in each file covers the time slice so that you can narrow your analysis to only the records relevant to the time of interest. The following figure illustrates coverage. It shows whether the data in each file completely or only partially covers the specified time slice, or is before or after it. The data outside the time slice is not processed. Conceptually, it is like processing a temporary extract.

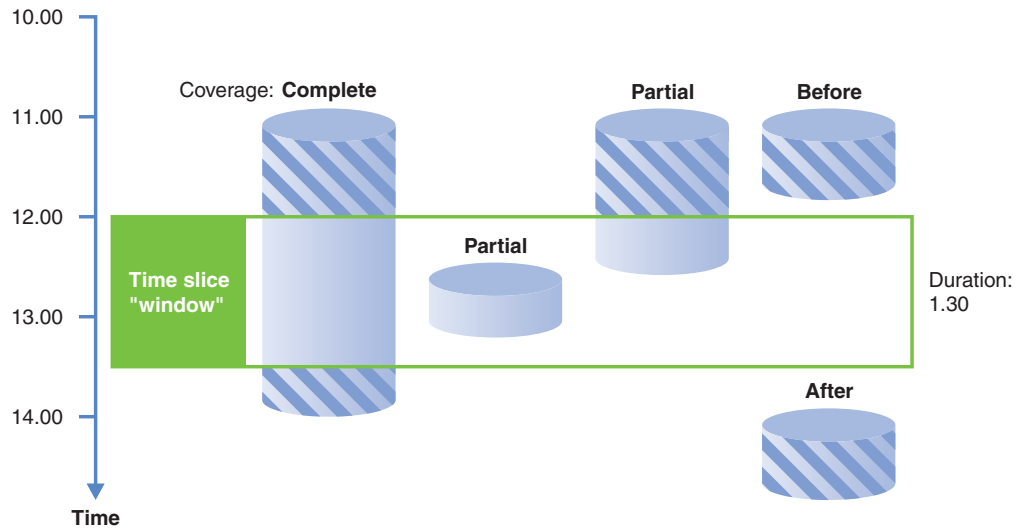


Figure 25. Time Slicing: Showing time slice specification and coverage

The advantages are:

- Locating the required time of day in the log file is quick. IMS Problem Investigator avoids time-consuming sequential processing, instead progressively sampling the file to locate the required time. Position in the log file can usually be established within a few I/O operations.
- Top of data is positioned to where you want to be, the start of the slice.
- IMS Problem Investigator only processes data in the required time range, as if you had previously extracted the data into a smaller file. Your session now performs with the responsiveness and convenience of a small extract file.
- You can time slice merged log files. The overlapping time range is made obvious so you can quickly and easily analyze the data from the point where merged records start intersecting.

To use Time Slicing, the steps are:

1. Instead of selecting log files with **S** or **SS**, use **W** or **WW**.

Process Log Files		Row 19 of 512 More: < >
Command ==> _____		Scroll ==> <u>CSR</u>
Select a Log File to browse.		IMS Release <u>121</u> + Zone <u>LOCAL</u>
/	Log File	Rel + Filter + Zone
WW	'JCH.TRIAL.CEXLOG'	<u>121</u> _____
	'JCH.TRIAL.DB2LOG'	<u>121</u> _____
WW	'JCH.TRIAL.IMSLOG'	<u>121</u> _____

Figure 26. Time Slicing: Select files using line action **W** or **WW**

2. The initial time slice is set to the date and time of the start of the latest log file and a default duration of 5 minutes. Specify the time of day and the duration that you want to investigate. You can use line action **T** against a file to set the time slice to the range of the file so that the slice adopts the date, time and duration characteristics of the file, and the file has complete coverage of the time slice.

```

Command ==> _____ Time Slicing Row 1 of 3 More: < >
                                   Scroll ==> CSR

Modify the 'Time Slice' detail in the type 'ALL' row. Then select this row to
merge and process all the files for that time range, or select individual
files from the rows below.

/      _____ Time Slice _____
Type  Time      Date      Duration
ALL   11.39.19.375619  2009-05-13  00.05.00.000000

      _____ Log Files _____
Type  Start Time  Date      Duration  Coverage
CON   11.39.19.375619  2009-05-13  Wed      26.56.834386  COMPLETE
DB2   05.28.27.087088  2009-05-13  Wed      >9.59.59.999999  COMPLETE
IMS   11.36.53.756111  2009-05-13  Wed      2.27.812449  BEFORE
***** Bottom of data *****

```

Figure 27. Time Slicing: Specify the time slice (time of day and duration)

3. Select the slice (first row) to merge and process all the files, or select one or more individual log files.

```

Command ==> _____ Time Slicing Row 1 of 3 More: < >
                                   Scroll ==> CSR

Modify the 'Time Slice' detail in the type 'ALL' row. Then select this row to
merge and process all the files for that time range, or select individual
files from the rows below.

/      _____ Time Slice _____
Type  Time      Date      Duration
S     ALL   11.36.53.756111  2009-05-13  00.02.27.812449

      _____ Log Files _____
Type  Start Time  Date      Duration  Coverage
CON   11.39.19.375619  2009-05-13  Wed      26.56.834386  AFTER
DB2   05.28.27.087088  2009-05-13  Wed      >9.59.59.999999  COMPLETE
IMS   11.36.53.756111  2009-05-13  Wed      2.27.812449  COMPLETE
***** Bottom of data *****

```

Figure 28. Time Slicing: Select the time slice to merge and process all files

The attributes of the Time Slicing display are:

- Type** Type of log file, determined from the first record in the file. IMS PI supports the following log types:
- IMS** IMS log
 - MON** IMS Monitor
 - CQS** CQS log stream (batch) or extract (dialog or batch)
 - CON** IMS Connect Extensions journal
 - TRF** OMEGAMON for IMS Transaction Reporting Facility, both TRF Collector records in the IMS Log and TRF Extractor records
 - ATF** OMEGAMON for IMS Application Trace Facility journal
 - DB2** DB2 log
 - MQ** WebSphere MQ log extract
 - SMF** System Management Facilities: IRLM Long Lock records
 - ITR** IMS trace table records (67FA, 67FF) in the IMS log

FRP IMS Repository Audit log stream (batch) or log file extract (dialog or batch); introduced in IMS V12

Time and Date

Time stamp of the first log record in the log file.

Duration

Time duration of the entire log file.

Coverage

Indicates whether the file contains data for the time slice:

COMPLETE

Contains data for the entire time slice

PARTIAL

Contains data for part of the time slice only

BEFORE Provides no coverage, file is before the time slice

AFTER Provides no coverage, file is after the time slice

EMPTY Log file is empty

DSN Scroll right to view the log file data set name.

Related reference:

"IMS log data" on page 68

Consider your data scrubbing requirements. No other special preparation is required.

Dynamic extract (Saving the result set)

At any time during log file analysis, you can extract the current result set to a specified data set that will then be available for analysis at a later time. The result set is the selected log file or log files after filtering and tracking.

In the process log browser, enter the EXTRACT primary command on the command line. Specify the extract data set name using normal ISPF conventions. If the data set name is not enclosed in quotes, your user prefix will be prepended. To append new records to an existing extract data set, add the MOD operand after the data set name. If the MOD operand is not specified and the data set already exists, the contents will be replaced by the current result. If the specified data set is not cataloged, IMS PI will create it with minimal space allocation RECFM=VB,SPACE=(CYL,(1,1)). If the result set is expected to be large, then you should pre-allocate the extract data set with sufficient space.

File Menu Edit Mode Navigate Filter Time Labels Options Help			
BROWSE		IADG.SLDSP.D10175.T1511193.V2B	Record 00000001 More: < >
Command ==>		EXTRACT 'SEC.IADG.RESULTS' MOD	Scroll ==> CSR
Forwards / Backwards . .		HH.MM.SS.THMIJU	Time of Day . . 18.00.00.000000
Code Description		Date 2010-06-24 Thursday	Time (Local)

/	43	Log Data Set Control	15.11.19.449878

—	03	Output Message	15.11.19.449880
UTC=15.11.19.448817 Userid=DFSMT CNT LTerm=SMAS TER			
OrgUOWID=IADG/C62D1A52DA987E40			

—	35	Output Message Enqueue	15.11.19.449915
UTC=15.11.19.449908 LTerm=SMAS TER OrgUOWID=IADG/C62D1A52DA987E40			

—	42	Log Buffer Control	15.11.19.449968
IMSID=IADG			

Figure 29. Dynamic extract of result set

Enter the EXTRACT *dsname* command and optional MOD operand on the log browser command line. Press Enter to extract the result set to the specified data set. When complete, enter the extract data set name on the Process Log Files panel from where you can continue your analysis.

File Menu Edit Help			
		Process Log Files	Row 1 of 1 More: < >
Command ==>			Scroll ==> CSR
Select a Log File to browse.		IMS Release 121 +	Zone
/	Log File	Rel + Filter + Zone	
S	'SEC.IADG.RESULTS'		

Figure 30. Process the dynamic extract data set

Related reference:

“Formatting log files” on page 76

The primary view is IMS PI Formatted mode. In Formatted mode, there are four views of the log file. You can list records with or without the global fields and with either the time or LSN in the right hand column. Use the Left function key (F10) and the Right function key (F11) to cycle through the views. The view that is current when you Exit will be the view that is presented to you on reentry.

“Tracking” on page 93

Connect and display all the log records associated with a transaction using the Tracking feature. Tracking effectively reduces the display to only those records associated with the selected transaction so you can easily analyze it.

Chapter 3. Installation and setup

How to install and verify the installation of IMS Problem Investigator.

These topics describe the supplied component libraries, security considerations, how to start the dialog, what to consider if upgrading from a previous product release, and the recommended ISPF settings.

IMS Problem Investigator libraries

The components of the IMS Problem Investigator dialog are supplied in a set of product libraries.

The components and low-level qualifiers for the library data set names are:

SALZEXEC

REXX EXECs

SALZLINK

Executable load modules

SALZMENU

ISPF messages

SALZPENU

ISPF panels

SALZSENU

ISPF skeleton JCL

SALZTENU

ISPF input tables

where ENU is for U.S. English.

In addition, sample REXX execs and JCL for generating reports, extracts and CSV files are supplied in the **SALZSAMP** library.

Installing the Request Authorization exit

Install the Request Authorization exit ALZUAUTH to control whether a user request can proceed and whether log records are scrubbed to remove sensitive data before reporting. If the exit is not installed, then all requests can proceed.

Before you begin

A sample library SALZSAMP is supplied with IMS Problem Investigator. Sample members include REXX execs and JCL for running batch reports and extracts, and preparing for formatting IMS user log records. See Chapter 33, “Sample library SALZSAMP,” on page 409 for the full list of supplied sample members.

Procedure

The Request Authorization exit performs a dual function. Take particular note of the following which might require your immediate action:

1. DBRC Log Selection IMSPLEX validation. If you are intending to use the IMS Problem Investigator DBRC Log Selection utility ALZDBRC to automatically locate your IMS log files, consider applying USERMOD ALZU002 to install and activate ALZUAUTH, the Request Authorization exit. If this exit is not installed, then potentially the RECON could be made inaccessible if an incorrect IMSPLEX name is specified.
2. Scrub IMS log records to remove sensitive data. The exit can force IMS log records to be scrubbed, depending on the supplied user ID, log file data set name, or site-defined criteria.

Starting IMS Problem Investigator with ALZOREXX

The IMS Problem Investigator initialization module is ALZOREXX.

About this task

ALZOREXX accepts four parameters:

- prefix** The data set prefix for IMS Problem Investigator data sets. For example, ALZ.V2R4M0. Alternatively, specify NODYNAM to tell IMS Problem Investigator to use the existing allocation settings.
- lang** Identifies the national language. The default is ENU (U.S. English). Currently, IMS PI only supports U.S. English.

PASSAPPL

Optional. Overrides the enforcement of the default IMS PI application NEWAPPL(ALZO). IMS PI uses the invoking application's APPL specification.

low level qualifiers

Optional. Overrides the default low level qualifiers for the six IMS PI data sets. All six qualifiers must be specified in the correct order, enclosed in brackets and separated by commas. For example:
(EXEC,LINKLIB,MSG,PNL,SKL,TBL)

You can start IMS PI by first installing IMS PI libraries statically within your ISPF library setup or you can start IMS PI dynamically.

Optionally, you can add IMS PI to an ISPF menu.

Dynamic setup

To start IMS PI and have the IMS PI libraries dynamically set up when the dialog is invoked.

Before you begin

Dynamic setup requires that the supplied library names are retained. These are listed under "IMS Problem Investigator libraries" on page 49.

About this task

Dynamic setup is the simplest and quickest approach to starting IMS PI.

Procedure

1. On the TSO command processor panel (ISPF option 6), enter the following command for dynamic startup:

```
EX 'prefix.SALZEXEC(ALZOREXX)' 'prefix lang'
```

For example:

```
EX 'ALZ.V2R4M0.SALZEXEC(ALZOREXX)' 'ALZ.V2R4M0 ENU'
```

If the qualifier for your installation data sets is not ALZ.V2R4M0, then alter the command accordingly.

2. To add IMS PI to an ISPF menu:

- a. Set &ZSEL to:

```
CMD(EX 'prefix.SALZEXEC(ALZOREXX)' 'prefix lang') NOCHECK
```

NOCHECK is specified to support entry of concatenated commands via the direct option (trail).

- b. Also specify on the calling panel:

```
&ZTRAIL=.TRAIL
```

Static setup

To install the IMS PI libraries statically within your ISPF library setup.

Procedure

1. Include the library *prefix.SALZEXEC* in your SYSEXEC or SYSPROC concatenation. This library contains the required EXECs. It is allocated with fixed-block 80 record format during installation.
2. You should put these libraries in the SYSEXEC concatenation. However, if you want to put them in SYSPROC, it must have a record length of 80 bytes.
3. Add the remaining libraries to your ISPF library setup:
 - a. Include the link/load module library *prefix.SALZLINK* in the ISPLLIB concatenation.
 - b. Include the message library *prefix.SALZMENU* in the ISPMLIB concatenation.
 - c. Include the panel library *prefix.SALZPENU* in the ISPLLIB concatenation.
 - d. Include the skeleton library *prefix.SALZSENU* in the ISPSLIB concatenation.
 - e. Include the table library *prefix.SALZTENU* in the ISPTLIB concatenation.
4. On the TSO command processor panel, enter:

```
%ALZOREXX 'NODYNAM lang'
```
5. To add IMS PI to an ISPF menu, set &ZSEL to:

```
CMD(%ALZOREXX 'NODYNAM lang') NOCHECK
```

Overriding the default application

The default IMS PI application is ALZO. You can override this by using the PASSAPPL parameter in the ISPF menu &ZSEL setting.

For example, executing the following command, IMS PI will use IMSP as the application rather than the default.

```
CMD(EX 'prefix.SALZEXEC(ALZOREXX)' 'prefix lang PASSAPPL') NOCHECK NEWAPPL(IMSP)
```

Overriding the data set low level qualifiers

The product libraries are supplied with default data set names that you can rename to suit your installation standards.

The default IMS PI data set low level qualifiers are listed under “IMS Problem Investigator libraries” on page 49. You can override these by specifying the desired qualifiers as the last parameter in the ISPF menu &ZSEL setting. All six qualifiers must be specified in the correct order, enclosed in brackets and separated by commas. For example:

```
CMD(EX ' 'prefix.SALZEXEC(ALZOREXX)' ' 'prefix lang (EXEC,LNK,MSG,PNL,SKL,TBL)' ')
```

IMS PI will then use the following libraries:

prefix.EXEC

REXX EXECs

prefix.LNK

Executable load modules

prefix.MSG

ISPF messages

prefix.PNL

ISPF panels

prefix.SKL

ISPF skeleton JCL

prefix.TBL

ISPF input tables

Upgrading to IMS PI V2R4

Upgrading to the next release of IMS PI should be simple and straightforward, but check this list of considerations.

When upgrading to IMS PI V2R4:

1. Check that the hardware and software prerequisites are satisfied. See “Hardware and software prerequisites” on page 14.
2. Install IMS PI V2R4 as described in the *Program Directory for IMS Problem Investigator for z/OS*.
Install all current maintenance. This will ensure that all new function is available.
3. Complete installation of the IMS PI dialog by following either of the two methods described in “Starting IMS Problem Investigator with ALZOREXX” on page 50.
4. All objects created in earlier releases of IMS PI are upwardly compatible to IMS PI V2R4 and automatically converted, where required.
5. If migrating from V1R1, your IMS system definitions (specified in IMS PI via the DBRC action bar in Process Log Files) are automatically transferred to the new format provided by option **4 Systems** and **5 Groups** on the IMS Problem Investigator Primary Option Menu.
6. If you use IMS Performance Analyzer for z/OS (5655-R03), you have the option to share System Definitions with IMS PI by specifying your IMS PA Profile Library in option **0.1 IMS PI Settings**. Note that IMS PI will automatically set your IMS PA Profile Library if it detects that you have IMS Performance Analyzer installed. If you do not specify an IMS PA Profile Library, your IMS PI Systems and Groups will be saved in your IMS PI Personal Profile Library.
Attention: To share definitions with IMS Performance Analyzer, you must first update IMS Performance Analyzer to V4.3 or later.

7. To ensure that IMS PI uses the V2R4 Knowledge Modules, specify the correct IMS PI Load Library for V2R4 in option **0.1 IMS PI Settings**. Otherwise, the IMS PI dialog issues a message such as:

ALZ0110E SALZLINK Load Libraries are mismatched; Starting=V2R4M0-H28T240,
Profile=V2R1M0-ALZ0036. Go to option **0.1 IMS
PI Settings**.

Related reference:

“IMS PI Settings” on page 273

You can adjust the settings to customize the IMS PI dialog and batch JCL for running reports and extracts. All required options have initial settings so you can start using IMS PI immediately.

Related information:

“ALZ0110E” on page 361

SALZLINK Load Libraries are mismatched; Starting=*maint-level-system*,
Profile=*maint-level-specified*. Go to option 0.1 IMS PI Settings.

Recommended ISPF setup

The IMS PI dialog is an ISPF application adhering to CUA conventions.

Set up your ISPF environment to use the IMS PI dialog efficiently.

Related concepts:

Chapter 4, “Using the ISPF user interface,” on page 59

The dialog provides an ISPF-based menu-driven facility to analyze IMS log files and the logs of related systems, both interactively and in batch.

CUA attribute settings

The IMS PI dialog is designed to use the default CUA attributes.

Changing CUA attributes, while allowed, may reduce your understanding of some panels in the dialog. It is recommended that the following Panel Element settings are honored. Enter the CUAATTR command to check these:

1. Data entry fields (Choice Entry, List Entry, and Normal Entry) have the USCORE (underscore) Highlight attribute set. This will allow you to easily identify the input fields on each panel.
2. Data entry fields, List Items, and Normal and Descriptive Text fields have their attributes set differently. This will allow you to easily distinguish between input and output data fields and instructions. The default settings are appropriate.
3. Point-and-Shoot and Entry fields have their Color attributes set differently. While this is not the CUA default, identifying Point-and-Shoot fields will be easier and enable you to use the IMS PI dialog more effectively. For example, if the Entry fields have the default color turquoise, set Point-and-Shoot fields to yellow or pink. You can enter the PSCOLOR command to take you direct to the Point-and-Shoot setting.
4. Normal Text, Emphasized Text and Reference Phrase have their Color and Intensity attributes set differently. This is particularly relevant for the online Help. The default settings are appropriate.

CUA Attribute Change Utility				Defaults
Command ==> _____				
Panel Element	Color	Intensity	Highlight	More: - +
Choice Entry Field	TURQ	LOW	USCORE	
Descriptive Text	GREEN	LOW	NONE	
Emphasized Text	TURQ	HIGH	NONE	
List Entry Field	TURQ	LOW	USCORE	
List Item Description	GREEN	LOW	NONE	
List Items	WHITE	LOW	NONE	
Normal Entry Field	TURQ	LOW	USCORE	
Normal Text	GREEN	LOW	NONE	
Point-and-Shoot	YELLOW	HIGH	NONE	
Reference Phrase	WHITE	HIGH	NONE	

Figure 31. Example CUAATTR settings to differentiate Point-and-Shoot

Related tasks:

“Using the online help” on page 62

Online Help is context-sensitive: the information is appropriate to the position of the cursor when you request help.

Prompt (F4)

Prompt is available on various data entry fields throughout the IMS PI dialog to help you specify valid values. Eligible prompt input fields are suffixed with a + symbol.

To use this facility, position the cursor in the input field and press the Prompt function key (F4). A list of available values is displayed from which you can select one or more as instructed.

Point-and-Shoot fields

IMS PI employs point-and-shoot fields. To be able to tab to point-and-shoot fields, use the ISPF command SETTINGS and select **Tab to point-and-shoot fields**.

Log/List Function keys Colors Environ Workstation Identifier Help	

ISPF Settings	
Command ==> _____	
Options	Print Graphics
Enter "/" to select option	Family printer type <u>2</u>
Command line at bottom	Device name _____
/ Panel display CUA mode	Aspect ratio . . . <u>0</u>
/ Long message in pop-up	
Tab to action bar choices	
/ Tab to point-and-shoot fields	General
/ Restore TEST/TRACE options	Input field pad . . <u>N</u>
Session Manager mode	Command delimiter . <u>;</u>
/ Jump from leader dots	
Edit PRINTDS Command	
/ Always show split line	
Enable EURO sign	

Figure 32. Recommended ISPF settings

Mouse options

If your terminal emulation allows, it is recommended that you configure your Mouse Options to assign the Enter key to left mouse button double-click.

This allows you to left button double-click on point-and-shoot fields and makes functions such as Zoom quicker and easier to use.

Panel size and scrolling

IMS PI dialog panels are optimized for 32-lines, but accommodate 24-lines using scrolling with the Backward function key (F7) and the Forward function key (F8).

When IMS PI displays formatted records, the amount of data in the viewing window is optimized according to the width of the screen, either 80- or 132-characters wide.

Displaying messages

IMS PI uses both long and short messages.

Short messages display at the top right, on the same line as the panel title. Long messages are designed to display in a pop-up window when you enter the Help function key (F1) after the Short message is displayed. However, long messages of less than the panel width can be customized to display just below or above the command line rather than in a window. To always display long messages in a pop-up window, enter the SETTINGS command to display the ISPF Settings panel, then select **Long message in pop-up**.

Messages displayed in a window can be moved to another location on the panel by doing the following:

1. Position the cursor on the top or bottom border of the message window, and press Enter.
2. Position the cursor at the location on the panel to which you wish to move the message, then press Enter.

Installation verification - dialog

The ISPF dialog is used to investigate log files. Follow this procedure to verify basic log file processing.

Procedure

1. From ISPF option 6, execute the command:
`EXEC 'ALZ.V2R4M0.SALZEXEC(ALZOREXX)' 'ALZ.V2R4M0 ENU'`

If the qualifier for your IMS PI installation data sets is not ALZ.V2R4M0, then alter the command accordingly.

2. Select option **1 Process** from the Primary Option Menu.
3. Specify the IMS release and add a log file data set name in the process list, then select it.

Process Log Files		Row 1 of 1 More: < >
Command ==>		Scroll ==> CSR
Select a Log File to browse.	IMS Release 141 +	Zone
/ Log File	Rel + Filter + Zone	
S 'IMSP.SLDS.T01'		
***** Bottom of data *****		

Figure 33. Installation verification: dialog

4. Review the log file contents Scroll up and down, left and right. then select a record to view its contents.
5. Get the most out of IMS PI by taking a few minutes to read the following sections in the User's Guide:
 - a. Chapter 1, "IMS Problem Investigator overview," on page 3, especially "IMS Problem Investigator concepts" on page 17
 - b. Chapter 2, "Tour of product features," on page 29

Installation verification - batch

The batch utility can generate reports, produce an extract of selected records from the log, or create a CSV file of selected log record fields. Follow this procedure to verify log reporting.

Procedure

1. Edit the following JCL, replacing *vrn* with the IMS release (121, 131, 141), specifying the appropriate IMS PI load library on the STEPLIB statement, and specifying an input log file.

```
//ALZIVP JOB ,CLASS=A,NOTIFY=&SYSUID
//ALZ EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrn>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//LOGIN DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT DD SYSOUT=*
//SYSIN DD *
PAGELIM(10000)
ZONE(LOCAL)
REPORT OUTPUT(LOGRPT)
CODE(ALL)
COND TRANCODE EQ '*'
FORMAT(STD)
/*
```

Figure 34. Installation verification: Submit report JCL

2. Enter SUB on the command line to submit the job.
3. Review the messages in SYSPRINT. Expect return code 4 if message "ALZ0010W" on page 355 is issued (because LOGRPT page limit reached for a large log file).


```

PAGELIM(10000)
ZONE(LOCAL)
REPORT OUTPUT(LOGRPT)
CODE(ALL)
COND TRANCODE EQ '*'
FORMAT(STD)
ALZ0005I Log File processing has started; DDname=LOGIN , Time=2014-04-16 09.00.00.004305, LSN=00000017172960F1
ALZ0010W Report processing has reached page limit; DDname=LOGRPT
ALZ0007I Report processing has ended; DDname=LOGRPT , Record count=10399
ALZ0009I IMS PI processing has completed, RC=04

```

Figure 35. Installation verification: System messages

4. Review the log record output in LOGRPT, formatted in the same way as the dialog.

```

V2R4M0          IMS V14.1          IMS Problem Investigator - Log Report

+0004 Code... 01      Input Message
+00E2 STCK... C42D103CECE1BB96      LSN.... 000000171729610D      Record... 29
      Date... 2014-04-16 Wednesday Time... 09.00.00.010779.724

+0000 MSGLRLL.... 06F2      MSGLRZZ.... 0000      MSGLCODE... 01      MSGFLAGS... D1      MSGDFLG2... 81
+0007 MSGFPADL... 94      MSGMDRRN... 08010AD6      MSGRDRRN... 08010AD6      MSGPRFLL... 0458      MSGCSW..... 00
+0013 MSGDFLG3... 00
+0014 MSGUOW.... Unit of Work (UOW) - Tracking
+0014 MSGORGID... 'IMSBXRF ' MSGORGTK... C42D103CECEDB16      MSGPROID... 'IMSBXRF '
+002C MSGPROTK... C42D103CECEDB16      MSGUFLG1... 00      MSGUFLG2... 00

. . .

```

Figure 36. Installation verification: Report output

5. If there are IMS log records in the input file, a Log Information report will also be produced detailing information about the log record types in the file. The default ddname is LOGININFO.

Chapter 4. Using the ISPF user interface

The dialog provides an ISPF-based menu-driven facility to analyze IMS log files and the logs of related systems, both interactively and in batch.

The dialog is designed to use the default CUA attributes.

Related concepts:

“Recommended ISPF setup” on page 53

The IMS PI dialog is an ISPF application adhering to CUA conventions.

IMS PI Primary Option Menu

The IMS PI dialog provides a menu-driven facility to view IMS logs and the logs of related systems, as well as request reports and extracts for analyzing problems associated with your IMS DB and TM systems.

When you start IMS PI, the Primary Option Menu is displayed.

```
File Help
-----
V2R4M0      IMS Problem Investigator - Primary Option Menu
Option ===>
-----
0 Profile   Customize your dialog profile
1 Process   Analyze log files: IMS, CQS, Connect, OMEGAMON, DB2, MQ
2 Filter    Define record filtering criteria
3 Forms     Define record presentation formats
4 Systems   Specify IMS and Connect systems and files
5 Groups    Specify groups of IMS and Connect systems (Sysplexes)
6 Connect   Process IMS Connect Extensions archive journals
7 User Log  Define and prepare User Log records for formatting
X Exit      Quit IMS Problem Investigator

Control Data Set . . . 'userid.IMSPI.CDS' +
```

Figure 37. Primary Option Menu

The Primary Option Menu options are:

0 Profile

Set options that affect the behavior of the ISPF dialog, specify default allocation attributes for CSV and extract data sets, identify OMEGAMON TRF and IMS Connect Extensions record codes, and specify the data set name of the IMS Connect Extensions definitions repository.

1 Process

Analyze log files. This is the functional hub of IMS PI.

2 Filter

Define filters.

3 Forms

Define forms.

4 Systems

Define systems, specify DBRC settings and log files.

5 Groups

Define groups of systems.

6 Connect

Analyze IMS Connect event data from systems and journals defined in the IMS Connect Extensions definitions repository.

7 User Log

Define User Log records for analysis by IMS PI.

X Exit Exit IMS PI.

The dialog allows you to:

- Customize your IMS PI user profile.
- Process log files from a variety of sources.
- View log files, where log record contents are presented in detail and navigation aids help you traverse the file.
- Merge log files to enable end-to-end analysis of transactions.
- Submit report requests to produce printed output of formatted log records.
- Submit extract requests, where data from one or more large log files is filtered and merged to a smaller extract file for easier analysis.
- Submit requests to create a CSV file from one or more log files.
- Specify filtering criteria so you only see the required records when viewing, reporting or creating extract or CSV files.
- Specify forms to tailor the presentation of log records so you only see the fields that interest you.

The dialog structure

IMS Problem Investigator provides an ISPF menu-driven dialog.

The following two figures show the panel hierarchy and primary functions. The first figure illustrates the functions driven from options 0 to 3 of the IMS Problem Investigator Primary Option Menu: the initial profile setup, the main function of processing log files, and the supporting functions of defining filters and forms.

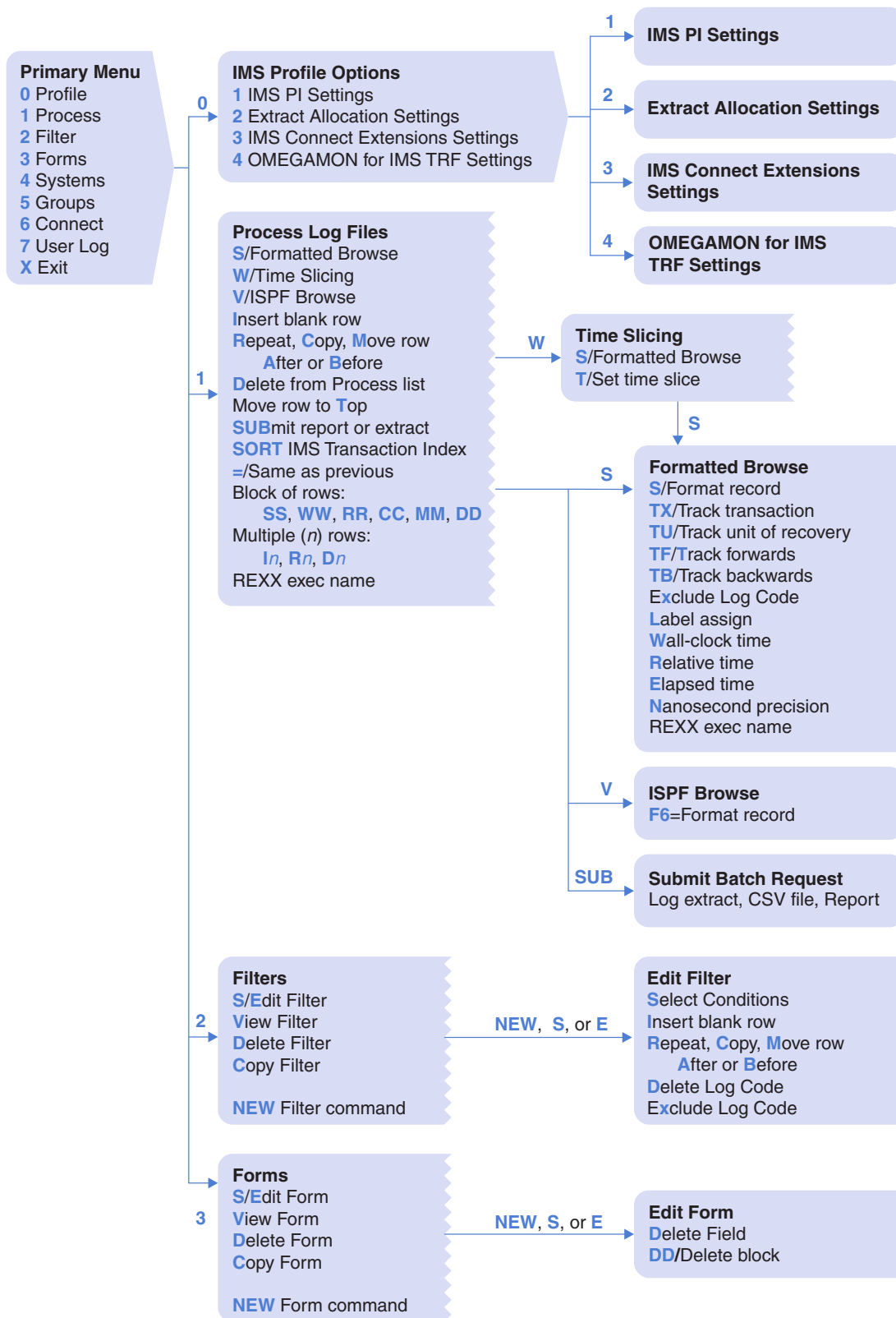


Figure 38. Panel hierarchy (Part 1 of 2): setup, processing logs, filters, forms

The second figure illustrates the remaining functions which are driven from options 4 through 7 of the Primary Option Menu: defining systems and groups, displaying system and journal file names from the IMS Connect Extensions

definitions repository, and defining user log codes.

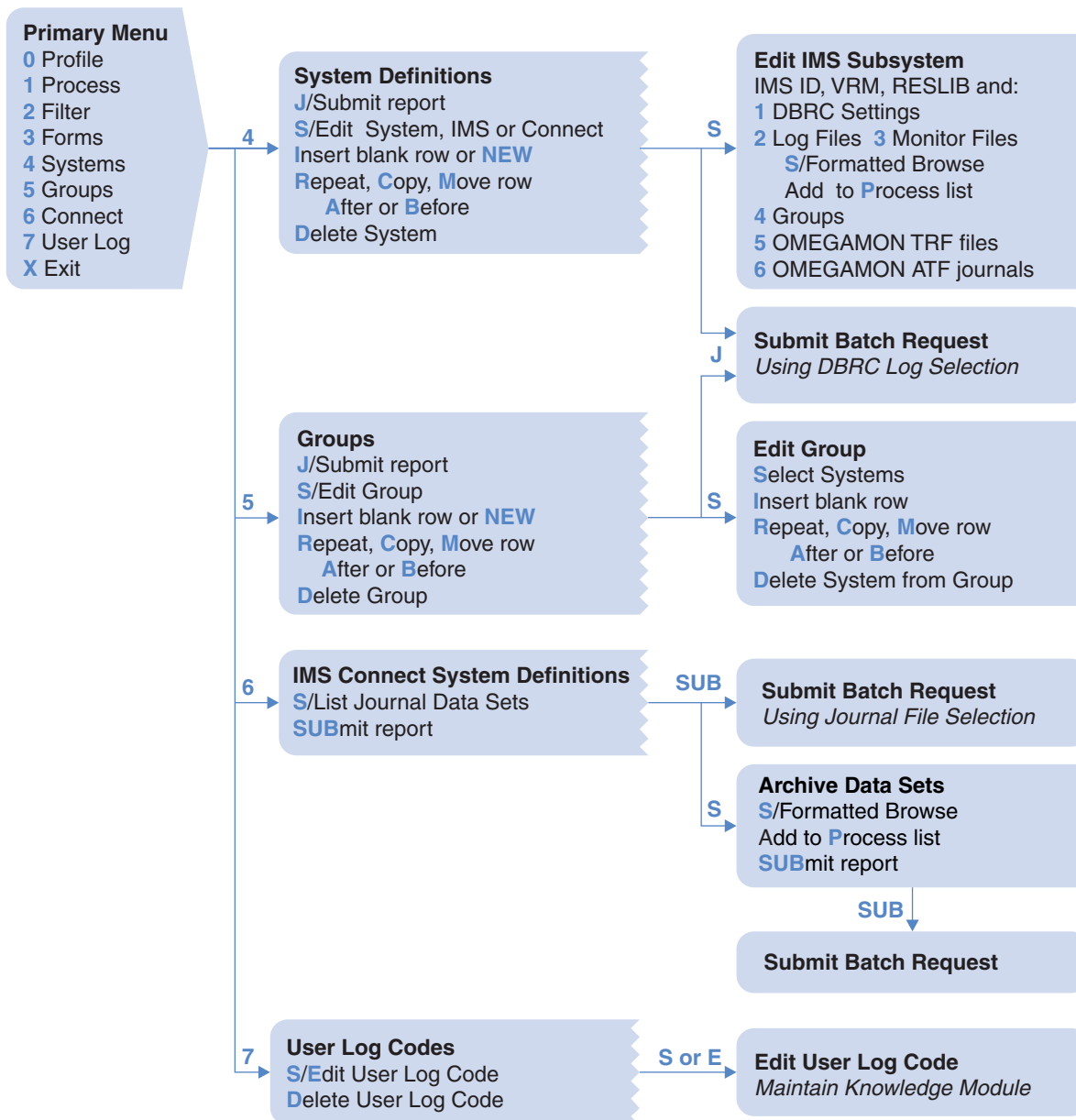


Figure 39. Panel hierarchy (Part 2 of 2): defining systems, groups, user log codes

Using the online help

Online Help is context-sensitive: the information is appropriate to the position of the cursor when you request help.

About this task

Function key the Help function key (F1) is the default key to request Help.

Procedure

1. To use the online Help efficiently, the Color and Intensity attributes for Normal Text, Emphasized Text and Reference Phrase should have different settings. Enter the ISPF command CUAATTR to check these. The default settings are appropriate:
 - Normal Text**
 - Green, Low intensity
 - Emphasized Text**
 - Turquoise, High intensity
 - Reference Phrase**
 - White, High intensity
2. The dialog offers the following types of online Help:
 - Help in the action bar of every panel:
 - a. Extended Help
 - b. Commands Help
 - c. Keys Help
 - Extended Help is also available from the command line of every panel. Position the cursor in the command line and press the Help function key (F1) or enter the HELP command. Typically, the line actions and primary commands that apply to the current panel are listed in the Extended Help.
 - Field Help is available on every input field. Position the cursor in the field and press the Help function key (F1).
 - Message Help is available. When a short message is displayed at the top right, press the Help function key (F1) to see the long message in a pop-up window. This is applicable if, in ISPF Settings, you have selected **Long message in pop-up**.
3. To navigate inside Help windows:
 - a. Reference Phrases are used to indicate that more information is available on a topic. Press the Tab key to position the cursor on a Reference Phrase (typically white, highlighted) then press the Help function key (F1). A pop-up Help window displays additional information on the topic.
 - b. When **More: +** is displayed in the top right corner, press the NxtPage function key (F8) or Enter for next page.
 - c. When **More: -** is displayed in the top right corner, press the PrvPage function key (F7) for previous page.
 - d. To close the Help window and return to the underlying window, press the Cancel function key (F12).
 - e. To terminate Help and return to the dialog panel, press the Exit function key (F3).
4. To resize the Help window by removing or restoring the border, press the Resize function key (F4).
5. To display the default function keys for Help windows as described here, press the KeysHelp function key (F6).

Related reference:

"CUA attribute settings" on page 53

The IMS PI dialog is designed to use the default CUA attributes.

Getting started

The quick method to get started using the dialog is dynamic setup.

Before you begin

See “Starting IMS Problem Investigator with ALZOREXX” on page 50 for instructions on how to set up to start using the IMS PI dialog.

Procedure

1. From ISPF option 6, enter the following command, but first alter it to use the qualifier of your IMS PI installation data sets if it is not ALZ.V2R4M0.
EX 'ALZ.V2R4M0.SALZEXEC(ALZOREXX)' 'ALZ.V2R4M0 ENU'
2. When you start using IMS PI for the first time, no special setup is required. You can start processing IMS log files immediately. IMS PI creates the necessary data sets automatically for you, including:

Personal Profile Library

IMS PI keeps your list of log file data set names and IMS system definitions in this library. The default name is 'userid.IMSPI.ALZPROF'. You can change to another data set in option **0.1 IMS PI Settings**. See Chapter 22, “Defining a profile,” on page 273 for more information.

Control Data Set (CDS)

IMS PI keeps your Filter and Form definitions in this VSAM KSDS. When required, IMS PI will prompt you to proceed with allocating the CDS. The default name is 'userid.IMSPI.CDS'. You can change this by overtyping the name of the Control Data Set on the Primary Option Menu. IMS PI will prompt you to allocate the CDS when you select a primary menu option that requires a CDS (such as, Forms and Filters). See Chapter 21, “Defining a Control Data Set (CDS),” on page 269 for more information.

Part 2. Log analysis

This part shows how to analyze logs, solve problems, produce reports and extracts, and use REXX to automate analysis steps.

Topics:

- Chapter 5, “Preparing log files for analysis,” on page 67
- Chapter 6, “Analyzing log files,” on page 73
- Chapter 7, “Creating reports, extracts and CSV files,” on page 95
- Chapter 8, “Formatting and analyzing logs with REXX,” on page 121
- Chapter 9, “Investigating IMS-related problems,” on page 135

Chapter 5. Preparing log files for analysis

IMS Problem Investigator supports analysis of log data from multiple sources. Most types of log file require no preparation, but some require a preparatory step before processing by IMS Problem Investigator.

Scrubbing IMS log files

Scrub removes sensitive or confidential information from selected IMS log files prior to inhouse analysis or sending offsite for problem determination. Use data scrubbing if you have this compliance requirement.

The record codes of scrubbed IMS log records are: 01, 03, 26, 4002, 4026, 4082, 4086, 48, 50, 5901, 5903, 5920, 5950, 5951, 5953, 5954, 5956, 5957, 6701, 67ED, 67EE, 67EF, 67FA, 67FB, 67FC, 67FD, 67FF, 9904. The records remain intact, only data such as transaction messages and database updates are modified to remove the sensitive information by overwriting with <<CLEARED>> or binary zero.

Log record scrubbing occurs in two ways:

1. In batch when the SCRUB option is requested. This causes input log records to be scrubbed. Output from all REPORT, EXTRACT, and CSV requests will be scrubbed.

EXTRACT with SCRUB will prepare log files that do not contain sensitive data. Use this approach when users must never be allowed to see sensitive data, or you want to send the log file to IBM or another external location.

A Log Information report is produced with every batch report request that processes IMS log records. When scrubbing is requested, all (filtered) log records are copied from SYSUT1 to SYSUT2, scrubbing all applicable record types. The Log Information report provides details about each record type that was copied to the output IMS log file SYSUT2 and scrubbed.
2. For all dialog and batch functions when enforced by the Request Authorization exit ALZUAUTH. Site-defined rules determine whether the user can only view scrubbed data. Use this approach when you want to make the original log files available to users, but prevent IMS Problem Investigator showing sensitive data in any of its reporting functions.

ALZUAUTH is supplied in the SALZSAMP library. If ALZUAUTH is already installed, the code will need modification to check the request type.

Related reference:

“Log Information report” on page 101

A Log Information report is produced with every batch report request when IMS log records are processed. The default ddname is LOGININFO. If record scrubbing is requested, the report provides details of the record types copied to the output log file and scrubbed.

“ALZUAUTH: Request Authorization exit” on page 435

ALZUAUTH is the Request Authorization exit. Apply USERMOD ALZU002 (supplied in the SALZSAMP library) to install and activate the exit.

“SCRUB command” on page 404

The SCRUB command causes input log records to be scrubbed prior to report, extract or CSV processing. Use this approach to prevent sensitive or confidential data from being disclosed during log analysis, or if you want to send log files to

IBM or another external location for problem determination.

IMS log data

Consider your data scrubbing requirements. No other special preparation is required.

Tip: IMS log files can be very large. IMS PI provides a very useful extract facility to create smaller, more manageable files for more efficient online analysis. You can create filtered extracts for selected systems and time periods. Alternatively, you can use time slicing to obtain similar processing efficiencies.

Related concepts:

Chapter 7, “Creating reports, extracts and CSV files,” on page 95

You can generate batch reports, extract data sets and CSV files from input files of various types.

“Time Slicing” on page 43

Time Slicing allows you to process large log files with the speed and convenience of a small extract by viewing them through a small window of time.

IMS Transaction Index

IMS Performance Analyzer creates IMS Transaction Index records in the order that transactions complete their transit processing in the IMS log file. The index is not sorted in transaction start time sequence. Sorting the index is optional, particularly if processing it standalone.

However, you may find it best to work with a sorted index so that the records are reported in the more meaningful message arrival time sequence, particularly if merging with other log files.

Related concepts:

“Preparing the IMS Transaction Index (optional)” on page 155

IMS Performance Analyzer creates IMS Transaction Index records in the order that transactions complete their transit processing in the IMS log file, not when they start. You might find it best to work with a sorted index in IMS Problem Investigator so that records are in the more meaningful transaction arrival time sequence, particularly if merging with other log files.

IMS monitor data

No special preparation is required.

IMS user log data

IMS PI can process user-defined IMS log records. However, you must first define the user log code and generate the corresponding Knowledge Module.

IMS PI can then process user log records in an IMS log file in the same way as IMS system log records.

Related concepts:

“Knowledge Modules reference” on page 339

To use IMS PI to analyze your IMS user log records, you need to define a Knowledge Module. IMS PI assists in this task by generating the Knowledge Module source, but you might need to edit the generated source to support more complex record formats.

CQS log stream data

CQS records are written by the MVS System Logger, not IMS.

IMS PI can process CQS log streams to produce batch reports and extracts. However, the IMS PI dialog does not support online viewing and navigation of CQS log streams directly. You must first create an extract data set which can then be processed by the dialog in a similar manner to an IMS log file.

Related concepts:

Chapter 11, “Analyzing CQS logs for IMS shared queue activity,” on page 163
IMS uses CQS to manage its shared message queues and resources. IMS CQS events are written by the MVS logger to a CQS log stream. IMS PI can process CQS log streams in batch.

IMS Connect event data

IMS PI can process IMS Connect event data collected by IMS Connect Extensions in journal data sets.

Ensure that the data required for analysis is captured at the appropriate *collection level* by IMS Connect Extensions.

IMS PI can process standalone journal data sets, but you must specify the log code of the IMS Connect Extensions records so that IMS PI can identify them.

For IMS PI to process IMS Connect systems and journal data sets that are predefined and maintained in IMS Connect Extensions, you must specify the name of the IMS Connect Extensions definitions repository.

Related concepts:

Chapter 12, “Analyzing IMS Connect Extensions journals,” on page 169
You can use IMS Problem Investigator to analyze IMS Connect events that have been recorded in an IMS Connect Extensions journal data set. IMS Connect Extensions is an IBM tool that provides instrumentation for IMS Connect. The tool collects realtime data about IMS Connect events, which it then regularly archives.

Related reference:

“IMS Connect Extensions Settings” on page 278

To process IMS Connect Extensions data, provide the log record code prefix of the IMS Connect event records and the data set name of the default IMS Connect Extensions definitions repository

IMS Connect Transaction Index

IMS Performance Analyzer creates IMS Connect Transaction Index records in the order that transactions complete their transit processing in the IMS Connect Extensions journal. The index is not sorted in transaction start time sequence. Sorting the index is optional, particularly if processing it standalone.

However, you may find it best to work with a sorted index so that the records are reported in the more meaningful message arrival time sequence, particularly if merging with other log files and journal data sets.

OMEGAMON TRF data

IMS PI can process both OMEGAMON Transaction Reporting Facility (TRF) Collector records from the IMS log, and also TRF records extracted from the IMS log by the TRF Extractor utility. Before processing TRF records from the IMS log, you must specify the log code prefix that identifies these records in the log.

The log code prefix is not required for TRF Extractor records as they are self-identifying.

Related concepts:

“Setting the TRF Collector log record code” on page 190

If processing TRF Collector records, tell IMS PI the ID of the TRF records written to the IMS log. This step is not required for TRF Extractor output records as they can be identified from the records themselves.

OMEGAMON ATF data

IMS PI can process OMEGAMON Application Tracing Facility (ATF) records from ATF journals (VSAM KSDS data sets).

When monitoring, ATF writes near-term history records to active journals.

It is recommended that you copy the journals to offline data sets before investigating with IMS PI or investigate the journals when ATF is offline.

DB2 log data

To specify DB2 log files for analysis, you must first determine the name of the relevant DB2 log data sets and their date ranges. You can use the supplied sample JCL to run the DB2-supplied print log map utility DSNJU004.

Related concepts:

“Locating the DB2 log files for analysis” on page 212

You can use the DB2-supplied print log map utility DSNJU004 to determine the DB2 log files and date ranges.

WebSphere MQ log data

To analyze WebSphere MQ data, you must first determine the name of the archive log data sets and the time range that they span by running the MQ-supplied print log map utility CSQJU004. IMS PI does not support the native MQ log. So the second step is to create an extract file using the MQ log print utility CSQ1LOGP.

Sample JCL to create the MQ log extract is supplied.

Related concepts:

“Locating the MQ log files for analysis” on page 229

The MQ-supplied print log map utility CSQJU004 identifies the data set name of the MQ archive log data sets and the time range that they span.

“Extracting the MQ log records” on page 229

IMS PI does not support the native MQ log, requiring instead the extract created by the MQ log print utility CSQ1LOGP.

SMF data for IRLM Long Locks

No special preparation is required.

Related concepts:

Chapter 18, “Investigating IRLM Long Lock events,” on page 251

The information in SMF 79.15 (X'4F0F') records allows you to measure transaction event latencies and to investigate performance problems when IMS transactions experience IRLM Long Locks.

IMS trace table data

IMS writes trace table entries to the IMS log. IMS Problem Investigator requires no special preparation of the IMS log before analyzing ITR type records.

IMS Repository Audit log stream data

The IMS repository server keeps an audit log in a log stream.

IMS PI can process the IMS repository audit (log type FRP) log streams to produce batch reports and extracts. However, the IMS PI dialog does not support online viewing and navigation of FRP log streams directly. You must first create an extract data set which can then be processed by the dialog in the usual way.

Chapter 6. Analyzing log files

IMS Problem Investigator supports analysis of log files of various types. It can merge the records in time sequence from multiple files, format the records, and allow you to drill down from file to record to field contents. You can track the entire lifecycle of a transaction, including program switches, or track transaction events associated with a single unit of recovery.

Specifying log files

From the IMS Problem Investigator Primary Option Menu, select option **1 Process** to display the Process Log Files panel. Use this panel to explicitly specify log files for interactive analysis or batch processing.

The Process Log Files panel is the main processing center of IMS PI. It allows you to perform the following tasks:

- Interactively browse and analyze formatted log files and extract data sets.
- Merge log files from various sources to enable end-to-end analysis of transactions.
- Generate and submit JCL to produce reports of formatted log records or to create log file extracts or CSV files.

Tip: DBRC Log Selection is available from option **4 Systems** and option **5 Groups**. See Chapter 7, “Creating reports, extracts and CSV files,” on page 95.

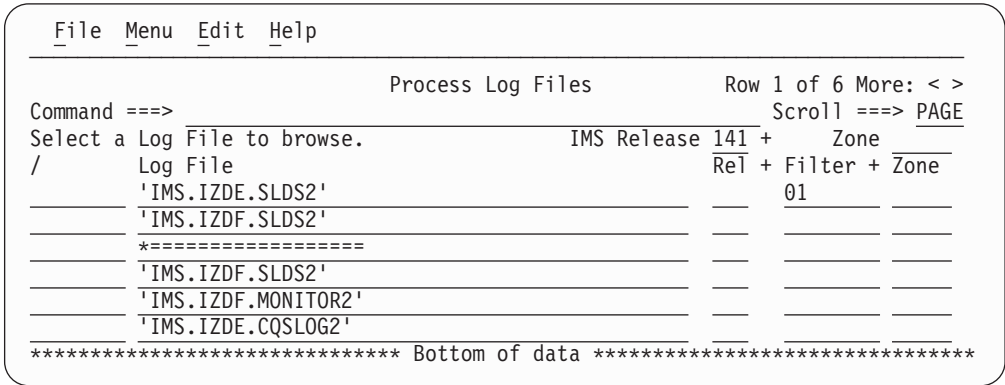


Figure 40. Process Log Files

The global settings are:

IMS Release

Specify the release of the IMS log files that you usually process. It also applies to Filters and Forms definitions.

Zone Specify either LOCAL, GMT, *+hhmm* or *-hhmm* (time zone offset) to tell IMS PI how to display the Store Clock (STCK) time stamp in Formatted mode. LOCAL is the default and is applicable when the log files are created in the same time zone as the system you are currently running on.

In IMS PI, you should specify an explicit time zone offset when the log file was created in a different time zone to your current system. This is the

number of hours (and optionally minutes) east (+) or west (-) of GMT. For example, specify -08 for US Pacific time and +10 for Sydney Australia time.

Specific options are:

Log File

Specify the data set names of the log files that you want to investigate. Normal ISPF data set conventions apply. Fully qualified data set names must be enclosed in quotes, except if PROFILE NOPREFIX is set. If the data set is not cataloged, then specify **UNIT** and **VOLSER**.

You can insert blank lines to serve as separators between unrelated log files. You can insert comment lines, or comment out data set names that you want ignored in block processing actions. Comments start with * (an asterisk) in this field. Row operations (such as insert, delete, move, change) can be performed on blank or comment lines, but processing actions (such as select, time slicing, submit) cannot.

Rel Specify the IMS release of this log file when it is different from the global setting. If you select and merge multiple files, the IMS release of the top file you selected applies to all files. If the top file has no IMS release specified, then the global IMS release applies to all files.

Filter (Optional, for any log file.) Specifies a filter that you want to use when processing this file:

- The name of a filter that is stored in the Control Data Set (CDS).
- A log type.
- A log code.
- A log type and code separated by a colon (:). For example, IMS:01.

Filters allows you to focus on only the log records that are of interest to you. If you select and merge multiple files, the filter of the top file you selected is applied. If the top file has no filter, then no filtering applies to any of the selected files.

Zone Specify a time zone offset if this log file uses a different time zone offset from that of the global setting. If you select and merge multiple files, the time zone of the top file you selected applies to all selected files. If the top file does not have a **Zone** specified, the global zone applies to all files.

UNIT (Required only if the data set is not cataloged.) Set the **UNIT** characteristic of the log file. You may need to press the Right function key (F11) to view this setting.

VOLSER

(Required only if the data set is not cataloged.) The volume serial of the log file data set. If a **VOLSER** is specified, then a **UNIT** must also be specified. You may need to press the Right function key (F11) to view this setting.

Line actions

The valid line actions for Process Log Files are:

- / Select line action from a list
- S Select file. Press Enter to merge all the files you selected and display the records in them. When selecting multiple files for merge processing, select the first file with a S, then you can use = (equal sign) for the other files instead of repeating S.

SS	Select a block of files. Press Enter to merge all the files in the range you set and display the records in them.
W	Analyze this file via time slicing. This is recommended for large files. A time slice from a large log file is processed with the efficiency of a smaller extract file. Conceptually, a time slice is like a temporary extract. When selecting multiple files for time slicing, select the first file with W , then you can use = (equal sign) for the other files instead of repeating W .
WW	Select a block of files to partition into time slices.
V	Browse this file in ISPF Browse mode. If you select more than one file, the next file opens when you close the first.
I	Insert a blank row after this row. Enter Inn to insert multiple rows. For example, I6 .
R	Repeat this row. Enter Rnn to repeat this row multiple rows. For example, R5 .
RR	Repeat a block of rows.
C	Copy this row.
CC	Copy a block of rows.
M	Move this row.
MM	Move a block of rows.
A	After this row (Move/Copy).
B	Before this row (Move/Copy).
D	Delete this row. Enter Dnn to delete multiple rows. For example, D3 .
	Note: Immediate CAncel can recover deleted rows.
DD	Delete a block of rows.
T	Move this row to the top of the list.
SUB	Submit a report, extract or CSV request for this file. Specify SUB against multiple files to submit them together for merged file processing. For subsequent line actions, you can use the = symbol instead of repeating SUB .
 	
SORT	Generate JCL to sort an IMS Transaction Index.
=	You can use = (equal sign) to represent the previous line action. It is particularly useful with S , U and SUB line actions as a standard way to select multiple files to merge and analyze.

Note: You can also execute a REXX exec from the line action prompt field.

Primary commands

The valid primary commands for Process Log Files are:

- SAVE** Save the current log file definitions in your Personal Profile Library. Editing of the data can continue after the save is complete. The SAVE command is the same as selecting **Save from File** in the action bar.
- SORT** Sort the data set list in ascending sequence by data set name. The order is retained on exit. You can also sort by selecting the point-and-shoot column heading **Log File**.

RESet Clear outstanding line actions and remove blank rows.

Tip: Use * (asterisk) in the first position of the log file name to mark the row as a comment line.

You can insert blank rows for convenient visual separation of files. However, block line actions cannot process across a blank row, and the RESET command removes them.

Related concepts:

“Preparing the IMS Transaction Index (optional)” on page 155

IMS Performance Analyzer creates IMS Transaction Index records in the order that transactions complete their transit processing in the IMS log file, not when they start. You might find it best to work with a sorted index in IMS Problem Investigator so that records are in the more meaningful transaction arrival time sequence, particularly if merging with other log files.

Formatting log files

The primary view is IMS PI Formatted mode. In Formatted mode, there are four views of the log file. You can list records with or without the global fields and with either the time or LSN in the right hand column. Use the Left function key (F10) and the Right function key (F11) to cycle through the views. The view that is current when you Exit will be the view that is presented to you on reentry.

To format a log file, enter line action **S** to select a log file from the Process Log Files panel. Type **S** next to more than one file to view them as if they are merged as one logical file. You can merge up to 32 log files.

IMS PI Formatted mode interprets the log records and displays common and useful information about the records, including:

Code and Description

Every log record type is identified by its code and sometimes further qualified by subcode. The code is located at byte 5 of the log record. IMS PI supports most IMS system log record codes, and User Log records.

Log Record Codes are two or four hexadecimal digits indicating the record type or subtype. IMS PI interprets the log codes and displays their description. For example:

01	Input Message
07	Application Terminate
5612	Syncpoint End of Phase 2
5937	Fast Path Syncpoint

If the log file contains a log record type that IMS PI cannot identify, such as a user-defined record type, it is given the description Unknown code.

Time

The first 8 bytes of the 16-byte log record suffix contain a STCK time stamp when the record was cut by IMS. IMS PI reports the time stamp for every log record, and optionally converts it based on your **Zone** specification.

The **Zone** setting is displayed in the column heading of the **Time** field. **LOCAL** is the default. If the log data was created in a different time zone from the system you are running on, you may want to specify a time zone offset (+*hmm* or -*hmm*) or **GMT**.

Note: CQS records do not have the 16-byte suffix.

Global fields

Global fields are pieces of information in a log record that identify the IMS resources affected by the event, allow you to quickly identify the source of the log record, or provide other significant details about the event. Global fields display in the extended description of records. Although they are “common” to many record types, not all global fields are present in all record types. All global fields are available to REXX execs.

Global fields can be used in filters or for tracking or both.

Eligible filtering fields:

ABEND

Abend code of pseudo abend or system abend.

ClientID

IMS Connect client ID.

Code

Log record code. Identifies the type of log record.

Database

Database name.

IMSID

IMS Subsystem ID.

ITASK

ITASK number.

LogToken

OTMA logon token. For IMS Connect, the event key.

LongLock

Deadlock cycle number of IRLM Long Lock.

LSN

IMS log record sequence number, from the log record suffix. A hexadecimal number representing the position of the record in the file; prefixed by the position of the file in the merge sequence. For example, record 154 (9A in decimal) in the second file that you selected for processing, is shown as:

2-0000000000009A

For DB2 and MQ log records, the LSN field contains the RBA.

LTerm

IMS LTERM.

LUWID

Logical unit of work ID. For example, the DB2 LUWID is a composite correlation token that uniquely identifies the transaction (along with the URID).

OrgUOWID

Transaction Originating Tracking Unit-of-Work ID. Incoming messages (transactions) are assigned a unique originating tracking unit-of-work ID. The token is contained in all message related log records associated with the transaction.

Port

IMS Connect TCP/IP port.

Program

Program or PSB name.

RBA

VSAM RBA or OSAM RBN of the updated database record.

RecToken

Recovery Token assigned to recoverable units of work. Recoverable units of work are assigned a unique recovery token. The token is contained in every log record for the transaction that can be used for recovery purposes.

Region

Region PST ID.

ResumeTP

IMS OTMA logon token for Resume Tpipe.

SSN

IMS Connect Send Sequence Number.

Terminal

VTAM Node name, BTAM line/terminal number, Line/PTerm, APPC Net ID or OTMA Tpipe.

TranCode

Transaction Code.

URID

Unit of Recovery ID. Applicable to DB2 and WebSphere MQ.

Userid

RACF User ID.

Eligible tracking fields: ITASK, LogToken, LongLock, OrgUOWID, RecToken, Region, ResumeTP, URID.

Global specification fields, but cannot be specified in a filter:

IMSRel

IMS Release.

UTC

The Coordinated Universal Time (UTC) time stamp shows when the event for which the log record was generated occurred rather than the time when the log record was created.

The time displayed in the **Time** column (referred to as the STCK) is the time when the log record was created and is therefore different from the UTC. Not all records have a UTC field.

You can display the UTC in local or GMT format.

Line actions

The valid line actions for browsing a log file in Formatted mode are:

/ Display the selection list of valid line actions.

- S** Format this record.
- If it is an unknown code, IMS PI will display the record in Dump format.
- TX** Track all records from the same transaction as the selected record, excluding all records that are not part of the transaction. Press the Backward function key (F7) to view older records in the transaction.
- Enter the RESET command to stop tracking and restore records that were excluded from the transaction.
- See also the FINDLIM command.
- TU** Applies only to IMS log records. Track all records from the same unit of recovery (UOR). Press the Backward function key (F7) to view older records in the UOR.
- Enter the RESET command to stop tracking and restore records that were excluded from the UOR.
- See also the FINDLIM command.
- T or TF** Start tracking forwards from this record to the next record in the same transaction. Press the Track function key (F6) to continue tracking forwards.
- TB** Start tracking backwards from this record to the previous record in the same transaction. Press the Track function key (F6) to continue tracking backwards.
- X** Exclude the log code. Records with the same log code are hidden.
- To reinstate, enter RESET X or use the FILTER command to edit the filter and delete the excluded entry.
- XT** Exclude the log record type. All records of this type are hidden. For example, to exclude all IMS trace events (67FA and 67FF trace event entries) from the display, issue the XT line action against any trace record.
- To reinstate, enter RESET XT or use the FILTER command to edit the filter and delete the excluded entry.
- L** Assign a quick label. Quick labels have the format .Znnnnnn and are assigned sequentially from .Z000000 to .Z999999.
- W** Display the default time stamp (wall-time).
- R** Display relative time. This is the time elapsed between the currently selected record and each visible record.
- E** Display the elapsed time between each visible record.
- N** Display relative or elapsed time in nanosecond precision.

Primary commands

The primary commands for Browsing a log file in Formatted mode are:

SWMODE

Press the Switch function key (F4) to switch between the two log file viewing modes:

1. Formatted mode
2. ISPF Browse mode

You can also switch mode by selecting from **Mode** in the action bar.

DISPLAY

Enter the DISPLAY command to set the following options:

- To prepend the LSN with the log record type, or to remove the LSN altogether, enter the DISPLAY command, and then set the **Display LSN** option.
- To control the visibility of the expanded view record separator line, enter the DISPLAY command, and then set the **Show separation line between log records** option.

You can also adjust your display settings by selecting **Options > Display** in the action bar.

HILITE

To customize the color and highlighting of records according to their log type, enter the HILITE command.

You can also adjust color highlighting settings by selecting **Options > Color highlighting** in the action bar.

TRACK X | U | OFF

With parameters, the command performs one of the following:

- X** Excludes (hides) all records not associated with the transaction of the record at the top of the display.
- U** Show only the records from a single unit of recovery (UOR) within an IMS transaction, typically a long-running transaction with program switches.
- OFF** Turns tracking off. Records excluded by TX or TU are redisplayed. If filtering was active before tracking, the filter is reactivated.

To commence tracking, the record must contain eligible global fields applicable to tracking.

Eligible tracking fields: ITASK, LogToken, LongLock, OrgUOWID, RecToken, Region, ResumeTP, URID.

See also the FINDLIM command.

TRACE ON | OFF

IMS log files can contain IMS trace records (log codes 67FA and 67FF). IMS PI can interpret and display individual trace entries, as well as track them to their associated transaction. The TRACE command is available in the dialog and batch reporting to show or hide the trace entries. The default is OFF. If the dialog detects trace records in the file, a pop-up window will ask if you want to activate TRACE ON now.

ON Display the trace entries.

OFF Hide the trace entries. This is the default.

RESET | RESET X | RESET XT

Without parameters, the RESET command clears all line actions and show records excluded by **TX** and **TU**.

To perform additional actions, specify one of the following parameters:

- X** Removes the **X** entries from the filter and reinstates the log code back into the display.

XT Removes the **XT** entries from the filter and reinstates the record type back into the display.

NAVigate

Toggle the display of the navigation toolbar on and off. The ON | OFF parameter is optional. You can also show or hide the navigation toolbar by selecting from **Navigate** in the action bar. The navigation toolbar is displayed at the top of the panel just above the formatted data and column headings. It allows you to traverse the log file by time.

For more information, see “Navigation” on page 85.

FILTER [EDIT | OFF | ON]

Dynamically change the active filtering options in effect for the current log file. The following commands are also available by selecting Filter in the action bar:

- FILTER or FILTER EDIT displays the active Filter. You can change the filtering criteria or switch to another Filter.
- FILTER OFF suspends filtering and displays all the log records in the file.
- FILTER ON resumes filtering if previously suspended.

In addition, you can enter line action **X** at any time to exclude individual log codes from the display.

FIND | F *string* [NEXT | PREV | FIRST | LAST] PREFIX | SUFFIX | WORD

Search for a specified character string in the current view. You can then press the Repeat Find function key (F5) to find the next occurrence.

For more information, see “FIND command” on page 82.

See also the FINDLIM command.

TIME W | R | E | N

Set the format of the **Time** column. The following options are available:

- W Wall-clock time.
- R Elapsed time relative to a base.
- E Elapsed time between each record.
- N Display relative and elapsed time with nanosecond precision.

.x (assign label command)

Assign the 1-7 character label *x* to “remember” the current position in the log file. You can relocate to this position using the LOCATE command.

For more information, see “Labels and the LOCATE command” on page 83.

Locate .x | x | n

Position the log file display at a particular label using *.x* or *x*, or record number using *n*. Use the L command (LOCATE command without a parameter) to display all the assigned labels, both quick and standard.

LABELS ON | OFF | RESet

Respectively, show, hide, or clear assigned labels.

FINDLIM *n*

Set the maximum number of records to process when using primary commands FIND and TRACK, and line actions TX and TU.

For example, entering FINDLIM 99999 will cause the FIND command to return control of the display back to the user if no match was found after 99,999 records have been searched. Pressing the Repeat Find function key (F5) recommences the search at the start of the next block of 99,999 records.

Note: To process an unlimited number of records, enter FINDLIM 0. Use with caution. With large log files, this command may lock the terminal for an extended period of time. Use this setting as a temporary measure and reinstate a limit once processing is complete.

TIMEOUT [*nn*]

Set a time limit on waits caused by long data set scans. Specify a value between 1 and 99 seconds, or 0 for no timeout. Specify TIMEOUT without parameters to display the current timeout value.

EXTDESC

Toggle the display of extended record descriptions in compact view. The ON | OFF parameter is optional.

EXTRACT *dsname* [MOD]

Extract the current result set to the data set specified by *dsname*.

The MOD option appends new records to an existing extract data set.

For example, EXTRACT EXTRACTS.MYEXTR MOD.

ICC *xx*

Set the IMS Connect Extensions log record code.

OMC *xx*

Set the OMEGAMON for IMS TRF log record code.

IMS50 ON | OFF

Controls the display of the IMS x'50' log record with subtypes.

Related concepts:

"Dynamic extract (Saving the result set)" on page 46

At any time during log file analysis, you can extract the current result set to a specified data set that will then be available for analysis at a later time. The result set is the selected log file or log files after filtering and tracking.

Related reference:

"Tracking" on page 93

Connect and display all the log records associated with a transaction using the Tracking feature. Tracking effectively reduces the display to only those records associated with the selected transaction so you can easily analyze it.

"TRACE command" on page 406

Specifies how to process IMS log records of type 67FA, and 67FF records for IMS trace tables: in their original format, or as individual IMS trace table entries (log type ITR).

FIND command

The FIND command is used to find and display the next occurrence of a character string in the current view. The command can be abbreviated to F.

The search is not case sensitive. Upper and lower case characters are treated the same. The cursor will be placed at the beginning of the found string. Automatic scrolling will be performed, if necessary, to bring the string into view. You can then press the Repeat Find function key (F5) to find the next occurrence of the string.

The syntax of the FIND command is:

```
FIND search-string NEXT|PREV|FIRST|LAST PREfix|SUFFix|WORD
```

If the string contains embedded spaces, enclose the string in quotes.

You can refine the FIND command on log file processing panels (but typically not selection lists) by specifying a second parameter:

- To control the direction and scope of the search: NEXT PREV FIRST LAST. The default is NEXT.
- To control the portion of the string to be matched: PREFIX SUFFIX WORD

Tip:

1. The FIND command searches forward or backward, but it only searches data that is visible in the current view. Press the Left function key (F10) or the Right function key (F11) to bring Time, LSN, and other global fields into or out of view as required for your search.
2. Data hidden by a filter or form is not included in the search.
3. When analyzing large files, you can improve efficiency by using the FINDLIM command to limit the number of records searched by the FIND command.

Examples

```
FIND DORY
find 'john brown'
f dave prev prefix
```

Labels and the LOCATE command

The current position in the log file can be remembered by assigning a Label. Then later you can reestablish position to that label using the LOCATE command.

There are two types of labels: *standard* and *quick*.

A *standard* label can be assigned (or reassigned) only to the first line of the current display. To label a particular record it must be positioned as the first line of the display.

You assign the label by entering it in the command line. The label, prefixed by a '.' (period), consists of 1 to 7 characters, which can then be used as a parameter of the LOCATE command. For example, you might want to assign the label .MYTRAN to line 2145 in the log file where my transaction starts. First, position line 2145 so that it is the first line displayed by scrolling, or by using the LOCATE or "FIND command" on page 82. Then enter: COMMAND ==> .MYTRAN

From then on, a LOC .MYTRAN command can be used in place of LOC 2145.

Quick labels are assigned using line action L. Quick labels have the format .Znnnnnn and are assigned sequentially from .Z000000 to .Z999999.

You can delete and reassign labels.

Note: Labels are remembered only while you are browsing the current log file. On exit from browse, all labels are cleared.

The syntax of the LOCATE command is:

```
LOCATE|LOC|L label-name|record-number
```

Examples:

COMMAND ===> .z
assigns label z to current top of data

COMMAND ===> locate z
positions top of data at label z

COMMAND ===> loc .9
positions top of data at label 9 (numeric label)

COMMAND ===> L 147
positions top of data at record 147

COMMAND ===> L .Z000004
positions top of data at quick label Z0000004

COMMAND ===> locate
displays a selection list of the assigned labels

A record may be assigned multiple labels of either type, but only one will be displayed on the record line.

Use the L command (LOCATE command without a parameter) to display all the assigned labels, both quick and standard. These labels are only available while browsing the current selection of log files. When you exit from browse and change the file selection, all labels are cleared.

```
File Edit Help

-----

Labels Row 1 to 4 of 4
Command ==> _____ Scroll ==> CSR

Select a label then press Enter.

Record
/ Label Number Code Time LSN
s DLK 5 67FF 12.59.59.123461 0000000000ABEF58
d DQ 11 36 12.59.59.123465 0000000000ABEF5E
- Z000000 15 43 12.59.59.123591 0000000000ABEF63
- Z000001 16 03 12.59.59.123592 0000000000ABEF64
```

Figure 41. Select a label

This list shows for each label the record number, log record code, STCK time stamp (formatted according to the Zone specification), and the logical sequence number of the corresponding record.

Enter line action **S** to select a label from the list. IMS PI will locate the corresponding record in the log file and position the display with that record as the first line of the display.

You can enter line action **D** to delete labels from the list that you no longer require.

Note: You can use the command LABELS ON | OFF | RESET to show, hide, or clear all labels. Equivalent function is available from **Labels** in the action bar.

Navigation

You can navigate through a log file forwards or backwards by a specified time interval or you can navigate to a particular time of day.

The **Navigate** action bar provides these options:

1. **Show Navigation Toolbar.** This is the default and allows you to skip forward or backward through the file by a specified interval, or to scroll to a specified time of day.
2. **Hide Navigation Toolbar.** Choose this option if you do not want to see the navigation toolbar on your display.

You can also toggle the display of the navigation toolbar on and off by entering the NAVigate command. The ON | OFF parameter is optional.

Navigate is activated by point-and-shoot and operates on the time displayed in the Time column (the STCK time stamp formatted using the Zone specification).

You can navigate through the log file in two ways:

1. Forwards or backwards in time by a specified amount, from as little as one microsecond to as much as several hours. Specify the time interval, then position the cursor on either of the point-and-shoot fields **Forwards** or **Backwards** and press Enter. IMS PI will locate the next record that is forwards or backwards (as requested) from the current record by at least the specified interval. Repeat to continue to skip through the log file by the specified interval.
2. To a particular time of day, accurate to one microsecond. Specify the time of day then position the cursor on the point-and-shoot field **Time of Day** and press Enter. IMS PI takes you directly to that point in time in the log file.

Enter times in the format *hh.mm.ss.thmiju* and in the range 00.00.00.000000 to 23.59.59.999999.

FILTER command

The FILTER command allows you to dynamically change the active filtering options for the current log file.

Filter action bar

The Filter action bar provides three choices:

1. Resume Filtering. Also available by entering FILTER ON.
2. Suspend Filtering. Also available by entering FILTER OFF.
3. Change active Filtering options. Also available by entering FILTER or FILTER EDIT.

The option marked with an asterisk (*) is currently in effect and so cannot be chosen.

File	Menu	Edit	Mode	Navigate	Filter	Time	Labels	Options	Help
BROWSE	IMS.IZDE.SLDS2	<div> *. Resume Filtering 2. Suspend Filtering 3. Change active Filtering options... </div>						: < >	
Command ==>								CSR	000000
Forwards / Backwards . .									
Code Description									
/									
0301	CQSCONN	Client Connect to Structure completed					4-000000000000001		
0301	CQSCONN	Client Connect to Structure completed					4-000000000000002		
42	Log Buffer Control	IMSID=IZDE					1-000000000000001		
06	IMS Accounting	UTC=17.00.29.531963 IMSID=IZDE					1-000000000000002		
43	Log Data Set Control						1-000000000000003		
48	OLDS Control Information						1-000000000000004		
5615	RRS Restart done	IMSID=IZDE					1-000000000000005		
0403	Tracking Site Information - SUBSYS Recovery complete	UTC=17.01.48.436711 IMSID=IZDE					1-000000000000006		
3201	System Checkpoint started						4-000000000000003		
0707	CQSPUT	System Checkpoint record written					4-000000000000004		
F1=Help	F3=Exit	F4=Switch	F5=Rfind	F6=Track	F7=Backward				
F8=Forward	F10=Left	F11=Right	F12=Cancel						

Figure 42. Filter action bar pull-down

Dynamic filter

The Dynamic Filter display is the same as the normal Filter display, except for the option to specify a Filter name. Update the Filter in the normal way to dynamically change your active filtering options.

VIEW	Filter	Row 1 of 1 More: < >
Command ==>		Scroll ==> CSR
Filter	+	
Description . . .	New Log Record Filter	Activate Tracking
/ Log Code + Exc Description		
Level	Conditions	Form + REXX
***** Bottom of data *****		

Figure 43. Edit Filter: Dynamically change filtering options

Scroll Left (F10) or Right (F11) to show full details or just the list of log codes. The list of log codes is sufficient if you are filtering on log code only and you are not using Level, Condition statements, Forms or a REXX exec.

You can change to a new Filter by overtyping the name or pressing the Prompt function key (F4) to select from a list of Filters. If you change the Filter name, IMS

PI displays the new Filter in place of the old one. If the specified Filter does not exist, IMS PI retains the existing Log Codes and options.

Dynamic Filters are displayed in a View session. SAVE is not available. Use the SAVEAS command to save the Filter with the same or another name.

When you have completed reviewing the Filter, press the Exit function key (F3) to start using the new filtering options or the Cancel function key (F12) to revert back to the previous Filter.

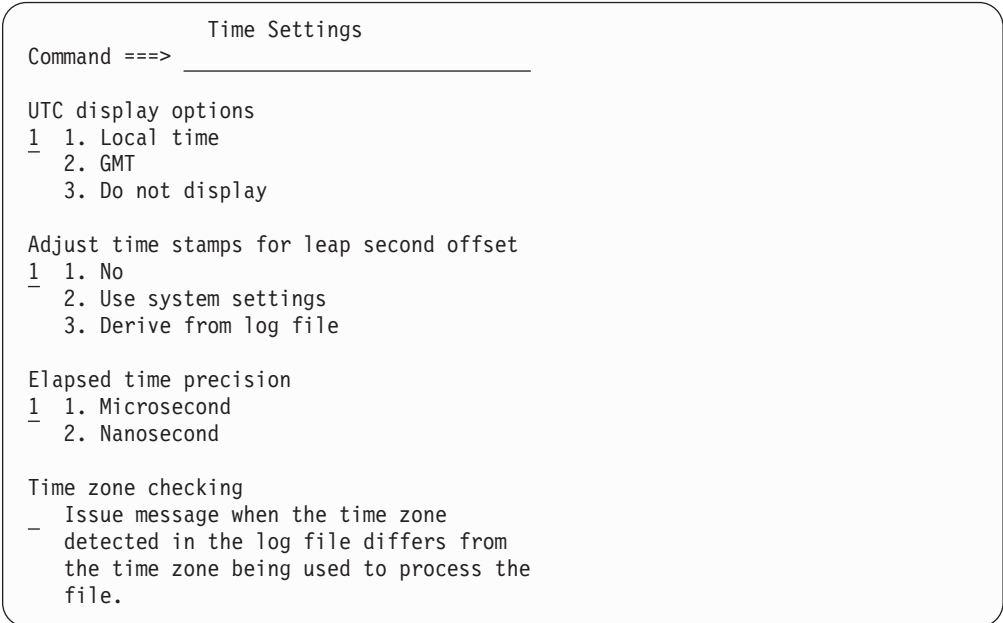
Related concepts:

Chapter 23, “Defining filters,” on page 281

Filters enable you to select the log records that you are interested in. For example, select only those records associated with a particular Transaction Code or User ID.

Time settings

You can configure time settings by entering the TIME primary command or through **Time** on the action bar.



```
Time Settings
Command ==> _____

UTC display options
1 1. Local time
  2. GMT
  3. Do not display

Adjust time stamps for leap second offset
1 1. No
  2. Use system settings
  3. Derive from log file

Elapsed time precision
1 1. Microsecond
  2. Nanosecond

Time zone checking
- Issue message when the time zone
  detected in the log file differs from
  the time zone being used to process the
  file.
```

Figure 44. Time action bar pull-down: Time Settings

The Time Settings menu consists of the following options:

UTC display options

Select one of the following display options for the UTC (Coordinated Universal Time) field:

Local time

Show the UTC global field in the local time of the system that logged the record. This is the default.

GMT

Show the UTC global field in Greenwich Mean Time (GMT).

Do not display

Hide the UTC global field.

Adjust time for leap second offset

Leap Second Offset is an adjustment (24 seconds from January 1, 2009) that you can apply (with the time zone offset) to STCK time stamps to report accurate local time values. This allows you to view IMS log files in conjunction with other diagnostic information (MVS SYSLOG) and show consistent time stamps. If your system timer does not use leap second offset feature, then you do not need to adjustment for leap seconds.

Select one of the following options:

No

Do not adjust for leap second offset. This is the default.

Use system settings

Use the CVTISO value. The value contains the leap second offset in time-of-day format. This is only available if you are running hardware with a sysplex timer.

Derive from log file

Use this option for log files generated on remote machines with different time settings. Where the UTC is available, its value (already adjusted for leap second offset) is compared to the STCK time stamp value. A difference greater than 15 seconds is assumed to be caused by a leap second offset, and the leap second offset then applies.

Elapsed time precision

This option applies when the Time column shows elapsed time between records or elapsed time relative (+/-) to a particular record. Use line actions R and E, or the commands TIME R and TIME E. Choose to display the elapsed time in microseconds (the default) or nanoseconds. This option is also available using line action N or the TIME N command.

For batch reports, specify the "ELAPSED command" on page 399.

Time zone checking

When selected, this option issues a message when the time zone detected in the log file differs from the time zone being used to process the file. The check does not occur when the specified time zone is GMT. The message is issued only once per process session.

Related reference:

"ELAPSED command" on page 399

The ELAPSED command is used for batch reports to request that record elapsed time relative to the previous record is reported in microsecond or nanosecond precision.

"ZONE command" on page 407

ZONE is relevant if the logs were created in a different time zone to where they are being processed. IMS PI will convert the STCK time stamp in the log records and report them in the required time zone.

Formatting log records

When browsing a log file, you can select particular records to format. The width of the formatted display optimally adjusts to your screen width.

- When browsing the log file in Formatted mode, enter line action S against the log record you wish to format.
- When browsing the log file in ISPF Browse mode, position the cursor on the record you wish to format and press the Format function key (F6).

Press the Switch function key (F4) to change view.

IMS PI displays the formatted log record according to your screen width:

- For a screen width of 80 characters, the record is formatted to a maximum width of 80 characters so you don't have to scroll right to see data.
- For a screen width of 132 characters, the record is formatted to a maximum width of 132 characters so your display is optimized for maximum data.

IMS PI format

IMS PI format helps you to understand log record contents to make the wealth of information they contain more easily and readily available for analysis.

IMS PI format displays the following log record details:

1. The leftmost column shows the offset in the record.
2. At the top is information from the log record prefix and suffix:
 - Log record code and description
 - STCK time stamp
 - Log record sequence number (LSN)
 - Date and time formatted from the STCK using the specified Zone
3. The body shows the fields and segments in the record:
 - The segments are delineated by a blank line.
 - Segment or field group names have a description.
 - The field names are point-and-shoot. To zoom in to view further details of any field, position the cursor on the field name and press Enter. For more information, see “Field zoom” on page 92.
 - Field contents are displayed in different formats depending on the type of field:
 - Character data is enclosed in quotes
 - Numeric data is prefixed by +
 - Hexadecimal data and Flags are hexadecimal digits
 - Dump fields are in Dump format showing the offset within the field, the hexadecimal data and EBCDIC character translation

Prompt/Switch (F4)

Function key F4 has a dual use, Switch/Prompt. The action depends on the position of the cursor when F4 is pressed:

- **Prompt.** If the cursor is positioned at the Form input field, a prompt selection list of eligible Forms is displayed.
- **Switch.** If the cursor is positioned away from the Form input field, the view switches to “Dump format” on page 91.

With the cursor positioned in the Form input field, press the Prompt function key (F4) to display a selection list of Forms relevant to the displayed record. Select one from the list to dynamically apply to the formatted record.

```

BROWSE      IMSP.SLDS.D2008142.T135723.F1      Record 00000071 Line 00000000
Command ==> _____ Scroll ==> CSR
Form ==> REC03 + _ Use Form in Filter      Format ==> FORM
***** Top of data *****
+0004 Code... 03      IMS Message
+0189 STCK... B93881DF30E0CA01      LSN.... 0000000000000047
      Date... 2014-04-04 Friday      Time... 09.32.51.120652

+0000 MSGLRLL.... 0199      MSGLCODE... 03      MSGFLAGS... C3
+0006 MSGDFLG2... 82
+0014 MSGUOW.... Unit of Work (UOW) - Tracking
+0014 MSGORGID... 'A50      ' MSGORGTK... B93881DF30D5C301
+0024 MSGPROID... 'A50      ' MSGPROTK... B93881DF30D5C301
. . .

```

Figure 45. Formatted record: specify a Form to display fields of interest

Press the Switch function key (F4) with the cursor positioned in the body of the panel, or enter one of the Format options **DUMP**, **HEX1**, **HEX0** to switch the record display to Dump format.

Primary commands

The primary commands for Formatting a log record in IMS PI format include:

FIND | *F string* [**NEXT** | **PREV** | **FIRST** | **LAST**] **PREFIX** | **SUFFIX** | **WORD**
 Search for a specified character string in the current view. You can then press the Repeat Find function key (F5) to find the next occurrence.

For more information, see “FIND command” on page 82.

SKIP **NEXT** | **PREV**

Skip to the next or previous record in the log file. Alternatively, press the SkipNext function key (F11) or the SkipPrev function key (F10).

TRACK **X** | **U** | **OFF**

Tracking isolates records in the same transaction.

- Specify **TRACK X** to show only the records from the one transaction. All other records are excluded (hidden).
- Specify **TRACK U** to show only the records from a single unit of recovery (UOR) within an IMS transaction, typically a long-running transaction with program switches.
- Specify **TRACK F** or **TF** to start tracking forwards from the current record.
- Specify **TRACK B** or **TB** to start tracking backwards from the current record.
- Specify **TRACK** to resume tracking.
- Specify **TRACK OFF** to stop tracking. Records excluded by **TX** or **TU** are redisplayed. If filtering was active before tracking, the filter is reactivated.

FORMAT

Formatting options allow you to change the way log records are displayed. Use the **FORMAT** command to toggle on and off the display of the Formatting options. You can also do this by selecting from **Format** in the action bar.

The Formatting options are displayed at the top of the panel just above the data and immediately below the command line (if you have the command line at the top, not the bottom).

Specify any of the following options in the **Format** ===> field:

STD

Formatted according to the Log Record DSECT mapping.

FORM

Formatted according to the specified Form. If a Form is not specified or defined, then STD is used.

- If **Use Form in Filter** is *not* selected (is blank), you can specify a Form for IMS PI to use to format all log records of this type. Forms specified in the Filter are ignored.
- Enter / to select **Use Form in Filter** to cause IMS PI to use the Form specified in the currently active Filter. A Form will only be used when a Filter is active and the log code in the Filter has a Form name specified.

Related reference:

“Field zoom” on page 92

When a record is displayed in IMS PI format, the field names are point-and-shoot. You can zoom in to view further details of any field by positioning the cursor on the field name and pressing Enter.

“Tracking” on page 93

Connect and display all the log records associated with a transaction using the Tracking feature. Tracking effectively reduces the display to only those records associated with the selected transaction so you can easily analyze it.

“FORMAT command” on page 402

FORMAT specifies one or more log record formatting options for reporting; it is ignored for extracts.

Dump format

The record is displayed in Dump format when requested by pressing the Switch function key (F4) from IMS PI format or when the log record code is unknown to IMS PI.

To request Dump format, press the Switch function key (F4) or enter one of the Format options: DUMP, HEX1, HEX0.

Dump format displays the following log record details:

1. The leftmost column shows the offset in the record.
2. The middle section shows the contents of the record in hexadecimal data format.
3. The rightmost column shows the EBCDIC character translation of the data.

To revert from Dump format back to IMS PI Format, press the Switch function key (F4) or enter one of the Format options: FORM or STD.

Primary commands

The primary commands in Dump format are FIND, SKIP, TRACK, and FORMAT. These commands work in the same way as the “IMS PI format” on page 89. However, the following formatting options apply to Dump format:

FORMAT

Formatting options allow you to change the way log records are displayed. Use the FORMAT command to toggle on and off the display of the Formatting options at the top of the panel just above the data.

Specify any of the following options in the **Format ==>** field:

DUMP

Dump format, similar to SYSUDUMP.

HEX1

Vertical Hexadecimal format with decimal offsets.

HEX0

Vertical Hexadecimal format with hexadecimal offsets.

You can quickly switch formats by entering in the Format input field either D for DUMP, H or 1 for HEX1, or 0 for HEX0.

Related reference:

“FORMAT command” on page 402

FORMAT specifies one or more log record formatting options for reporting; it is ignored for extracts.

Field zoom

When a record is displayed in IMS PI format, the field names are point-and-shoot. You can zoom in to view further details of any field by positioning the cursor on the field name and pressing Enter.

The offset in the record, field name and field description are always displayed. The presentation of the data in the field depends on the type of field:

1. **Character fields** are reported as is in character format enclosed in quotes. Typically these are short-fixed length fields such as names.
2. **Numeric fields** are reported as a decimal integer prefixed by a + together with its hexadecimal and EBCDIC character translations. Typically these are counters.
3. **Hexadecimal fields** are reported in hexadecimal representation together with the EBCDIC character translation. Typically these are short fixed-length non-character fields such as addresses.
4. **Flag fields** are reported in hexadecimal representation. Typically these are one byte flag fields that have bit settings. The associated Flag bit settings are displayed and can be used as Filtering Criteria.
5. **UTC fields** are divided into their date, time and zone components and reported in both GMT and Local time using the zone component of the field. This is the time the event occurred.
6. **STCK fields** are reported in hexadecimal representation and formatted date and time using the specified Zone. This is the time the log record was written by IMS.
7. **Dump fields** are reported in hexadecimal dump format showing the offset within the field, hexadecimal data and EBCDIC character translation. Typically these are long variable-length fields such as message text segments or database update records.

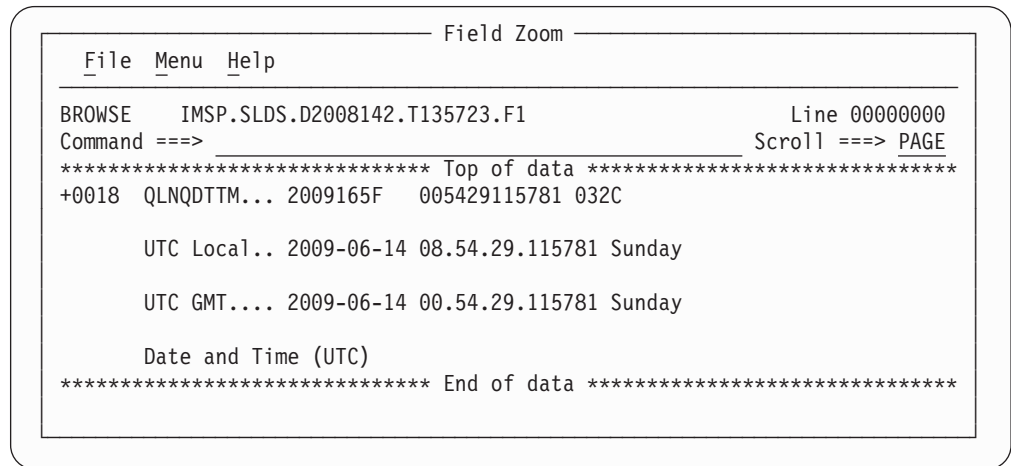


Figure 46. Field zoom

Related reference:

“IMS PI format” on page 89

IMS PI format helps you to understand log record contents to make the wealth of information they contain more easily and readily available for analysis.

Tracking

Connect and display all the log records associated with a transaction using the Tracking feature. Tracking effectively reduces the display to only those records associated with the selected transaction so you can easily analyze it.

Tracking works by identifying and then progressively discovering the tokens that uniquely identify a transaction, for example the tracking unit of work ID associated with an IMS message and the recovery token associated with the processing of an application.

You start tracking by identifying an event (log record) associated with the required transaction and issuing a tracking action against that record. You can start tracking from any event in the transaction; for example you can start tracking from a 01 input message or a 50 database update.

IMS PI supports the following types of tracking against the IMS log:

Transaction tracking (TX)

To track the entire lifecycle of the transaction, including all its program switches. This is achieved by connecting all IMS messages that share the same originating tracking unit of work ID.

Unit of recovery tracking (TU)

To track the transaction events associated with a single unit of recovery. This is achieved by connecting all transaction events with the same processing tracking unit of work ID and recovery token.

Scheduling tracking

Tracks all the units of recovery within a single program schedule (from the 08 to the 07 log record).

Scheduling tracking is activated (always and only) when you commence tracking with **TX** or **TU** against an application program schedule event record (08 start or 07 termination) or a CA01 for a non-message driven BMP.

Notes:

- **TX** ignores quick reschedules and displays the entire OASN program schedule sequence, for example 08-07-08-07-08-07 where the middle 07-08 records are quick reschedules.
- **TU** strictly honors the 08-07 boundaries, regardless of whether it is a quick reschedule or not.

IMS PI can process (merge) the following log file types and then track across them:

1. IMS log
2. IMS monitor
3. CQS log
4. IMS Connect Extensions event journal
5. OMEGAMON TRF files and ATF journals
6. DB2 log
7. MQ log extract
8. IRLM long locks
9. IMS trace
10. IMS Repository Audit log

Tracking can connect events across all the file types for a complete end-to-end picture. For example, the OTMA logon token (Connect event key) is used to track from IMS Connect (Extensions journal) and then into the IMS log.

You will notice some differences in tracking depending on the different file types. Tracking against the IMS monitor is done by PST number as IMS PI does not recognize the transaction framing events.

After you have tracked, don't forget to use the **R** (Relative) and **E** (Elapsed) line actions to identify long event latencies. Use FINDLIM to control the number of records processed during a tracking session.

At any point during your tracking session, you can enter the **EXTRACT** primary command to save the result set to an extract data set for later analysis using IMS PI.

Related concepts:

"Dynamic extract (Saving the result set)" on page 46

At any time during log file analysis, you can extract the current result set to a specified data set that will then be available for analysis at a later time. The result set is the selected log file or log files after filtering and tracking.

Related reference:

"Formatting log files" on page 76

The primary view is IMS PI Formatted mode. In Formatted mode, there are four views of the log file. You can list records with or without the global fields and with either the time or LSN in the right hand column. Use the Left function key (F10) and the Right function key (F11) to cycle through the views. The view that is current when you Exit will be the view that is presented to you on reentry.

"IMS PI format" on page 89

IMS PI format helps you to understand log record contents to make the wealth of information they contain more easily and readily available for analysis.

Chapter 7. Creating reports, extracts and CSV files

You can generate batch reports, extract data sets and CSV files from input files of various types.

- One or more explicitly specified log files, that can be any combination of log types IMS, CON, MON, CQS, TRF, ATF, DB2, MQ, SME, ITR, FRP
- One or more extract files, and possibly one or more log files of any type
- An IMS system, or an IMS Connect system
- A group of IMS systems, or IMS Connect systems, or both (possibly a sysplex)

To save log record result sets to extract files whilst tracking a transaction in the dialog, see “Dynamic extract (Saving the result set)” on page 46.

Related concepts:

“Merge IMS log files from multiple systems in a sysplex” on page 38

IMS PI can merge data from multiple log input files from multiple IMS and IMS Connect systems.

Related reference:

“IMS log data” on page 68

Consider your data scrubbing requirements. No other special preparation is required.

Automated file selection

IMS Problem Investigator batch processing can automatically select required files so you do not have to specify their data set names explicitly. Automated file selection is performed by the ALZDBRC utility. It locates the IMS log files and IMS Connect journal data sets for a specified time range when you request a report, extract or CSV for a system or group of systems.

Automated file selection is suited to both IMS and IMS Connect systems:

- For IMS systems, IMS Problem Investigator uses DBRC Log Selection to select the IMS log files for the specified systems and report period. Both SLDS data sets and if requested, OLDS data sets, are selected.
- For IMS Connect systems, Journal File Selection automatically selects the relevant IMS Connect journal data sets using information in the IMS Connect Extensions definitions repository. Both archive and active journal data sets are eligible for selection.

When requested from the dialog, the JCL is generated as a two step process. The first step runs the ALZDBRC utility, locates the required files, constructs DD statements for them to populate skeleton JCL, and then submits the job. This second job then generates the requested report, extract or CSV from the submitted data sets and specified report interval.

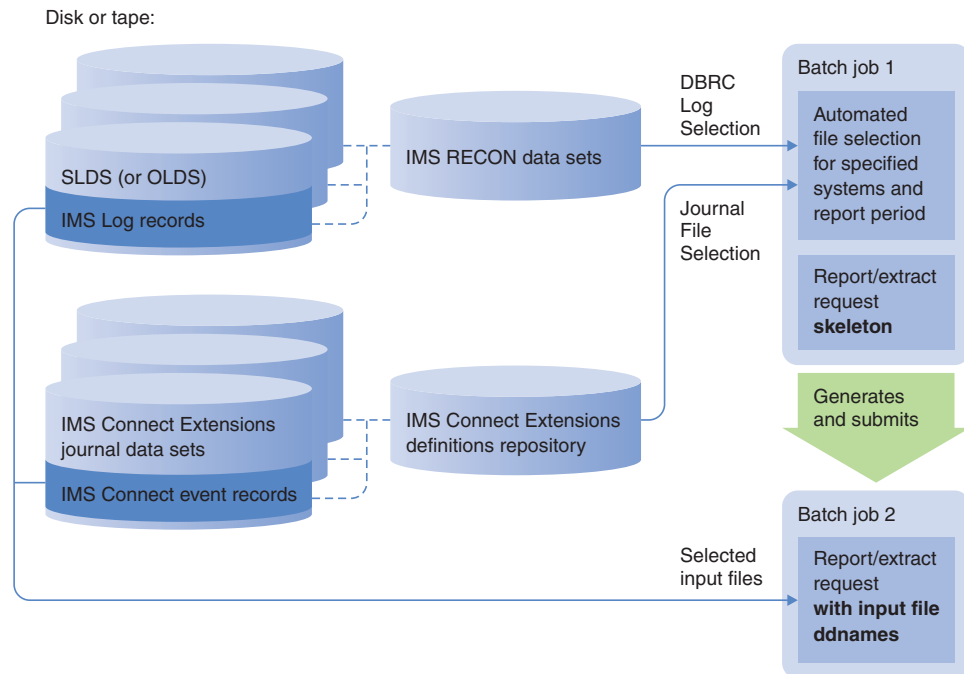


Figure 47. Automated file selection for reports and extracts

Related reference:

“ALZDBRC JCL statements” on page 113

IMS Problem Investigator generates JCL to perform automated file selection using the ALZDBRC utility.

Creating a report, extract or CSV from a group of systems

Using automated file selection to automatically select relevant log files from a group of systems.

Before you begin

You first need to define the systems and groups of systems:

- To define systems, see “Preparing for DBRC Log Selection” on page 107 and Chapter 26, “Defining systems,” on page 321.
- To define groups, see Chapter 27, “Defining groups,” on page 331.

About this task

Automated file selection can automatically select relevant IMS SLDS or OLDS log files for a single system or a group of systems such as an IMSplex.

After identifying the relevant files, you might then choose to extract them into a single file:

- Extract records from a specified time period.
- Extract records matching filtering criteria. For example, extract just the security violations.

Procedure

1. To request automated file selection for a group of systems, select primary menu option **5 Groups**. (To request automated file selection for a single system, use option **4 Systems**.)

```

Command ==> _____ Groups Row 1 to 3 of 3
                               Scroll ==> PAGE

Specify Groups of IMS and Connect systems.

  1                               2                               2
/ Group      Description      # Auto Files      # Auto Files
- PRODPLEX   Production IMS Sysplex  3 Yes No      1 Yes No
- TESTPLEX   Test IMS Sysplex       3 Yes No      1 Yes No
J DEVTPLEX   Development IMS Sysplex  3 Yes No      1 Yes No

```

Figure 48. Groups: Specify groups of IMS and Connect systems

- 1 A group contains one or more IMS systems, IMS Connect systems, or both. The number of each type of system is shown in their respective # columns.
- 2 The **Auto** columns indicate whether the group is eligible for automated file selection:
 - **IMS: Auto** column indicates if all the IMS systems in the group have DBRC settings specified.
 - **Connect: Auto** column indicates if all the IMS Connect systems in the group are defined in the IMS Connect Extensions definitions repository with at least one journal data set.
2. Enter line action **J** next to the group from which you want to extract data. The Submit Batch Request panel is displayed.

```

Submit Batch Request
SUBMIT Group - DEVTPLEX
Command ==> _____

Filtering Criteria:      ----- Report Interval -----
Filter . . . _____ +      YYYY-MM-DD HH.MM.SS.TH
                               From 2014-03-17 01.00.00.00
                               To   2014-03-17 01.30.00.00

/ Extract
- Data Set . . . 'USER.EXTRACT.DEVGRP'

- CSV
  Form . . . _____ + _ Include field labels
  Delimiter . . ;
  Data Set . . . _____

/ Report
/ Form / STD _ Brief      Enter "/" to select option
/ Dump / HEX0 _ HEX1      _ File is a log stream
                          _ Edit JCL before submit
                          / Scrub sensitive data

```

Figure 49. Submit Batch Request: specify options for this run

3. Complete the details of the extract request as described in “Creating a report, extract, or CSV from specified log files” on page 98.
4. Press Enter twice (the second press confirms the action). IMS Problem Investigator then does the following:

- Uses DBRC to select the relevant IMS log files for the specified IMS systems and report interval.
- Uses automated journal file selection, to select the relevant IMS Connect Extensions journals, archive or active, for the specified IMS Connect systems and report interval.
- After the files are selected, records matching the filtering criteria, and created in the report interval, are extracted to the output file.

Related reference:

“ALZDBRC JCL statements” on page 113

IMS Problem Investigator generates JCL to perform automated file selection using the ALZDBRC utility.

Creating a report, extract, or CSV from specified log files

You can use the IMS Problem Investigator ISPF dialog to request a report, extract, or CSV file from one or more log files.

Before you begin

Before creating a CSV file, you must define a form for the corresponding log record type. See Chapter 25, “Defining forms,” on page 313.

Procedure

1. From option **1 Process**, to request a report, extract or CSV from one or more input files, specify line action **SUB** for each log file you want to merge, then press Enter.

Tip: Rather than entering many **SUB** line actions, you can specify **SUB** once for the first file that you want from the list, = for the other files that you want, and then press Enter.

2. The Submit Batch Request panel is displayed. The panel allows you to set the following options:

Report Interval

Specify a Report Interval to focus your report, extract or CSV on the period of time that is of particular interest to you. You can specify a date-time range, or leave it blank.

Date can be either a calendar date in the format *yyyy-mm-dd* or a relative date. Relative dates are specified as 0, -1, -2, and so on, meaning a date relative to the current date. 0 represents today, -1 yesterday, -2 two days ago, and so on. If both **From** and **To** dates are specified, they must be in the same format.

Time is specified in the format *hh.mm.ss.th*. If date is specified without time, the time defaults to 00.00.00.00.

The report interval is included as parameter input in the generated JCL:

```
//SYSIN DD *
START yyyy-mm-dd-hh.mm.ss.th
STOP  yyyy-mm-dd-hh.mm.ss.th
REPORT [FILTER(filter)]
EXTRACT [FILTER(filter)]
CSV    [FILTER(<filter>)] FORM(<form>) [DELIMITER(<;>)] [LABELS]
```

or

```
//SYSIN DD *
START -nnn-hh.mm.ss.th
STOP -nnn-hh.mm.ss.th
REPORT [FILTER(filter)]
EXTRACT [FILTER(filter)]
CSV [FILTER(<filter>)] FORM(<form>) [DELIMITER(<;>)] [LABELS]
```

Filtering Criteria

To filter the data to include only that of particular interest, specify a log record code or the name of a Filter:

- Log record codes are two or four hexadecimal digits. For example: 01 or 5937. IMS PI will select only the log records with that code.
- If you specify a Filter by name, IMS PI will display only those log records that match the Filtering Criteria specified by the Filter. You can type the Filter name or press the Prompt function key (F4) to select from a list.

Note: Filters are held in the Control Data Set (CDS). If the CDS is not cataloged, press the Exit function key (F3) to return to the Primary Option Menu where you can specify the name of the CDS, then select option **2 Filter** to allocate the CDS and define the required Filters.

Extract Data Set

To create a log file extract:

- a. Select the **Extract** option, and
- b. Specify the name of the Extract **Data Set** to contain the output with default ddname EXTRACT

Filter and **Report Interval** are applied, but Forms in the Filter are ignored.

Extracts contain records in the same format as the original log files. The smaller extract files contain a subset of the records from the original files and allow more efficient processing. If the JCL is submitted immediately (do not select **Edit JCL before submit**), when the job completes, the name in **Extract Data Set** is automatically added to the Process list (viewable by selecting option **1 Process**) in the next row after the last original file selected.

If IMS PI is to create the data set at run time, the default allocation attributes specified in “Extract Allocation Settings” on page 277 in your Profile Options will be used when generating the JCL. If the data set is already cataloged, then IMS PI will overwrite it unless you edit the JCL and change to DISP=MOD. Alternatively, you can use a GDG to create a new data set each time the extract is run.

Standard TSO conventions apply when specifying the data set name. For example, if the TSO option PROFILE PREFIX is in effect, the prefix will be appended as the high-level qualifier unless the data set name is enclosed in quotes.

Tip: To achieve similar processing efficiencies to a small extract, use “Time Slicing” on page 43.

CSV A CSV file is a delimited text file which you can download for use by your familiar spreadsheet applications.

To create a CSV output file:

- a. Select the **CSV** option to request a CSV extract.

- b. Format the CSV records by specifying a form in the **Form** field. A header record of the field names is optional. Forms in the filter are ignored.
- c. *Optional:* To write a header record with the field names as labels, select **Include field labels**.
- d. Specify a delimiter in the **Delimiter** field to delineate the CSV field names. The default delimiter is a semicolon (;).
- e. Specify the name of the data set where the output records are to be written. IMS PI will include this in the JCL with a ddname of CSV.

Only records from the log input file that pass the **Filtering Criteria** will be written to the CSV data set.

If IMS PI is to create the data set at run time, the default allocation attributes specified in “Extract Allocation Settings” on page 277 in your Profile Options will be used when generating the JCL. If the data set is already cataloged, then IMS PI will overwrite it unless you edit the JCL and change to DISP=MOD. Alternatively, you can use a GDG to create a new data set each time the CSV job is run.

Standard TSO conventions apply when specifying the data set name. For example, if the TSO option PROFILE PREFIX is in effect, the prefix will be appended as the high-level qualifier unless the data set name is enclosed in quotes.

Report

To request a report showing records in selected formats:

- a. Select this option to request a report.
- b. Specify one or more Log record formatting options.

IMS PI Format options are:

STD

Formatted according to the Log Record DSECT mapping.
This is the default.

FORM

If selected, but a Form is not specified or defined, then STD is used.

BRIEF

A concise report that shows general and high-level information (record description and global fields), similar to the ISPF dialog Formatted Log Browser.

Dump Format options are:

DUMP

Dump format, similar to SYSUDUMP.

HEX1

Vertical Hexadecimal format with decimal offsets.

HEX0

Vertical Hexadecimal format with hexadecimal offsets.

File is a log stream

Select this option when the file is a log stream, such as a CQS or FRP (IMS Repository Audit) log stream. It is not relevant when processing a System or Group.

Edit JCL before submit

Select this option to edit the JCL before it is submitted. IMS PI will generate the JCL and display it in an ISPF-style Edit panel. You can review or modify the JCL using the usual ISPF Edit commands and actions, or you can use the CREATE command to save the JCL in an external data set. Then to submit the job, enter SUB in the Edit command line.

If this option is not selected, the generated JCL is not displayed and the job is submitted immediately.

Note:

- a. When you request a report, it can produce a large volume of output. PAGELIM(10000) sets a default limit of 10,000 pages. You can change this limit if you select to edit the JCL before submit.
- b. When you request an extract, if you want the extract data set to automatically be added to the Process list, do *not* select to edit the JCL before submit.

Scrub sensitive data

Select this option to request to remove sensitive or confidential data such as customer business information before processing. The records remain intact, only data such as transaction messages and database updates are modified in the output. This generates the "SCRUB command" on page 404.

A Log Information report is produced with every batch report request. When scrubbing is requested, the report shows how many records are scrubbed and copied to the output IMS log file. For an example, see "Log Information report."

3. When the specification of your run-time options is complete, press Enter. You will be prompted to Press ENTER to proceed with request. This provides a last opportunity to review and change your submit request.

Related reference:

"ALZBATCH JCL statements" on page 103

Explanation of ALZBATCH JCL which is used to process explicitly specified log files.

"START, STOP (FROM, TO) command" on page 405

START and STOP specify a report interval. Only log records with a STCK time stamp within the report interval are included in the report, extract or CSV. The report interval is optional when processing a specific log file, but mandatory for automated file selection or processing a log stream.

Log Information report

A Log Information report is produced with every batch report request when IMS log records are processed. The default ddname is LOGINFO. If record scrubbing is requested, the report provides details of the record types copied to the output log file and scrubbed.

The Log Information report provides a break down of the log record types in the input IMS log file or files showing record count, length, rates per second, and volume. Selected record types are broken down further to provide additional information about transaction arrival and processing throughput.

Example 1: Log Information report with SCRUB

When SCRUB is requested, all (filtered) log records are copied from SYSUT1 to SYSUT2, scrubbing all applicable record types. The Out columns on the right-hand side of the Log Information report then show how many records are copied to the output log file SYSUT2 and scrubbed.

For example:

```
//SYSIN DD *
SCRUB
REPORT
EXTRACT
FORMAT(STD,BRIEF,DUMP)
/*
```

V2R4M0 IMS V12.1 IMS Problem Investigator - Log Information											
Log data From 2013-12-07 03:11:42.448679 To 2013-12-07 03:12:50.742916 Duration 1:08.294237											
Code	Count	MCNT	Recs/Sec	Avg len	Max Len	Byte/Sec	MB	%	Count	Scrubbed	
01 IN	6,025		88	719	2,170	63,719	4.3	4.7	6,025	5,326	
INPUT	6,025		88	719	2,170	63,719	4.3	4.7	6,025	5,326	
03 IN	1,412		20	634	799	13,179	0.8	1.0	1,412	1,412	
INPUT	1,412		20	634	799	13,179	0.8	1.0	1,412	1,412	
03 OUT	11,507		169	627	1,734	106,255	7.2	7.8	11,507	10,473	
OUTPUT	6,900		101	713	1,734	72,433	4.9	5.3	6,900	5,866	
MSG SWI	4,607		67	499	582	33,821	2.2	2.5	4,607	4,607	
07	3,588	7,405	52	456	456	24,060	1.6	1.8	3,588	0	
MPP	3,528	6,919	51	456	456	23,658	1.6	1.7	3,528	0	
QUICK	45	450	0	456	456	301	0.0	0.0	45	0	
ABEND	15	36	0	456	456	100	0.0	0.0	15	0	
08	3,590		52	156	156	8,235	0.5	0.6	3,590	0	
MPP	3,545		52	156	156	8,132	0.5	0.6	3,545	0	
QUICK	45		0	156	156	103	0.0	0.0	45	0	
11	1,078		15	68	68	1,078	0.0	0.1	1,078	0	
12	1,064		15	48	48	751	0.0	0.1	1,064	0	
...											
5957	32		0	150	150	70	0.0	0.0	32	32	
5958	78		1	49	49	56	0.0	0.0	78	0	
63	699		10	129	200	1,333	0.0	0.1	699	0	
66	4,916		72	60	60	4,337	0.2	0.3	4,916	0	
6705	118		1	776	1,040	1,347	0.0	0.1	118	0	
67FF	615		9	525	1,056	4,754	0.3	0.3	615	615	
6D	68		1	63	63	63	0.0	0.0	68	0	
7201	351		5	336	336	1,734	0.1	0.1	351	0	
7202	356		5	40	40	209	0.0	0.0	356	0	
Total	314,610		4,626	295	4,488	1,368,293	93.0	100.0	314,610	159,054	

Figure 50. Log Information report with scrub

Example 2: LOGINFO request

If the LOGINFO command is specified to request the Log Information report on its own without an accompanying report, the default ddname is LOGRPT. However, you can redirect the report output to another ddname by specifying the OUTPUT(ddname) operand.

For example:

```
//SYSIN DD *
REPORT LOGINFO OUTPUT(EXAMINE)
/*
```

V2R4M0	IMS V14.1		IMS Problem Investigator - Log Information						
Log data From 2014-03-07 18:22:43.121522			To 2014-03-07 18:22:44.129380			Duration		0:01.007858	
	----- In -----								
Code	Count	MCNT	Recs/Sec	Avg len	Max Len	Byte/Sec	MB	%	
9904	2		2	473	485	946	0.0	100.0	Data capture - changed data
Total	2		2	473	485	946	0.0	100.0	

Figure 51. Log Information report

Related reference:

“Scrubbing IMS log files” on page 67

Scrub removes sensitive or confidential information from selected IMS log files prior to inhouse analysis or sending offsite for problem determination. Use data scrubbing if you have this compliance requirement.

“SCRUB command” on page 404

The SCRUB command causes input log records to be scrubbed prior to report, extract or CSV processing. Use this approach to prevent sensitive or confidential data from being disclosed during log analysis, or if you want to send log files to IBM or another external location for problem determination.

ALZBATCH JCL statements

Explanation of ALZBATCH JCL which is used to process explicitly specified log files.

The JCL consists of the following statements:

JOB Job statement generated from **Job Statement Information** in the IMS PI Settings profile options.

EXEC PGM=ALZBATCH,PARM='parameter list'

Execute the IMS PI Log Reporter, ALZBATCH. The parameters are:

V<vrn>

The IMS release of the log file being reported. This parameter must be specified. It is generated from **IMS Release** in Process Log Files.

UPPER

Specify only if you want the report output in upper case. For example, specify UPPER if your printer does not support mixed case. This parameter is generated if you specify **YES** to **Reports in Upper Case** in the IMS PI Settings profile options. The default is mixed case (UPPER omitted).

NOHEAD

Specify only if you want the report to have no page headings. To specify this option from the dialog, select **Edit JCL before submit**, then add it to the EXEC PARM before submitting.

STEPLIB DD

Concatenated data sets:

1. The library (SALZLINK) containing the IMS PI executable load modules. This is generated from **IMS PI Load Library** in the IMS PI Settings of the Profile Options menu (0.1). You do not need to specify the name of this library if the modules reside in the system LNKLIST.
2. If applicable, the library (IMSPI.USERLOAD) containing the knowledge modules defined to IMS PI to format user log records. This is generated from **User Load Library** in the IMS PI Settings of the Profile Options

menu (0.1). You do not need to specify the name of this library if the modules reside in the system link list (LNKLST).

CEXDEF DD

IMS Connect Extensions Definitions Repository for the Connect system definition, otherwise the default repository from your profile settings. This data set contains the IMS Connect Extensions system definitions.

ALZCDS DD

The name of the **Control Data Set** (CDS) containing the Filters, Forms, Object Lists and IMS user log records required by the job.

LOGIN DD

The name of the log input data set to be processed by IMS PI.

DCB attributes for this data set must be RECFM=VB and DSORG=PS.

LOGIN is the default ddname for one input file. If more than one, ddnames are constructed by IMS PI in the format *Lxxxxnnn* to uniquely identify each input file.

Lxxxxnnn DD

The name of the log input data sets to be processed by IMS PI when multiple files are specified.

The data sets can be direct-access or tape. DCB attributes for the data sets must be RECFM=VB and DSORG=PS.

For merging multiple input files, the single LOGIN DD statement is replaced with a series of DD statements to uniquely identify each input file.

When generated from the dialog, the default format of the ddname for each explicitly specified file that is input to merge processing is *Lxxxxnnn* where:

L Identifies the data set as a log input file

xxxx Sequence number 0001-9999 corresponding to the order in which the files were specified. For best results, specify files in time sequence.

nnn 001

CEXIN DD

The name of an IMS Connect Extensions journal data set to be processed by IMS PI.

CEXIN is the default ddname for one journal data set when automated journal file selection is requested. If more than one, ddnames are constructed by IMS PI in the format *CEXxxxxnnn* to uniquely identify each input file.

CEXxxxxnnn DD

The name of IMS Connect Extensions journal data sets to be processed by IMS PI when there is more than one.

For merging multiple input files, the single CEXIN DD statement is replaced with a series of DD statements to uniquely identify each input file.

When generated by automated file selection for an IMS Connect system or systems, the default format of the ddname for each file that is input to merge processing is *CEXxxxxnnn* where:

CEX	Identifies the data set as an IMS Connect Extensions journal
<i>xx</i>	Identifying number 01-99 corresponding to the IMS Connect system
<i>nnn</i>	Sequence number 001-999 to order the journals in time sequence within system

SYSPRINT DD

The data set used by IMS PI for its messages and run time information. It must be specified and should be checked for error messages. For an explanation of these error messages, see “Message descriptions” on page 354.

It is usually defined as SYSOUT=* or SYSOUT=A.

LOGRPT DD

The data set that contains the report output. The ddname is specified in the OUTPUT parameter of the “REPORT command” on page 403. The default ddname is LOGRPT. You can request more than one report, but each report must specify a unique ddname.

LOGRPT is the default ddname for the Log Information report if it is requested alone by specifying the LOGINFO option, or you can redirect the output by specifying OUTPUT(*ddname*).

LOGINFO DD

This data set contains the Log Information report which is always produced if at least one IMS log record is processed. The report gives a synopsis of the log record types in the IMS log, including record count, lengths, rate per second, and volume. Selected record types are broken down further to provide additional information about transaction arrival and processing rates.

EXTRACT DD

Optional. The name of the **Extract Data Set** specified on the Submit Batch Request panel. The ddname is specified in the OUTPUT parameter of the “EXTRACT command” on page 400. The default ddname is EXTRACT. You can request more than one extract, but each must specify a unique ddname.

CSV DD

Optional. The name of the **CSV Data Set** specified on the Submit Batch Request panel. The ddname is specified in the OUTPUT parameter of the “CSV command” on page 398. The default ddname is CSV. You can request more than one CSV data set, but each must specify a unique ddname.

SYSIN DD

The IMS PI commands. The IMS PI dialog automatically generates the commands. A **SUB** line action on the Process Log Files panel initiates the batch request. IMS PI allows you to edit the commands prior to job submission. The START and STOP reporting period is optional.

For more information on the commands, see Chapter 32, “ALZBATCH: Report and extract utility,” on page 395.

Related concepts:

Chapter 32, “ALZBATCH: Report and extract utility,” on page 395

The IMS PI batch commands are used to request reports, extracts, and CSV files.

Related tasks:

“Creating a report, extract, or CSV from specified log files” on page 98
You can use the IMS Problem Investigator ISPF dialog to request a report, extract, or CSV file from one or more log files.

Related reference:

“JCL using specified journal data set” on page 172
The JCL to produce a report, extract or CSV from an IMS Connect Extensions journal data set is based on the SALZSAMP library member ALZCON.

Merging logs from multiple systems

IMS PI can merge data from multiple log input files from multiple IMS and IMS Connect systems. Records are processed (reported or extracted) in time sequence as if they were read from a single log file. The time sequence is determined by the STCK time stamp in the IMS log record suffix.

To process sysplex IMS log data, it is recommended that you use DBRC Log Selection. This will ensure that the correct SLDS (and optionally OLDS) log files for all systems are selected for your required reporting interval.

To use merge processing, you must replace the single LOGIN DD statement with a series of special DD statements.

The format of the ddname for log input merge processing is *Lxxxxnnn* where:

L Identifies a log input file

xxxx IMS Subsystem ID

nnn Sequence number 001-099 to determine the sequence of this log data set within the subsystem

Consider the following log input file specification for two IMS Subsystems (IMSA and IMSB), with two tape log files each:

```
//LIMSA001 DD DSN=IMSA.D03184.SLDS,...  
//LIMSA002 DD DSN=IMSA.D03185.SLDS,UNIT=AFF=LIMSA001,...  
//LIMSB001 DD DSN=IMSB.D03184.SLDS,...  
//LIMSB002 DD DSN=IMSB.D03185.SLDS,UNIT=AFF=LIMSB001,...
```

IMS PI merges the log records of subsystem IMSA with those of IMSB in time sequence as follows:

- Initially, files LIMSA001 and LIMSB001 are opened and the records from both systems are merged in time sequence.
- Records are processed as if they came from a single source, the result being that report and extract output will contain records from both systems inter dispersed.
- When file LIMSA001 reaches end-of-file it is closed and processing of LIMSA002 commences.
- When file LIMSB001 reaches end-of-file it is closed and processing of LIMSB002 commences.
- Files for IMSA and IMSB are processed independently. That is, when processing for IMSA subsystem switches from LIMSA001 to LIMSA002, IMSB subsystem processing may or may not have switched from LIMSB001 to LIMSB002.

Note: If your log files are tape data sets then:

- The job will require 1 tape drive per IMS Subsystem

- The second and subsequent log files for each subsystem should specify UNIT=AFF to avoid additional and unnecessary tape device allocation

DBRC Log Selection

DBRC Log Selection is an IMS PI facility that uses DBRC to select the log files from one or more IMS subsystems for report and extract processing. This facility offers an alternative to having to explicitly specify log input files. Simply by specifying the time period for which reporting is required, IMS PI will use DBRC to select the SLDS files covering that time period.

DBRC Log Selection can be used as:

- An alternative to specifying log input file names prior to report submission
- A facility to generate report JCL for submission by an automated job scheduler

The log files can be from one or more IMS Subsystems. Multiple IMS Subsystems can be, but are not limited to, subsystems participating in a sysplex. Sysplex support lets you merge log data from all systems participating in the sysplex to get a system-wide view of IMS events that require investigation.

DBRC Log Selection is requested by selecting option **4 Systems** or option **5 Groups** from the IMS PI Primary Option Menu, or from the action bar.

Related reference:

“START, STOP (FROM, TO) command” on page 405

START and STOP specify a report interval. Only log records with a STCK time stamp within the report interval are included in the report, extract or CSV. The report interval is optional when processing a specific log file, but mandatory for automated file selection or processing a log stream.

Preparing for DBRC Log Selection

To use DBRC Log Selection, you must first specify the details of the IMS subsystems.

Procedure

1. From the IMS Problem Investigator Primary Option Menu, select option **4 Systems** to display your table of IMS subsystems.
For the first time user of both IMS Problem Investigator and IMS Performance Analyzer, no IMS subsystems will be defined.
For a user upgrading from a previous release of IMS Problem Investigator, your IMS subsystems will automatically be available.
2. Enter the line action **S** against the IMS subsystem that is to be reported using DBRC Log Selection.
3. To go to the IMS Subsystem view that displays the DBRC Settings, enter View number 1 or use the Right function key (F11) or the Left function key (F10).
4. Review and update the details displayed for the selected IMS subsystem. For a description of the IMS subsystem details, see “Setting up an IMS subsystem for DBRC Log Selection” on page 324.

IMS Subsystem ID

The unique identifier of the IMS subsystem.

IMS Version (VRM)

IMS Version. IMS PI supports IMS versions 121, 131, and 141.

RESLIB Data Set

RESLIB data set name. The RESLIB data set must contain the DBRC API routine DSPAPI00. The RESLIB data set can also be used to determine the IMS version. If you do not specify the VRM explicitly, IMS PI will set the IMS version from information in module DFSVC000. You do not need to specify the RESLIB data set name if the modules reside in the system link list (LNKLST).

DBRC Subsystem ID

The DBRC Subsystem ID defines the DBRC Subsystem (SSID) that owns the SLDS entries.

Specify DBRC Subsystem ID when the SSID is longer than 4 characters or different to the IMS Subsystem ID.

- For IMS and DBCTL subsystems, the DBRC Subsystem ID is the IMSID value from IMSCtrl SYSGEN macro (four characters). In this case, DBRC Subsystem ID need not be specified. DBRC Log Selection uses the IMS Subsystem ID as the DBRC Subsystem ID.
- For Batch and Utility subsystems, specify the job name.
- For XRF, specify the RSENAME (Recovery Service Element) of the IMS Subsystems (active and alternate).

DBRC IMSplex name

Specify which IMSplex the DBRC should join.

DBRC Log Selection JCL is generated with the IMSPLEX parameter:

```
//ALZDBRC EXEC PGM=ALZDBRC,PARM='IMSPLEX=name'
```

The Group IMSplex specification is used for reporting on a group of systems.

The System IMSplex specification is used for System report requests, and is ignored when the System is part of a Group report request.

DBRC Sharing Group ID

Specify the DBRC group ID defined in the RECON data set used by the DBRC group.

DBRC Log Selection JCL is generated with the DBRCGRP parameter:

```
//ALZDBRC EXEC PGM=ALZDBRC,PARM='IMSPLEX=name,DBRCGRP=grp'
```

Specify IMSPLEX and DBRCGRP as you would when using the Database Recovery Control utility (DSPURX00):

```
EXEC PGM=DSPURX00,PARM='IMSPLEX=plexname,DBRCGRP=xxx,READONLY'
```

The Group DBRCGRP specification is used for reporting on a group of systems.

The System DBRCGRP specification is used when reporting on a system, and is ignored when reporting on a group.

RECON Data Set 1,2,3

The DBRC RECON data set names used by this IMS subsystem. DBRC requires at least two RECON data set names to be specified. The RECON data set names can be omitted if the MDA data set is specified.

MDA Data Set

The IMS MDA (MVS Dynamic Allocation) data set for this IMS subsystem. If the RECON data set names are not specified, IMS PI uses the MDA data set to determine the RECON data set names.

Log Data Sets are Cataloged

If the SLDS data sets are not cataloged, IMS PI will include UNIT, VOLSER, and LABEL parameters in the Report Set JCL. If cataloged, the parameters will be omitted.

It is recommended that if your IMS online systems use MDA to dynamically allocate the RECON data sets, then MDA should also be used for IMS Problem Investigator.

IMS Problem Investigator ensures RECON data set integrity by:

- Using the DBRC API
- Ensuring that there are no data set name conflicts between RECON and MDA specifications

Sometimes, it is not possible to allow users to have access to the DBRC RECON data sets, because the enqueue issued by the DBRC API can cause your IMS online system to wait. If this is a problem, take a copy of your live RECON data sets and instruct IMS Problem Investigator to use the copies by specifying the RECON copy data set names explicitly. For an example of how to do this, see “DBRC Log Selection using RECON copy data sets” on page 110.

5. After you have completed updating the subsystem information, exit the IMS Subsystem panel. You will notice that the DBRC indicator for the subsystem is set to **Yes**. This indicates that the IMS subsystem is eligible for report submission using DBRC Log Selection.
6. Repeat steps 2 on page 107 to 5 for each IMS subsystem that will use DBRC Log Selection.
7. Optional: Specify the DASD Work File Unit name. If your system does not have a default DASD Unit Name, such as SYSDA, then you will need to specify a unit name in your settings, otherwise you can use the system default. DBRC Log Selection uses temporary DASD work files when retrieving Log file details via DBRC. From the Primary Option Menu, select option **0.1 IMS PI Settings**. Specify the DASD Work File Unit Name for your system.

Security consideration

The Request Authorization exit ALZUAUTH ensures that the DBRC Log Selection utility ALZDBRC always uses the correct IMSPLEX identification settings.

An incorrect EXEC PARM='IMSPLEX=xxxxx,DBRCGRP=xxx' specification can inadvertently cause DBRC to change control information in the RECON data sets and disrupt IMS.

As a safeguard, consider installing the Request Authorization exit for IMSPLEX security. The authorization exit also provides a scrub option to prevent disclosure of sensitive or confidential data. The authorization exit and associated install JCL are supplied in sample library members:

- ALZUAUTH - Request Authorization exit
- ALZU002 - JCL to install ALZUAUTH

This completes the setup for DBRC Log Selection, and you are now ready to submit extract, CSV or report JCL using this facility.

Related reference:

“ALZUAUTH: Request Authorization exit” on page 435

ALZUAUTH is the Request Authorization exit. Apply USERMOD ALZU002 (supplied in the SALZSAMP library) to install and activate the exit.

“ALZU002: Install Request Authorization exit” on page 443

Apply USERMOD ALZU002 to install and activate ALZUAUTH, the Request Authorization exit.

DBRC Log Selection utility

IMS Problem Investigator DBRC Log Selection is performed in batch by the DBRC Log Selection Utility, ALZDBRC. Report JCL built by the dialog when DBRC Log Selection is requested differs from report JCL for explicitly specified log files.

Using DBRC Log Selection causes IMS Problem Investigator to execute two jobs:

1. The DBRC Log Selection Utility, which invokes DBRC to select Log files
2. Report processing, submitted by the DBRC Log Selection Utility

The DBRC Log Selection JCL is a single step job whose JCL is constructed from the options specified in the dialog.

The DBRC Log Selection Utility performs the following tasks:

- Selects the Log files for processing, by invoking DBRC
- Constructs the Report JCL, appending Log file DD statements at the end of the Report JCL skeleton
- Submits the constructed Report JCL

The execution of the report, extract or CSV batch commands takes place in a second job, submitted by the DBRC Log Selection Utility.

DBRC Log Selection using RECON copy data sets

DBRC Log Selection uses the standard DBRC interfaces to extract log file information and can access active RECON data sets or copy data sets.

The DBRC API service DSPAPI requires only READ access intent, with the READONLY=YES option.

However, some installations do not allow you to access the online RECON data sets for reasons which might include:

1. User batch jobs can cause IMS systems to wait, holding up critical transaction workload.
2. Before IMS version 10, update intent was required to access the RECONs.

When DBRC Log Selection cannot be used against active RECONs, an alternative is to use copies of the RECON data sets.

Creating copies of the active RECON data sets

JCL to create copies of the active RECON data sets.

Procedure

1. Modify the following JCL with the correct data set names of the RECON data sets and copy files.

```

//IMSPI    JOB ,NOTIFY=&SYSUID
/*
//DELETE   EXEC PGM=IDCAMS
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
DELETE ('OFFLINE.IMSP.RECON1' -
        'OFFLINE.IMSP.RECON2' -
        'OFFLINE.IMSP.RECON3')
SET MAXCC=0
/*
//DEFINE   EXEC PGM=IDCAMS
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
DEFINE CLUSTER (NAME('OFFLINE.IMSP.RECON1') -
                MODEL('IMSP.RECON1'))
DEFINE CLUSTER (NAME('OFFLINE.IMSP.RECON2') -
                MODEL('IMSP.RECON2'))
DEFINE CLUSTER (NAME('OFFLINE.IMSP.RECON3') -
                MODEL('IMSP.RECON3'))
/*
//REPRO    EXEC PGM=IDCAMS
//SYSPRINT DD  SYSOUT=*
//I1       DD  DISP=SHR,DSN=IMSP.RECON1
//O1       DD  DISP=SHR,DSN=OFFLINE.IMSP.RECON1
//I2       DD  DISP=SHR,DSN=IMSP.RECON2
//O2       DD  DISP=SHR,DSN=OFFLINE.IMSP.RECON2
//I3       DD  DISP=SHR,DSN=IMSP.RECON3
//O3       DD  DISP=SHR,DSN=OFFLINE.IMSP.RECON3
//SYSIN    DD  *
REPRO IFILE(I1) OFILE(O1)
SET MAXCC=0
REPRO IFILE(I2) OFILE(O2)
SET MAXCC=0
REPRO IFILE(I3) OFILE(O3)
SET MAXCC=0
/*

```

Figure 52. JCL for creating copies of the active RECON data sets

- 1** Active RECON data set names: IMSP.RECON n
 - 2** Copied RECON data set names: OFFLINE.IMSP.RECON n
2. Submit the job. Note that one of the REPRO requests may fail. This can occur against the spare RECON data set, but this is not a problem and can be ignored.

What to do next

Rerun the job periodically so that the copies contain the most recent SLDS data sets.

Changing the system definition

To use the RECON copies instead of the active RECON data sets, update the system definition to specify the data set names of the RECON copies.

Procedure

1. Edit the IMS subsystem definition.
2. Make the suggested modifications. The following system definition for IMS subsystem IMSP demonstrates how to specify the alternate RECON data set names.

IMS Subsystem More: < >

Command ==> _____

IMS Subsystem definition:

IMS Subsystem ID IMSP IMS Version (VRM) . . . 131 + 1

Description IMSP Production

RESLIB Data Set 'IMSP.SDFSRESL' 2

Specify required view . . 1

1. DBRC Settings	4. Groups
2. Log Files	5. OMEGAMON TRF Files
3. Monitor Files	6. OMEGAMON ATF Journals

Specify DBRC Settings for automated log file selection:

DBRC Subsystem ID (Specify RSENAME for XRF)

DBRC IMSPlex name (RECON Loss Notification)

DBRC Sharing Group ID (Parallel RECON Access)

RECON Data Set 1 'OFFLINE.IMSP.RECON1' 3

2 'OFFLINE.IMSP.RECON2'

3 'OFFLINE.IMSP.RECON3'

MDA Data Set 4

Enter "/" to select option JES2 options:

- Log Data Sets are Cataloged	(DBRC) Node . . . _____	SYSAFF . . . _____
- Use OLDS that are not Archived	(SLDS) Node . . . _____	SYSAFF . . . _____
- Use Secondary Log Data Sets		

Figure 53. Specify the alternate RECON data set names

- 1 Ensure that the IMS version is correct. Both DBRC Log Selection and batch reporting need this information to execute their correct version-dependent processors.
- 2 The RESLIB data set must contain the DBRC API module.
- 3 Specify the data set names of the RECON copies.
- 4 The MDA data set specification must be blank to ensure that the RECON copies are used.

Requesting DBRC Log Selection using the copies

There is no difference in the way you request DBRC Log Selection when using RECON copies.

Procedure

1. In the usual way, request batch reporting for the system or a group it belongs to.
2. On the submit panel, specify the required report interval, optional filter, and request an extract, CSV, report, any two, or all three.

Figure 54. Submit batch request using DBRC Log Selection

Figure 55. JCL for DBRC Log Selection using the RECON copies

If you requested to edit the JCL, an ISPF-style Edit panel will display the generated JCL like that in the following example. You can review or modify the JCL, then enter SUB in the Edit command line to submit the job.

```

//userid JOB ,CLASS=A,NOTIFY=&SYSUID
//*****
/* Job statements and values in < ... > are specified in the dialog. *
//*****
//ALZDBRC EXEC PGM=ALZDBRC[,PARM='IMSPLEX=<PLEXA>,DBRCGRP=<GRP>']
//STEPLIB DD DSN=<ALZ.V2R4M0.SALZLINK>,DISP=SHR
//CEXDEF DD <prefix.CEXDEF.REPOSTRY>,DISP=SHR CON
//SYSPRINT DD SYSOUT=*
//ALZPRINT DD SYSOUT=*
//ALZRDR DD SYSOUT=(*,INTRDR)
//ALZWRK1 DD SPACE=(TRK,(1,1,1)),UNIT=SYSDA
//ALZWRK2 DD SPACE=(TRK,(3,1)),UNIT=SYSDA
//SYSIN DD SPACE=(TRK,(3,1)),UNIT=SYSDA
//ALZPARM DD *
FROM=(<yyyy-mm-dd>[<-hh.mm.ss.th>])
TO=(<yyyy-mm-dd>[<-hh.mm.ss.th>])
IMSID=<imid>
SSID=<ssid>
VRM=<vrm>
CAT=<YES|NO>
OLDS=<YES|NO>
SLDS=<PRI|SEC>
RECON1=<recon1.dsn>
RECON2=<recon2.dsn>
RECON3=<recon3.dsn>
RESLIB=<ims.reslib.dsn>
MDA=<ims.mda.dsn>
HWSID=<xxxxxxx> CON
/*
//ALZSKEL DD DATA,DLM=$$
//userid JOB (ACCOUNT),'NAME'
/*
//ALZ EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrm>[,UPPER][,NOHEAD]'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//ALZCDS DD DISP=SHR,DSN=<prefix.IMSPI.CDS>
//SYSPRINT DD SYSOUT=*
//LOGRPT DD SYSOUT=*
//LOGIN DD DUMMY /* Log file insert point */
//EXTRACT DD DISP=OLD,DSN=<prefix.IMSPI.EXTRACT>
//CSV DD DISP=OLD,DSN=<prefix.IMSPI.CSV>
//SYSIN DD *
PAGELIM(10000)
ZONE(LOCAL)
START <yyyy-mm-dd-hh.mm.ss.th>
STOP <yyyy-mm-dd-hh.mm.ss.th>
REPORT [OUTPUT(LOGRPT)] [FILTER(<filter>)]
EXTRACT [OUTPUT(EXTRACT)] [FILTER(<filter>)]
CSV FORM(<form>) [OUTPUT(CSV)] [FILTER(<filter>)] [DELIMITER(<;>)] [LABELS]
CONNECT(<cc>) CON
TRF(<tt>)
/*
$$

```

Figure 56. JCL using ALZDBRC automated file selection

For automated file selection, IMS PI executes two jobs:

1. The first job executes the Automated File Selection utility ALZDBRC. This is a single step job that invokes DBRC to select IMS log files in the specified period. The JCL is generated from the options specified on the DBRC Log Selection and IMS Subsystem panels. This job selects the log files, constructs JCL inserting DD statements for the selected files at the position of //LOGIN DD DUMMY, then submits this as a second job.

CON indicates the additional statements required if processing Connect data. For automated Journal File Selection, the Connect system or systems (HWSID=) must be defined in the IMS Connect Extensions Definitions Repository (CEXDEF DD).

2. The second job is submitted by the first job. It executes the IMS PI Log Reporter ALZBATCH to produce the requested reports, extracts or CSV output for the specified time period using the files identified by the first job.

Splitting the log selection process and the reporting into two jobs enables IMS PI to avoid dynamic allocation of log files on tape devices. Leaving allocation of tape devices to JES or the initiator avoids potential job failures.

The JCL for the first job consists of the following statements:

JOB Job statement generated from **Job Statement Information** in the IMS PI Settings profile options.

EXEC PGM=ALZDBRC[,PARM='IMSplex=name[,DBRCGRP=grp]']

Execute the automated file selection utility.

For DBRC log selection, if the RECON data sets that you want to use belong to an IMSplex:

- Specify the name of the IMSplex in the PARM parameter. This is generated from the IMS Subsystem **DBRC IMSplex name**.
- The structured call interface (SCI) address space must be running on the system on which you want to run the automated file selection utility.

Specify the **DBRC Sharing Group ID** (DBRCGRP) defined in the RECON data set used by the DBRC group.

STEPLIB DD

The library containing the IMS PI executable load modules. This is generated from **IMS PI Load Library** in the IMS PI Settings profile options. You do not need to specify the name of this library if the modules reside in the system link list (LNKLST).

CEXDEF DD

The data set name of the IMS Connect Extensions definitions repository.

SYSPRINT DD

The data set used by the DBRC API for its messages and run time information.

ALZPRINT DD

The data set used by the automated file selection utility for its messages and run time information. It must be specified and should be checked for error messages. For an explanation of these error messages, see “Message descriptions” on page 354.

ALZRDR DD

Internal reader file. IMS PI submits JCL for the second job after automated file selection has completed.

ALZWRK1,2 DD

Work file data sets.

SYSIN DD

Work file data set.

ALZPARM DD

The parameter input for automated file selection:

FROM and TO

The **Report Interval** specified on the Submit Batch Request panel. The DBRC API selects the log files that are relevant to this period.

Performance Consideration: The Report Interval is also a useful way to reduce the amount of data processed by IMS PI.

HWSID

The ID of the IMS Connect system. If you specify HWSID, then you need to specify the data set name of the IMS Connect Extensions definitions repository in the CEXDEF DD statement. For processing a group with multiple IMS Connect systems, specify a separate HWSID for each system.

IMSID

The ID of the IMS subsystem. For sysplex processing, multiple subsystems can be specified. For an example, see “Merging logs from multiple sysplexes” on page 117.

For each subsystem, specify the following parameters immediately after the IMSID specification:

SSID The **DBRC Subsystem ID**. This only needs to be specified if it is longer than 4 characters or different to the IMS Subsystem ID.

VRM The **Release** of the IMS Subsystem.

CAT=YES|NO

Whether the log data sets are cataloged. If not, IMS Problem Investigator will include UNIT, VOLSER, and LABEL parameters in the JCL.

OLDS=NO|YES

Whether to use OLDS data sets in the event that SLDS files are not available for the requested reporting time period.

SLDS=SEC|PRI

Whether to use OLDS data sets in the event that SLDS files are not available for the requested reporting time period.

RECON1,2,3

The two or three **RECON data sets** used by this IMS subsystem. DBRC requires at least two RECON data sets to be specified. IMS PI calls the DBRC API to determine the relevant log files from the RECON data sets. These are ignored if the MDA data set is specified.

RESLIB

The **RESLIB data set** for this IMS subsystem. The DBRC API routine must reside in this data set.

The RESLIB data set can also be used to determine the IMS version. If you do not specify the VRM explicitly, IMS Problem Investigator will set the IMS version from information in module DFSVC000.

MDA The **MDA data set** (MVS Dynamic Allocation) for this IMS subsystem. IMS PI uses the MDA data set to determine the RECON data set names, and in turn DBRC determines the

relevant log files from the RECON data sets. You do not need to explicitly specify the RECON data set names if the MDA data set is specified.

ALZSKEL DD

The JCL skeleton for the second job. Automated file selection appends DD statements for the selected files and then submits the job.

The JCL for the second job is described in “ALZBATCH JCL statements” on page 103 but with an additional feature. The **LOGIN DD** statement for the one specified DASD log file is replaced by one or more **Lxxxxmm DD** statements for the log file data sets selected by the first job. These data sets may be on DASD, tape or cartridge.

To produce the reports, extracts or CSV output, IMS PI merges the log files in STCK time stamp sequence. For more information on the specialized DD statements for log file merge processing, see “Merging logs from multiple systems” on page 106.

Related tasks:

“Creating a report, extract or CSV from a group of systems” on page 96
Using automated file selection to automatically select relevant log files from a group of systems.

Related reference:

“Automated file selection” on page 95
IMS Problem Investigator batch processing can automatically select required files so you do not have to specify their data set names explicitly. Automated file selection is performed by the ALZDBRC utility. It locates the IMS log files and IMS Connect journal data sets for a specified time range when you request a report, extract or CSV for a system or group of systems.
“ALZDBRC: DBRC Log Selection” on page 415
Generic JCL to run Automated File Selection (DBRC Log Selection for IMS log data and Journal File Selection for Connect data), then automatically submit a job to run the IMS PI Log Reporter for the selected files.

Merging logs from multiple sysplexes

IMS PI DBRC log selection supports analysis of IMS transactions that run on different IMS systems on different sysplexes using different RECON data sets.

To analyze the IMS logs across sysplexes, define all the systems you want to process together in a single group. Each system in the group can have independent RECON data sets.

The following JCL shows two systems (in a group) with independent RECON specifications. IMS PI processes each system with their respective RECON data sets, and creates an extract of merged log records.

```

//userid JOB ,CLASS=A,NOTIFY=&SYSUID
/*
//ALZDBRC EXEC PGM=ALZDBRC
//STEPLIB DD DISP=SHR,DSN=ALZ.V2R4M0.SALZLINK
//SYSPRINT DD SYSOUT=*
//ALZPRINT DD SYSOUT=*
//ALZRDR DD SYSOUT=(*,INTRDR)
//ALZWRK1 DD SPACE=(TRK,(1,1,1))
//ALZWRK2 DD SPACE=(TRK,(3,1))
//SYSIN DD SPACE=(TRK,(3,1))
//ALZPARM DD *
FROM=(2013-05-05-10.00.00.00)
TO=(2013-05-05-11.00.00.00)
IMSID=IMS1
CAT=YES
VRM=121
RECON1=IMS1.RECON1
RECON2=IMS1.RECON2
RECON3=IMS1.RECON3
IMSID=IMS2
CAT=YES
VRM=121
RECON1=IMS2.RECON1
RECON2=IMS2.RECON2
RECON3=IMS2.RECON3
/*
//ALZSKEL DD DATA,DLM=$$
//userid JOB ,CLASS=A,NOTIFY=&SYSUID
$. $.
$$

```

Figure 57. Cross-sysplex analysis: JCL for DBRC Log Selection

You can create an extract file from each sysplex, then merge the extracts, either in the dialog or batch.

Command ==>		Process Log Files	Row 1 of 22 More: < >
			Scroll ==> CSR
Select a Log File to browse.		IMS Release <u>121</u> +	Zone _____
/	Log File	Rel + Filter + Zone	
S	'PLEX1.EXTRACT'	_____	_____
S	'PLEX2.EXTRACT'	_____	_____

Figure 58. Cross-sysplex analysis: Browse merge extracts

Submit extract files for batch merge processing.

Command ==>		Process Log Files	Row 1 of 22 More: < >
			Scroll ==> CSR
Select a Log File to browse.		IMS Release <u>121</u> +	Zone _____
/	Log File	Rel + Filter + Zone	
SUB	'PLEX1.EXTRACT'	_____	_____
SUB	'PLEX2.EXTRACT'	_____	_____

Figure 59. Cross-sysplex analysis: Merge extracts for batch reporting

The resulting JCL merges the two extract files to create a new combined extract.

```

//userid JOB ,CLASS=A,NOTIFY=&SYSUID
//IMSPI EXEC PGM=ALZBATCH,PARM=V121
//STEPLIB DD DISP=SHR,DSN=ALZ.V2R4M0.SALZLINK
//SYSPRINT DD SYSOUT=*
//ALZCDS DD DISP=SHR,DSN=IMSPI.CDS
//EXTRACT DD DISP=OLD,APPC.PROD.EXTRACT
//LOGRPT DD SYSOUT=*
//L0001001 DD DISP=SHR,DSN=PLEX1.EXTRACT
//L0002001 DD DISP=SHR,DSN=PLEX2.EXTRACT
//SYSIN DD *
ZONE(LOCAL)
START 2013-05-05-10.00.00.00
STOP 2013-05-05-11.00.00.00
EXTRACT
/*

```

Figure 60. Cross-sysplex analysis: One merged extract data set

Chapter 8. Formatting and analyzing logs with REXX

The ALZEXEC REXX environment provides an application programming interface (API) to IMS Problem Investigator. The commands allow you to analyze any of the file types that IMS Problem Investigator supports.

You can present the output of your REXX exec through the dialog or write it to a data set.

Running a REXX exec

You can run a REXX exec through the IMS Problem Investigator dialog or in batch.

In a filter, through the ISPF dialog

Specify your REXX exec in a filter. The exec runs when a user browses a record matching the log code and conditions. The REXX exec also runs when a user zooms on a field in the matching record. If you use the filter in batch, the REXX exec is ignored. See “Specifying a REXX exec in a filter” on page 306.

Directly through the ISPF dialog

Run a REXX exec in your SYSEXEC concatenation as:

- A line action in the process list panel.
- A primary command in file, record, or zoom mode.

In batch, using the ALZBATCH utility

See “REXX command” on page 404 for details of the batch command.

Related reference:

“Specifying a REXX exec in a filter” on page 306

For each log code in your Filter, you can specify the name of a REXX exec.

Sample REXX execs

REXX execs supplied in the sample library SALZSAMP.

ALZAPPLC

Display checkpoint PDIR segments (log code 4007) as a SYSGEN APPLCTN macro.

ALZDBASE

Display checkpoint DDIR segments (log code 4006) as a SYSGEN DATABASE macro.

ALZICONV

ASCII – EBCDIC translation using code page 1047.

ALZMSGT

Process IMS 01 log records and present the contents of messages spanning multiple segments and records in a merged view.

ALZRTCDE

Display checkpoint RCTE segments (log code 4083) as a SYSGEN RTCODE macro.

ALZTRANS

Display checkpoint SMB segments (log code 4004) as a SYSGEN TRANSACT macro.

ALXA0A4

For CON A0A4 fields ASCII – EBCDIC translation.

ALXDUMP

Create a formatted hexadecimal dump.

ALXFMT

Translate unprintable characters to periods (.), useful when creating formatted dumps.

The sample member ALZRXPY is provided to copy the sample REXX execs to your specified SYSEXEC library.

The SYSGEN macro generating execs are designed to run when you zoom on a relevant segment. As shown in the following screen example, you can automatically display SYSGEN macros when a user zooms on the segment by defining the samples in a filter.

File	Menu	View	Help
VIEW		Filter	Row 1 of 5 More: < >
Command ==>			Scroll ==> CSR
Filter SAMPRXX +			
Description . . . Zoom on segment to display SYSGEN		Activate Tracking	
/ Log Code + Exc Description			
- ALL Global Criteria for all Log Record Codes			
Level 1 Conditions No Form + REXX			

- IMS 4007		Checkpoint PDIR	
Level 1		Conditions No Form + REXX ALZAPPLC	

- IMS 4006		Checkpoint DDIR	
Level 1		Conditions No Form + REXX ALZDBASE	

- IMS 4083		Checkpoint RCTE	
Level 1		Conditions No Form + REXX ALZRTCDE	

- IMS 4004		Checkpoint SMB	
Level 1		Conditions No Form + REXX ALZTRANS	

***** Bottom of data *****			

Figure 61. Using the REXX samples in a filter

The supplied sample ALZTRANS can be invoked when processing SMB segments in 4004 records. The following example shows that when you zoom on an SMB segment, the REXX exec automatically runs and displays an SMB segment as a SYSGEN macro.

```

File  Menu  Format  Help
----- Field Zoom -----
  File  Menu  Help
-----
BROWSE      REA.IMSPI.IZDF.SLDS                      Line 00000000
Command ==>                               Scroll ==> CSR
***** Top of data *****
*      APPLCTN PSB=DAMPGM01,
      TRANACT CODE=(DAMTRAN3),
      AOI=NO,
      DCLWA=YES,
      EDIT=UC,
      FPATH=NO,
      INQUIRY=(YES,RECOVER),
      MAXRGN=10,
      MODE=SNGL,
      MSGTYPE=(SNGLSEG,RESPONSE,1),
      PARLIM=0,
      PROCLIM=(20,10),
      PRTY=(8,10,5),
      ROUTING=NO,
      SCHD=3,
      SEGNO=65535,
      SEGSIZE=0,

+0042  SBLMTCT... +5          SMCOUNT... +20          SMBTIME... 000A
+0048  SMBSAVPR... 00        SMBFLAG5... 00          SMBSIDR... 0000
+004C  SMBPDIR... 07571C40    SMBSEGNO... FFFF        SMBSEGSZ... 0000
+0054  SMBRGNS... +0          SMBPARLM... 0000
+0058  SMBFLAGB... SMB Flag word
+0058  SMBAOIFL... 00          SMBFLAG4... 00          SMBAOIPT... FFFF
+005C  SMBSSPND... 00000000    SBSMBPT... 07568ED0    SMBFNDCT... +0

```

Figure 62. The REXX exec displays an SMB segment as a SYSGEN macro

Related concepts:

Chapter 33, “Sample library SALZSAMP,” on page 409

The SALZSAMP library supplied with IMS PI contains JCL samples that you can tailor to suit your requirements.

Chapter 23, “Defining filters,” on page 281

Filters enable you to select the log records that you are interested in. For example, select only those records associated with a particular Transaction Code or User ID.

Related reference:

“Writing a REXX exec for filters” on page 126

Considerations for a REXX exec that is to be defined in filters.

“Specifying a REXX exec in a filter” on page 306

For each log code in your Filter, you can specify the name of a REXX exec.

Parts of a typical exec

This example shows the structure of typical ALZEXEC REXX.

```

/*ALZEXEC REXX example */
address ALZEXEC 1
address MVS 'NEWSTACK'
select 2
  when ALZ.MODE = 'F' then do /* Actions for file mode */
    "READ STEM(REC.) CODE(01)" /* Find next 01 record */ 3
    if REC.0 = 0 then do /* Actions if no matches found */ 4
      queue "No 01 records found"
    end
  end
end

```

```

:
:
else
  /* Actions when record found */
end
when ALZ.MODE = 'R' then do /* Actions for record mode */
  "FETCH STEM(FLD.) FIELD(*)" /* Fetch fields in record */ 5
:
:
end
when ALZ.MODE = 'Z' then do /* Actions for zoom mode */
  if value(ALZ.FIELD) = "MYVALUE" /* Actions for field value */ 6
:
:
end
queue "Execution completed"
"DISPLAY REPLACE" /* Show queued values in place of record */ 7
address MVS 'DELSTACK' /* Clear the stack */
exit 8

```

- 1 The statement address ALZEXEC sets the host command environment to the environment of IMS Problem Investigator.

Note: This statement is not required when your REXX is initialized from the IMS Problem Investigator ISPF dialog because the ALZEXEC environment is already set for you. While not required, it is recommended.

- 2 The select statement evaluates whether the user invoking the exec is browsing a file (F), a record within a file (R), or zooming on a field within a record (Z). Depending on how a user invokes the exec, you may want to initiate different actions. See “Determining the invocation mode” for details.
- 3 In file mode, this exec reads the first record with the log code 01 and returns values to the stem 'REC. '.
- 4 The READ command has set 'REC' as the stem (compound) variable. The variable REC.0 contains the number of records matching a filter or code.
- 5 In record mode, this exec fetches each field in the record.
- 6 In zoom mode, this exec evaluates the value inside the field.
- 7 The DISPLAY command outputs the content of the stack or stem variable. Depending on its parameters, it can output to a data set and the IMS Problem Investigator ISPF dialog.
- 8 The REXX clears the stack created at the start of the exec and exits. When the REXX exits, the output of the last DISPLAY command appears in the ISPF dialog.

Determining the invocation mode

A REXX exec can be invoked while browsing a log file, a record within the file, or a field within the record. The REXX exec can determine the invocation mode using the ALZ.MODE variable which is set by IMS Problem Investigator when the exec is initialized.

The following example shows an exec that counts the number of records with a given log code. If the REXX exec is invoked while browsing the log file, not having selected a record, the exec prompts you to enter which log code to count. If browsing a record within the log file, on the other hand, the exec gets the log code

of that record and counts all other records with the same code.

```
:
select
  when ALZ.MODE = 'F' then do /* File mode */
    say "Enter the log code you want to count:"
    pull usercode .
    "READ COUNT(9999) STEM(REC.) CODE("usercode")"
  end
  when ALZ.MODE = 'R' then do /* Record mode */
    "READ COUNT(9999) STEM(REC.) CODE("ALZ.LOGCODE")"
:
:
```

Figure 63. Example of using the invocation mode in a REXX exec

Reading a record

Use the READ command to position on a record, find a record, or fetch global fields.

Position on the first record in the file

```
"READ RRN(1) STEM(stem.)"
```

Position on the next record

```
"READ STEM(stem.)"
```

Position on the next record with a given code

```
"READ STEM(stem.) CODE(01)"
```

Position on the record from which the exec was initialized

```
"READ RRN("ALZ.RRN") STEM(stem.)"
```

Position on the record that returned data to stem1

```
"READ RRN("stem1.RRN") STEM(stem.)"
```

Position on the end of the file

```
"READ RRN(99999999) STEM(stem.)"
```

Position on the last record in the file with a given log code

```
"READ RRN(99999999) STEM(stem.)"
"READ PREV STEM(stem.) CODE(01)"
```

Get global fields from the record from which the exec was initialized

```
"READ RRN("ALZ.RRN") STEM(stem.) GLOBALS"
```

Fetching fields in the record

Examples of how you would typically use the FETCH command.

Fetch all fields

Fetch all fields in the currently positioned record:

```
"FETCH"
```

Test flag fields

Fetch a flag field and test its flag bits:

```
"FETCH FIELD(MSGFLAGS)" /*gets flag bits in field*/
if MSGFFIRST & MSGFLAST then do /*both flag bits on*/
  say "Message spans single record"
end
else do
  say "Message spans multiple records"
end
```

Note: Flag bit values are returned as either:

0 Flag bit off

1 Flag bit on

Fetch fields from a particular segment

Fetch fields in from a repeating segment in a record. In the example, fetching all fields in the third SMB segment:

```
"FETCH POSITION(SMB,3) FIELD(*)"
```

Fetch fields from another record

Fetch fields from another record (for example, an 01 record) and return to the current record:

```
/* Positions on an 01 record*/  
"READ CODE(01) STEM(stem.)"  
/* Retrieves 01 message text to MSG01.*/  
"FETCH FIELD(MSGXSTXT) STEM(MSG01.)"  
/* Returns to the current record */  
"READ RRN("ALZ.RRN") STEM(stem.)"
```

Exiting from a REXX exec

Consider the following when exiting from a REXX exec.

- Accumulate information in the stack or stem variable first, and only then issue the DISPLAY command. The information is displayed on exit.
- If you are using a stack, it is recommended that you get a new stack with:

```
address MVS 'NEWSTACK'
```

and then, after issuing the DISPLAY command, delete the stack with:

```
address MVS 'DELSTACK'
```

Writing a REXX exec for filters

Considerations for a REXX exec that is to be defined in filters.

Consider the following when writing a REXX exec that is to be defined in filters:

- If you only want to customize the panel when a user zooms on a field, exit on all modes other than zoom:

```
if ALZ.MODE <> 'Z' then exit 0
```

- Use any of the following display options to integrate your exec with IMS Problem Investigator panels:

```
"DISPLAY REPLACE"
```

or:

```
"DISPLAY PREPEND"
```

or:

```
"DISPLAY APPEND"
```

If you use any other display mode, exit with return code 4. Otherwise, IMS Problem Investigator shows the REXX formatted ISPF panel and then shows the original IMS Problem Investigator panel.

- If you want to use a filter solely to select the conditions for which to run REXX execs, include the ALL record type with no conditions in the exec.

Related reference:

"Sample REXX execs" on page 121

REXX execs supplied in the sample library SALZSAMP.

Writing a REXX exec that runs in batch

Consider the following when writing a REXX exec that runs in batch.

When your exec is initialized in batch:

- The mode is set to FILE.
- You cannot use direct-access READ syntax.
- You cannot read backwards (READ PREV).
- You cannot use the DISPLAY command. Instead, use functions such as 'say' to write to SYSTSPRT or the EXECIO command to write to another file.

ALZEXEC variables at initialization

The following table shows the variables that IMS Problem Investigator sets when it initializes the REXX exec. It also shows the modes in which these variables are set, whether file, record, or field (zoom) mode.

Table 1. REXX variables set on initialization

Variable	Description	Possible settings		Note
ALZ.ENV	Environment mode.	B	Batch	
		I	ISPF	
ALZ.MODE	The exec invocation mode.	F	File	
		R	Record	
		Z	Zoom (field)	
ALZ.IMSVRM	IMS version of the log file.	1410	V14.1	
		1310	V13.1	
		1210	V12.1	
ALZ.FILTER	The name of the filter. Blank if there is no named filter.	0 - 8 characters		
ALZ.RRN	The relative record number. The position of the record in the merged file.	8 decimal digits		
ALZ.LOGCODE	The log record code.	2-byte hexadecimal code		
ALZ.POSITION	The position of the current segment in relation to other segments in the record. See POSITION.	Variable length string formatted as: <i>segment_name</i> , <i>n</i> , <i>segment_name</i> , <i>n</i> , ...		1
ALZ.SEGMENT	The name of the segment.	Variable length string		1
ALZ.FIELD	The name of the field currently zoomed. To get the value stored in the field, use: <code>value(ALZ.FIELD)</code>	Variable length string: <i>field_name</i>		1
<i>field_name</i>	A variable with the name of the zoomed field, holding the value of that field.	Variable length string: <i>field_value</i>		1

Note:

- 1** Some variables apply to only some of the invocation modes. Segment position, segment name, field name, and field value only apply to zoom (field) mode.

ALZEXEC commands

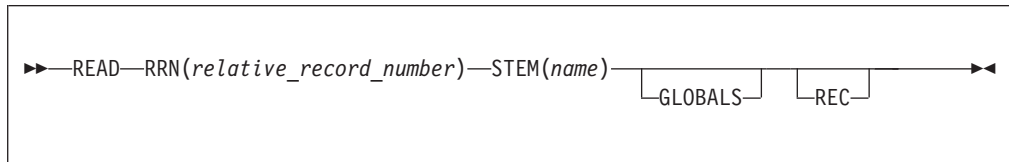
The ALZEXEC commands are READ, FETCH, and DISPLAY.

READ

The ALZEXEC READ command reads records and positions on them. The command has two forms: *direct access* and *sequential access*.

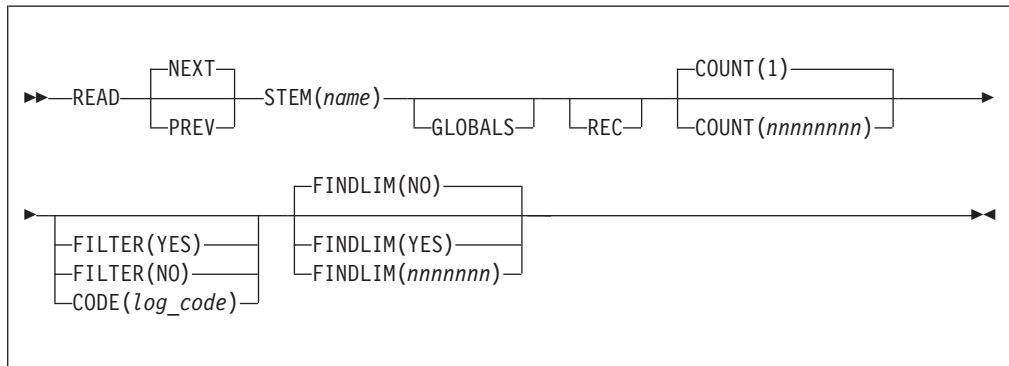
Format - direct access

The *direct access* form of the READ command reads and positions on a record with a given relative record number (RRN).



Format - sequential access

The *sequential access* form of the READ command reads and positions on the next or previous record; optionally, matching criteria.



Parameters

RRN(*relative_record_number*)

(Direct access only) Sets the record that is read and positions on that record. Subsequent sequential access READ commands will operate relative to this RRN.

If the record does not exist, then return code 8 is set and the position is set to the top of the file (RRN=0).

NEXT | PREV

(Sequential access only) Selects the next (NEXT) or previous (PREV) record relative to the current position.

STEM(*stem*)

Specifies the name of the stem variable set by this function. All variables will have the form:

stem.variable

The *stem* parameter can be up to 176 characters. For the names and descriptions of variables returned, see “Results” on page 130.

GLOBALS

Sets variables with the global fields. The variables are in this format:

stem.global_field_name

Where:

stem The name assigned in the STEM keyword.

global_field_name

The name of the global field. For example:

stem.IMSID

For the names of all global fields, see “Results” on page 130.

REC

Returns the data of the entire record in hexadecimal format. The READ function will place the data in this variable:

stem.REC

Where *stem* is the name assigned in the STEM keyword. The index (*i*) is set only if the COUNT parameter is present.

COUNT(*nnnnnnnn*)

(Sequential access only) Specifies the number of records to read. The default count is one. If you specify a number greater than 1, then each variable this function returns will be suffixed by an index number, in the form:

stem.varname.i

Where *i* is the record index number.

FILTER(**YES** | **NO**)

(Sequential access only) One of the following:

YES Activates the filter.

NO Deactivates the filter.

If you do not specify the FILTER parameter, the command uses the existing batch or ISPF filter settings.

CODE(*nn* | *nnnn*)

(Sequential access only) Specifies a log code number for filtering. The READ function returns only those records with the selected log code. If you specify a code it will override any other filtering option.

FINDLIM(**NO** | **YES** | *nnnnnnnn*)

(Sequential access only) Specifies the maximum number of records that the command can parse to find a matching record. The options are:

NO If required, parses until end of file (for NEXT), or start of file (for PREV).

YES Uses the FINDLIM value set through the program ISPF dialog.

nnnnnnnn

Parses up to *nnnnnnnn* records. Specify 1000 - 9999999 records.

If the limit is reached, the variable RC equals 1.

Results

The READ command returns the following variables to the stem:

0 Number of matching records found.

RRN

The relative record number.

LOGCODE

The log code of the record.

DESCRIPTION

The description of the log code.

DATE

The date stamp of the record. For example:

2009-03-16 Monday

TIME

The time stamp of the record. For example:

17.17.34.544527

STCK

The store clock time. For example:

BE82FEEAE80A0320

LSN

The logical sequence number. For example:

1-000000000002D4

If you specified GLOBALS, the read command may also return any of the following global fields to the stem:

- ABEND
- ClientID
- Code
- Database
- IMSID
- IMSRel
- ITASK
- LogToken
- LongLock
- LSN
- LTerm
- LUWID
- OrgUOWID
- Port
- Program
- RBA
- RecToken
- Region
- ResumeTP
- SSN
- Terminal
- TranCode
- URID
- Userid
- UTC
- Source

- User1, User2, User3, User4 (free-form fields)

Return codes

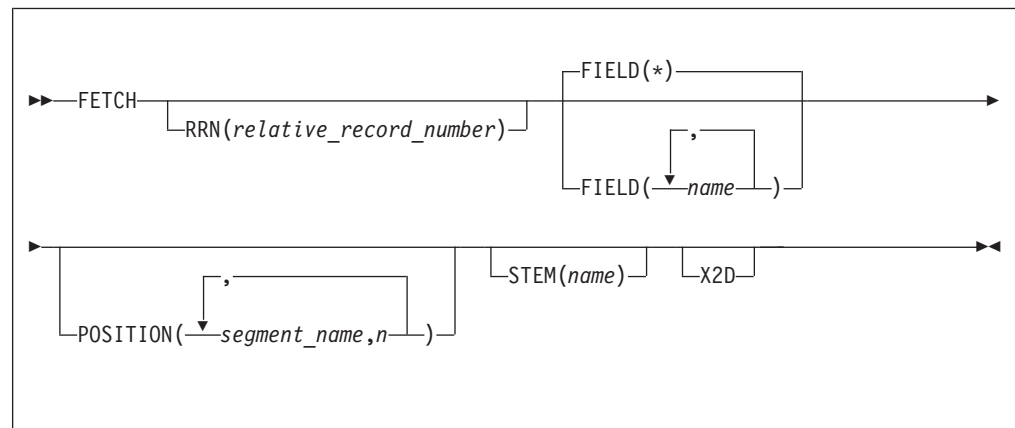
After the command runs it sets the REXX special variable RC to one of the following return codes:

- 0 Successful: field values retrieved and position set.
- 1 The limit set by the FINDLIM parameter reached.
- 2 End of file for NEXT parameter. Start of file for PREV parameter.
- 8 RRN not found. ALZ.ERRMSG set to “ALZ8000E” on page 380.
- 20 Unrecoverable error. For example, a syntax error or an I/O error. Message in SYSTSPRT log.

FETCH

The ALZEXEC FETCH command fetches fields from the record.

Format



Parameters

RRN(*relative_record_number*)

Retrieves fields from the specified record. Omit, to retrieve fields from the currently positioned record. You cannot use this parameter in batch.

FIELD(* | *name_list*)

Retrieves values for the fields you list, setting the values in variables with the names of the fields. If you do not specify the POSITION parameter, fields in repeatable segments will be ignored (if FIELD(*) is specified) or generate an error condition if you try and fetch them directly.

POSITION(*segment_name, n*)

Sets the segment from which to retrieve field values. The variable specifies the nesting level and segment number within the record. Up to six levels of nesting can be specified. For example, if this is the structure of the record:

```

SegA
  SegB
  SegB
    <To position here>
  SegB
  
```

then this value for the POSITION parameter retrieves fields from the second SegB segment in the record:

```
"...POSITION(SegmentA,1,SegmentB,2)..."
```

Note:

1. You must use the POSITION parameter to retrieve fields from repeatable segments.
2. If in zoom mode, the parameter
"...POSITION("ALZ.POSITION")..."

Sets the position to the current segment.

STEM(*stem*)

Specifies the name of the stem variable set by this function. All variables will have the form:

stem.VARNAME

The *name* parameter can be up to 176 characters.

X2D

Converts hexadecimal fields to decimal.

- Only fields that are 1 - 4 bytes long are converted to decimal.
- Flag fields are always returned as hexadecimal.
- Fields defined as integers are always returned as decimal.

Return codes

After the command runs it sets the REXX special variable RC to one of the following return codes:

- 0** Successful: field values fetched.
- 8** Match not found:

Record not found

The variable ALZ.ERRMSG is set to the message "ALZ8000E" on page 380.

Segment not found

The variable ALZ.ERRMSG is set to the message "ALZ8001E" on page 381.

Field not found

The variable ALZ.ERRMSG is set to the message "ALZ8002E" on page 381.

Field values ambiguous

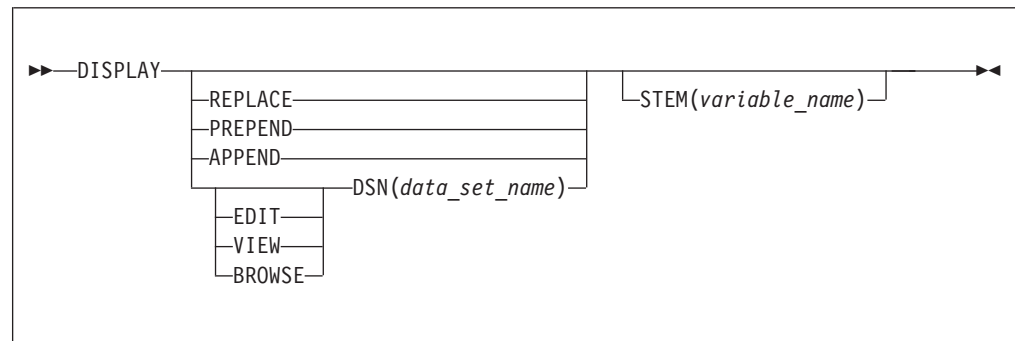
The variable ALZ.ERRMSG is set to the message "ALZ8003E" on page 381.

- 20** Unrecoverable error. For example, a syntax error or an I/O error. Message in SYSTSPRT log.

DISPLAY

The ALZEXEC DISPLAY command displays the contents of the stack or a stem variable in the ISPF dialog; optionally, to edit, view, or browse the data set. The DISPLAY command clears the stack.

Format



Parameters

REPLACE | PREPEND | APPEND

For record and field zoom: Displays the data (from the stack or the specified stem variable) in the record browse panel or field zoom pop-up window.

REPLACE

Replaces the normal contents of the panel.

PREPEND

Displays the data before the normal contents of the panel.

APPEND

Displays the data after the normal contents of the panel.

Note:

1. Do not use more than one DISPLAY command with PREPEND, APPEND, or REPLACE: if the exec is run from a filter, each DISPLAY command will overwrite the output of the previous command.
2. If you intend to use the exec in filters, then using REPLACE, PREPEND, or APPEND provides a more consistent experience to users than using EDIT, VIEW, or BROWSE.

EDIT | VIEW | BROWSE

For record and field zoom: Writes the data (from the stack or the specified stem variable) to a data set, and then displays the data in an ISPF Edit, View, or Browse panel.

EDIT

Outputs to a data set and displays the data in an ISPF Edit session.

VIEW

Outputs to a data set and displays the data in an ISPF View session.

BROWSE

Outputs to a data set and displays the data in an ISPF Browse session.

Note:

1. If the REXX exec exits with return code 0, the normal record browse panel or field zoom pop-up window is displayed after the user exits the ISPF Edit, View, or Browse panel. To suppress the display of the normal panel, set the REXX exec return code to 4.
2. If you use more than one DISPLAY command with EDIT, VIEW, or BROWSE, then each set of data (from the stack or the specified stem variable) is displayed in sequence, in its own ISPF panel.

3. If you use EDIT, VIEW, or BROWSE with a filter, it is recommended that you set return code 4 on exit. This ensures that the output replaces the normal panels.

DSN(*data_set_name*)

The name of the data set to output the data to. The name must be specified in uppercase. Only valid for EDIT, VIEW, or BROWSE.

STEM(*variable_name*)

Displays data from a stem variable, where:

variable_name.0

Holds the number of lines to display.

variable_name.n

Holds the contents of the *n*th line.

When not using a stem variable, the DISPLAY command pulls the data from the stack, clearing it in the process.

Return codes

After the command runs it sets the REXX special variable RC to one of the following return codes:

- 0** Successful.
- 20** Unrecoverable error. For example, a syntax error or an I/O error. Message in SYSTSPRT log.

Chapter 9. Investigating IMS-related problems

To analyze issues with your IMS systems, you need to know which log record types are useful for analyzing particular areas of IMS processing.

You can use IMS PI to investigate problems associated with, but not limited to, the following areas of interest:

- Transaction message processing
- Full-function database processing
- Application program processing
- Fast Path message and database processing
- IMS checkpoint processing
- Security
- External subsystem processing
- IMS system events
- Traces

This section provides the following information for each of these areas:

1. A table listing the IMS log records that contain information relating to problems in this area.
2. An example of a relevant log record with a description of the information in the log record that can help your investigation.
3. Sample IMS PI report output showing the formatted log record that shows:
 - A starting section that is common to all log records including the log code and description, and the STCK time stamp and log sequence number from the suffix.
 - The record is broken down into its various segment components. Each segment starts with a blank line and descriptive heading.
Where applicable, segments are broken down into their various sub-segments.
IMS PI not only maps the basic log record, but when necessary, includes additional macro mappings to provide the complete picture of log record fields.
 - Long fields, such as message text, are dumped in the usual hexadecimal and character format.

The IMS PI dialog displays log records in a similar format but has the added advantage of interactive viewing facilities such as navigation, tracking, FIND, labels and LOCATE, adjusting filters, switch to ISPF Browse mode, field zoom, and so on.

Zoom to any field allows you to:

- a. See a descriptive explanation
- b. Break down flags into their bit settings
- c. Format UTC and STCK time stamps

Related reading: When analyzing IMS-related problems, refer to the *IMS Diagnosis Guide* or *IMS Diagnosis Reference* to determine whether the IMS log contains the required information.

Transaction message processing

IMS log records related to Transaction message processing.

Table 2. IMS log records related to Transaction message processing

IMS log code	Description
01/03	IMS message placed on message queue
30	Message prefix was changed
31	A GET UNIQUE was issued for a message
32	A message was rejected; it was presumed to have been the cause of an application program ABEND
33	The queue manager released a record
34	A message was cancelled
35	A message was enqueued or re-enqueued
36	A message was dequeued or saved or deleted
37	Records marked as NO INPUT and NO OUTPUT are written by the sync point coordinator when all resource managers have completed Phase 1
3730	Syncpoint End of Phase 1
38	An input message was put back on the input queue when the application abnormally terminated
39	The output queue was freed during cleanup processing of a RELEASE call

Example

The following type 01 log record is for an OTMA message.

The formatted record includes:

- A starting section that is common to all log records including the log code and description, and the STCK time stamp and log sequence number from the suffix.
- The record is broken down into its various segment components. Each segment starts with a blank line and descriptive heading.
Notice the APPC segment for OTMA (DFSYPRE). The OTMA segment is itself broken down into its various sub-segments.
- Long fields, including the message text, are dumped in the usual hexadecimal and character format.


```

+0004 Code... 01      IMS Message
+0456 STCK... B786D28F6DFA8345      LSN.... 0000000002C6E1E1
      Date... 2011-04-24 Sunday      Time... 11.02.57.853352

+0000 MSGLRLL.... 0466      MSGLRZZ.... 0000      MSGLCODE... 01      MSGFLAGS... D1      MSGDFLG2... 81
+0007 MSGFPADL... 94      MSGMDRRN... 08000009      MSGRDRRN... 08000009      MSGPRFLL... 03DE      MSGCSW.... 00
+0013 MSGDFLG3... 00
+0014 MSGUOW.... Unit of Work (UOW) - Tracking
+0014 MSGORGID... 'IMSP '      MSGORGTK... B786D28F6DF73A85      MSGPROID... 'IMSP '
+002C MSGPROTK... B786D28F6DF73A85      MSGUFLG1... 00      MSGUFLG2... 00
+0036 MSGRSQTY... 00      MSGDOFS.... 0000      MSGDRBN.... 00000000

+0040 MSGSSEGM... Message Prefix System Segment; Item ID = 81
+0040 MSGSILL.... 0040      MSGSIID.... 81      MSGCFLG1... 00      MSGCFLG2... C8      MSGCFLG3... 00
+0046 MSGCQSF1... 00      MSGCQSF2... 00
+0048 MSGPTERM... Full Physical Input Terminal ID
+0048 MSGILINE... 00000000      MSGITERM... 00000000
+0050 MSGTISEQ... 1EAC      MSGPREFO... +0      MSGPREFI... +0      MSGSETS.... 00      MSGRES01... 00
+005C MSGRECCT... +0      MSGIDSTN... F0FFFFFF1CB1CC60      MSGODSTN... 'STOCK '
+0070 MSGIHSQN... 0000000000000000      MSGFMTNM... ' '

+0080 MSGEPHDR... Extended Prefix System Segment; Item ID = 86
+0080 MSGSILL.... 0010      MSGSIID.... 86      MSGEPTL.... 035E      MSGEPFL1... FC      MSGEPFL2... 00

+0090 DFSYPRE.... MVS APPC System Segment for OTMA; Item ID = 87
+0090 LUY_LENGTH..... 0270      LUY_ZZ.... 0000      LUY_MSG_PREFIX_TYPE..... 87
+0095 LUY_CONVERSATION_TYPE..... ' '      LUY_SYNC_LEVEL..... 'C'      LUY_MSG_TYPE..... 80
+0098 LUY_MSG_FLAG..... 84      LUY_RACF_OPT..... 'C'      LUY_TMAMCRSI..... 20
+009C LUY_LTERM..... 'FUN87047'      LUY_TRANCODE..... 'STOCK '
+00AC LUY_TOKEN..... B786D28F6DE591C5      LUY_FLAGS..... 00000000
+00B8 LUY_LUMBLK_TOKEN... 1CB1CC60      LUY_MEMBER_NAME.... 'OTMA0001 '
+00CC LUY_FRONTEND_SMQNM..... 0000000000000000      LUY_ASYNC_TOKEN.... 0000000000000000

+00E0 TMAMCTL... IMS XCF Message Control and Header Definitions
+00E0 TMAMCALV... 01      TMAMCMGT... 40      TMAMCRSI... 00      TMAMCCCI... 00      TMAMCTYP... 00
+00E5 TMAMCPFG... 00      TMAMCTNM... 'FUN87047'      TMAMCCHN... A0      TMAMCPFL... F0      TMAMCSSN... 0000097A
+00F4 TMAMCSNS... 00000000      TMAMCSNC... 0000      TMAMCRSC... 0000      TMAMCRSQ... 00000000      TMAMCSEQ... 0001

+0100 TMAMHDR... State Data Common Section
+0100 TMAMHLEN... 0048

+0102 TMAMHORG... State Data for Transaction messages
+0102 TMAMHIST... 00      TMAMHSYN... 20      TMAMHSLV... 01      TMAMHMAP... ' '
+010E TMAMHTOK... 00000000000000000000000000000000      TMAMHCOR... 7558C01000000000B786D28F6DB41F85
+012E TMAMHCID... 00000000000000000000000000000000      TMAMHLM... ' '      TMAMHLIU... 0000

+0148 TMAMSEC... Security Data
+0148 TMAMSLEN... 006A      TMAMSFLG... C3      TMAMSFLN... 52

+019E TMAMSUDS... Security Data for User IDs
+019E TMAMSULN... 09      TMAMSUTY... 02      TMAMSUID... 'STEVEN '

+01A8 TMAMSGDS... Security Data for Groups
+01A8 TMAMSGLN... 09      TMAMSGTY... 03      TMAMSGRP... 'CENTRAL '

+014C TMAMSFDS... Security Data for Utokens
+014C TMAMSRNL... 51      TMAMSRTY... 00
+014E TMAMSPRF...
+0000 50018055 55559555 55555555 55555555 55555555 55555555 55555555 55555555 55555555 *&.....n.....*
+0020 55555555 55555555 55555555 55555555 55555555 55555555 55555555 55555555 55555555 *.....*
+0040 B7939683 B0928615 0EAC9491 B1A5A5A5 *..loc.kf...mj.vvv *

```

Figure 64. Transaction message processing: IMS log code 01 (1 of 2)

```

+01B2 TMAMUSR.... User Data
+01B2 TMAMULEN... 014E
+01B4 TMAMUDTA...
+0000 C3D64040 00000001 00000040 00000008 FFFFFFFF 00000000 00000311 00000025 *CO .....*
+0020 D4D8C9D4 E2D74040 00000000 00000001 414D5120 4C50514D 20202020 20202020 *MQIMSP .....(<&.(.....*
+0040 3CC296F8 05D923D3 00000000 00000000 00000000 00000000 00000000 00000000 *.Bo8.R.L.....*
+0060 00000000 C3C1E3C1 4BD5E64B C3E4E2E3 D6D4C5D9 4BD9C5D7 D3E84BD8 E4C5D9E8 *....CATA.NW.CUSTOMER.REPLY.QUERY*
+0080 40404040 40404040 40404040 40404040 40404040 D4D8D3D7 40404040 40404040 * .....MQLP *
+00A0 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * ..... *
+00C0 40404040 D5E6C3E4 E2D9D840 40404040 00000000 00000000 00000000 00000000 * NWCUSRQ .....*
+00E0 00000000 00000000 00000000 00000000 40404040 40404040 40404040 40404040 * ..... *
+0100 40404040 40404040 40404040 40404040 40404040 00000000 40404040 40404040 * ..... *
+0120 40404040 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * ..... *
+0140 40404040 D4D8C9D4 E2E5E240 * .....MQIMSVS *
+0300 MSGSEC.... Security System Segment; Item ID = 88
+0300 MSGSILL... 0014 MSGSIID... 88 MSGRACUS... 'STEVEN ' MSGSAFNM... 'SAFRQ001' MSGUSIDI... 00
+0314 MSGWLM.... Workload Manager (WLM) System Segment; Item ID = 89
+0314 MSGSILL... 0010 MSGSIID... 89 MSGWLMSC... 00178000 MSGMGATM... B786D28F6DFA0145
+0324 MSGMSE.... Message System Extension; Item ID = 8A
+0324 MSGSILL... 0018 MSGSIID... 8A
+0328 MSGUTC.... Coordinated Universal Time (UTC)
+0328 MSGUDATE... 2011114F MSGUTIME... 110257853343 MSGUZONE... 020D
+033C MSGMSCE... MSC Extension System Segment; Item ID = 8B
+033C MSGMSELL... 005C MSGSIID... 8B
+0340 MSGMSEX... Coordinated Universal Time (UTC)
+0340 MSGMDATE... 00000000 MSGMTIME... 0000000000000000 MSGMZONE... 0000
+034C MSGMSEFL... Flags Multiple-System use
+034C MSGMSFL5... 00 MSGMSFL6... 00 MSGMSFL7... 00 MSGMSFL8... 80
+0350 MSGSQSID... 0000 MSGGSINM... 0000000000000000 MSGESONM... 0000000000000000
+0364 MSGMETRA... 0000000000000000 MSGMEVID... 0000000000000000000000000000000000 MSGDSSID... 0060
+037E MSGRSID... 0060 MSGMORID... 'IMSP ' MSGMMOTK... B786D28F6DF73A85
+0398 MSGMSC.... TMR System Segment; Item ID = 8C
+0398 MSGSILL... 0046 MSGSIID... 8C MSGMSCZ2... 00 MSGMSTRA... 00000060
+03A0 MSGMSVID... 0000000000000001 MSGMSONM... 'STOCKBMP' MSGMSINM... FFFFFFFF1CB1CC60
+03B8 MSGMSOID... 60 MSGMSIID... 60 MSGMSFL1... 01 MSGMSFL2... 4C MSGMSFL3... 40
+03BD MSGMSFL4... 08 MSGMSUID... 0000000000000000 MSGMSGID... 0000
+03C8 MSGMSPAD... 0000000000000000
+03D0 MSGMSCTS... Date and Time - Standard UTC
+03D0 MSGMSCDT... 00000000 MSGMSCTM... 00000000000000 MSGMSCZN... 0000
+03DC MSGIMSR... 06 MSGIMSL... 10
+03DE QLOGMSGD... Message Text
+03DE MSGXDLEN... 0078 MSGXFLG1... 03 MSGXFLG2... 00
+03E2 MSGXSTXT...
+0000 E2E3D6C3 D2C2D4D7 40E38885 408195A2 A6859940 A39640A3 88854083 A4A2A396 *STOCKBMP The answer to the custo*
+0020 94859940 E2A39683 9240D8A4 8599A840 89A240A3 8881A340 D78199A3 40D5A494 *mer Stock Query is that Part Num*
+0040 82859940 E7F0F1F2 F0F4F740 89A24081 A5818993 81829385 40819584 40998581 *ber X012047 is available and rea*
+0060 84A84086 96994084 859389A5 8599A840 40404040 *dy for delivery

```

Full-function database processing

Table 3. IMS log records related to full-function database processing

Example

The following type 50 log record is for a full-function database update.

The formatted record includes the following useful information:

- User ID and Program
- Database name and RBA
- Undo and Redo data so you can see what has changed

```
+0004 Code... 50      Database Update
+009C STCK... B96A36B719A19C00      LSN.... 00000000002D5CFD
      Date... 2008-05-13 Tuesday      Time... 22.22.50.259993

+0000 DLENGTH... 00AC      DLOGZZ.... 0000      DLOGCODE... 50      DLOGSCDE... 50      DLOGPSTN... 0008
+0008 DLOGRTKN... Recovery Token
+0008 DLOIMSID... 'IMSP '      DLOOASN.... 0000F0DB      DLOGCMN.... 00000000
+0018 DLOGSTCK... B96A36B719A15F00      DLOGVIMS... 82      DLOGDBF1... 63      DLOGDBF2... 00
+002A DLOGDBOR... 40      DLOGDSOR... 88      DPGMNAME... 'STOCKP '      DDBDNAME... 'STOCKDB1'      DDSID..... 01
+003D DDSID2.... 00      DLOGSLVL... 01      DLOGCALL... 20      DLOGRBA... 00002000      DLOGBLKO... 0000
+0048 DLOGSEQ... 000001CC      DLOGXTOF... 0000      DLOGDSOF... 006C      DLOGIDOF... 007A      DLOGTKOF... 0000
+0054 DLOGDLOF... 0000      DLOGKYOF... 0000      DLOGSPOF... 0000      DLOGUNOF... 0082      DLOGREOF... 008C
+0060 DDSTMP.... UTC Time Stamp
+0060 DDATE..... 2008133F      DTIME..... 222250258437      DZONE..... 008C

+006C DLOGDSHR... Data Sharing Section
+006C DLOGDSSN... 00000000      DLOGLSN.... 00000000000018E2      DLOGUSID... 18E2E298

+007A DLOGID.... RACF Userid Section
+007A DLOGUSER... 'STEVEN '
+0082 DLOGUNDO... Undo Data Section
+0082 DLOGDFLG... 80      DLOGDFUN... 40      DLOGDOFF... 01CC      DLOGDLEN... 0004
+0088 DLOGDDAT...
+0000 C7D6D6C4      *GOOD      *

+008C DLOGREDO... Redo Data Section
+008C DLOGDFLG... 80      DLOGDFUN... 40      DLOGDOFF... 01CC      DLOGDLEN... 0004
+0092 DLOGDDAT...
+0000 C2C1C45A      *BAD      *

+0096 DBCKCHN.... 0000E6C71670
```

Figure 66. Full-function database update: IMS log code 50

Application Program processing

IMS log records related to application program processing.

Table 4. IMS log records related to Application Program processing

IMS log code	Description
08	An application program was scheduled
07	An application program terminated
56FA	Transaction-level accounting statistics
09	SB (Sequential Buffering) statistics
0A08	A CPI communications driven application program was scheduled
0A07	A CPI communications driven application program terminated
11	A conversational program started
12	A conversational program terminated
41	A batch program or BMP program issued a checkpoint

Example

The following type 07 log record is for a Program Termination.

The formatted record includes the following useful information:

- Transaction Code, Program, Job Name and User ID

- Completion Code
- CPU time
- Accounting data, including DLI call counts

```

+0004 Code... 07      Application Terminate
+01B8 STCK... C62D26AFC2BF7802      LSN.... 00000000000009DB
      Date... 2010-06-24 Thursday    Time... 16.06.38.093303.500

+0000 DLRLL..... 01C8      DLRZZ..... 0000      DLRLTY.... 07
+0005 DLRNPSB.... 'CEXTPGM '      DLRTNCD... 'CEXTCONV'      DLRPTY.... 08
+0016 DLRTYPE.... 01      DLRTIME.... 00000CCC      DLREXTIM... 0.088457
+0028 DLRCMP..... 00      DLRCOMP.... 00000000
+002C DLRNJOB.... 'IBEHMPP8'      DLRNSTP.... 'REGION '      DLRCMNT.... +7

+0040 DLRACCT.... Accounting data from DFSDACCT
+0040 DLRGU1..... +0      DLRGN..... +0      DLRGNP..... +0
+004C DLRGHU..... +14      DLRGHN..... +0      DLRGHNP.... +0
+0058 DLRTSRT.... +7      DLRDLET.... +7      DLRREPL.... +7
+0064 DLRCLCNT... +35      DLRGUMES... +8      DLRGNMES... +7
+0070 DLRISMES... +14      DLRPUMES... +0      DLRSTNQ... +0
+007C DLRTSTWT... +0      DLRTSTDQ... +0      DLRCQCONQ... +0
+0088 DLRQCOWT... +0      DLRQCOWDQ... +0      DLRSUPNQ... +0
+0094 DLRSUPWT... +0      DLRSUPDQ... +0      DLREXCNQ... +0
+00A0 DLREXCWT... +0      DLREXCDQ... +0      DLRCMD..... +0
+00AC DLRGCMDB... +0      DLRCMGB... +0      DLRAUTH.... +0
+00B8 DLRSETO.... +0      DLRAPSB.... +0      DLRDPSB.... +0
+00C4 DLRGMSG.... +0      DLRCMD.... +0      DLRCMD.... +0
+00D0 DLRCHKP.... +0      DLXRST.... +0      DLRROLB.... +0
+00DC DLRROLS.... +0      DLRSETS.... +0      DLRSETU.... +0
+00E8 DLRINIT.... +0      DLRINQY.... +0      DLRSLOG.... +0
+00F4 DLRDEQ..... +0      DLRVSAMR... +0      DLRVSAMW... +7
+0100 DLRVSAMR... +0      DLRVSAMW... +0      DLRTOTIO... +7
+010C DLRESAF.... +98      DLRFLD..... +0      DLRPOS..... +0
+0118 DLRRLSE.... +0      DLRXSAVE... +0      DLRXRSTR... +0
+0124 DLRXCOPY... +0      DLRICAL.... +0
+0140 DLRUSID.... 'FUNTRM15'      DLRTSKID... 0000001A      DLRFLAG2... 20
+0155 DLRFLAG3... 80      DLRPSTNR... 0001
+015A DLRTOKN.... C9C1C4C74040404000000001600000007
+016A DLRNPGM.... 0000000000000000
+0174 DLRCPUID... 003521D120660000      DLRABRSN... 00000000
+018C DLRUSN.... 00000000      DLRTMEIO... 0.009358      DLRTMEPL... 0
+01A0 DLRIOCNT... +0      DLRSQ6TM... 180.100000
+01A8 DLRACCQ6... 191.200000
+01AC DLRUTC..... UTC Time Stamp
+01AC DLRDTE..... 2010175F      DLRTME..... 080638093296
+01B6 DLROFF..... 032C
+0148 DLRNWID.... '

```

Figure 67. Application Program termination: IMS log code 07

Fast Path message and database processing

IMS log records related to Fast Path message and database processing.

Table 5. IMS log records related to Fast Path message and database processing

IMS log code	Description
5901	An input message was received
5903	An output message was sent
5910	FP VSO I/O from Dataspace/CF
5911	An input message was inserted on an EMHQ structure
5912	FP VSO CIs hardened to DASD
5916	An output message was inserted on an EMHQ structure
5920	An MSDB was updated

Table 5. IMS log records related to Fast Path message and database processing (continued)

IMS log code	Description
5921	FP DEDB ADS Open
5922	DEDB area data set was closed
5923	DEDB area data set status was changed
5924	An ADS error queue element FLSD (EQE) was created
5936	An output message was dequeued
5937	A synchronization point operation completed
5938	A synchronization point operation was unsuccessful
5942	FP DMHR Dequeue
5945	FP Statistics
5947	Contains a bit map of CIs that have updates in an HSSP image copy data set
5950	A DEDB was updated
5951	Nonrecoverable suppression has taken place
5953	An online utility updated a DEDB
5954	A log record was created each time an area containing sequential dependent buffers was opened
5955	A new buffer for sequential Dependent segments was obtained
5956	Indoubt SDEP buffer from the resynchronization process
5957	Local/Global portion of DMAC logged
5958	An SDEP buffer was successfully written
5970	The MSDB relocation factor for XRF is shown
59FF	Track internal IMS/FP information

Example

The following type 5937 log record is for a Fast Path Transaction Sync Point.

The formatted record includes the following useful information:

- Program
- Completion Indicator
- Accounting data, including DEDB call counts

```
+0004 Code... 5937 Fast Path Sync Point
+00B0 STCK... B7E910B012BB2560 LSN.... 00000000A4F5F18A
      Date... 2011-07-11 Monday Time... 14.22.43.801010

+0000 SYNCRL... 00C0 SYNCRZZ... 0000 SYNCODE... 59 SYNCUBC... 37 SYNCRTYP... 20
+0007 SYNCRSV1... 00 SYNCRGID... 002F SYNCFAIL... 00 SYNCRSV3... 00 SYNCNAME... 'STOCKP '
+0014 SYNCDATE... Sync Point Time Stamp (UTC)
+0014 SYNCDATE... 2011192F SYNCTIME... 142243801008016D
+0020 SYNCPTYP... 40 SYNCPCON... 00
+0022 SYNCSTST... Start of Statistics Area
+0022 SYNCDECL... +34 SYNCDERD... +7 SYNCDEWT... +0 SYNCOVFN... +0 SYNCBFWT... +0
+002C SYNCBSTL... +0 SYNCNBA... +10 SYNCOTHR... +2 SYNCNRDB... +1 SYNCUOWC... +0
+0036 SYNCUOWW... +0 SYNCMSCL... +0
+003A SYNCFLG1... 00 SYNCFLG2... 00 SYNCRTKN... C9D4E2D740404001C947840000865B SYNCBPUF... +0
+004E SYNCBWT... +0 SYNCASIO... +0 SYNCVSOR... +2 SYNCVSRD... +0 SYNCVSWT... +2
+005C SYNC#GU... +14 SYNC#GN... +10 SYNC#GNP... +0 SYNC#GHU... +5 SYNC#GHN... +0
+0066 SYNC#HNP... +0 SYNC#ISR... +2 SYNC#DEL... +1 SYNC#REP... +2 SYNC#FLD... +0
+0070 SYNC#POS... +0 SYNCNTN... 0000000000000000 SYNCLGCI... +0 SYNCCOMB... +0
+007E SYNCSTCK... B7E910B012BB1460 SYNCCLKS... +0 SYNCAIOW... +0
+008C SYNCUOW... Unit of Work Identifier
+008C SYNC0IMS... 'IMSP ' SYNCOTKN... B7E910B012BADD40 SYNCPIMS... 'IMSP '
+00A4 SYNCPTKN... B7E910B012BADD40 SYNCUSF1... 00 SYNCUSF2... 00
```

Figure 68. Fast Path Sync Point: IMS log code 5937

IMS checkpoint processing

IMS log records related to IMS checkpoint processing.

Table 6. IMS log records related to IMS Checkpoint processing

IMS log code	Description
40xx	Checkpoint information
45xx	Checkpoint statistics
47	PSTs that were active in the system

Example

The following type 4506 log record is a Scheduling Statistics record written at Checkpoint time.

Statistics records provide a useful guide to the performance of your IMS resources including the IMS Message Queue, various Buffer Pools, TCBs, IRLM and many others.

```
+0004 Code... 4506 Scheduling Statistics
+0080 STCK... B96A33D8DF9AC100 LSN.... 00000000002D59C7
      Date... 2008-05-13 Tuesday Time... 22.10.00.367532

+0000 STATLEN.... 0090          STATZZ..... 0000          STATCODE... 45          STATTYPE... 06          STATID..... 'AS'

+0008 ST4506_STATS..... Scheduling statistics
+0008 ST4506_NOSCH..... +0          ST4506_NSDB..... +0
+0010 ST4506_NSCH..... +175          ST4506_BMPACT..... +1
+0016 ST4506_MPPACT..... +0          ST4506_NSMISC..... +83
+001C ST4506_SKCNT..... 0000F0D1
+0030 ST4506_PSBGETSTATS..... PSB Pool GET statistics
+0030 ST4506_PSBGRQSTS... +20          ST4506_PSBGNPPCCSA..... +0
+0038 ST4506_PSBGCOCOSA... +0          ST4506_PSBGFAILCSA..... +0
+0040 ST4506_PSBGNPPCDLI..... +0          ST4506_PSBGCODLI... +0
+0048 ST4506_PSBGFAILDLI..... +0          ST4506_PSBGNPPCBOTH..... +0
+0050 ST4506_PSBGTIMENCO..... 00000000001C5F00 ST4506_PSBGTIMECO..... 0000000000000000
+0060 ST4506_PSBFREESTATS..... PSB Pool Free statistics
+0060 ST4506_PSBFRQSTS... +110          ST4506_PSBFTIME.... 00000000008EE400
+0070 ST4506_PSBWGETSTATS..... PSB Work Area Pool GET statistics
+0070 ST4506_PSWGRQSTS... +111          ST4506_PSWGFAIL.... +0
+0078 ST4506_PSWGTIME.... 000000000068EA00
```

Figure 69. Scheduling Statistics at Checkpoint: IMS log code 4506

Security

IMS log records related to security.

Table 7. IMS log records related to Security

IMS log code	Description
10	A security violation occurred

Example

The following type 10 log record is for a Security violation.

SCERROR has a value of 66, indicating that an invalid Password was entered.

```

+0004 Code... 10      Security Violation
+002C STCK... B96AB0ADDA8EF600      LSN.... 00000000002E3DB6
      Date... 2008-05-14 Wednesday Time... 07.28.29.690095

+0000 SCDL..... 003C      SCDZZ..... 0000      SCRFLAG.... 10      SCFLAG1.... 40      SCERROR.... +66
+0008 SCNODE..... 'CENTRAL1' SCTRAN..... 'STEVEN '
+0018 SCDST..... Violation Time Stamp (UTC)
+0018 SCDATE..... 2008134F      SCTIME..... 072829690078      SCOFFSET... 008C
+0024 SCPGM..... 1CCB585000182740

```

Figure 70. Security violation: IMS log code 10

External Subsystem processing

IMS log records related to external subsystem processing.

Table 8. IMS log records related to External Subsystem processing

IMS log code	Description
55	Reserved for external subsystem information
56xx	IMS external subsystem support recovery

Example

The following type 5612 log record is an ESAF Sync Point event.

Information available includes:

- User ID and Program
- Recovery Token. You can use Tracking to link all events for this recoverable unit-of-work.

```

+0004 Code... 5612 External Subsystem - End of Phase 2 Syncpoint
+0058 STCK... B96A3411C73BFA01      LSN.... 00000000002D5C20
      Date... 2008-05-13 Tuesday Time... 22.11.00.036543

+0000 TPCPLL..... 0068      TPCPZZ..... 0000      TPCPCDE.... 56      TPCPSSTY... 12      TPCPSBCD... 0000
+0008 TPCPOSSN... 'IMSP '

+0010 TPCP55X.... Data Area for ESAF IMS use
+0010 TPCPNSS.... +0      TPCPSTN.... 0000      TPCPPSB.... 'STOCK ' TPCPUSID... 'STEVEN ' TPCPGRPN... 'CENTRAL1'
+002C TPCPRTKN... Recovery Token
+002C TPIMSID.... 'IMSP'      TPOASN..... 0000F0D2      TPCOMN..... 00000000
+003C TPCPFLGS... 00      TPCPCPUI... 7202746596720000      TPCPSIDD... 0000      TPCPSIDS... 0000

+004C TPCPDATA... Variable Data
+004C TPCPCKTZ... 12 byte Time Stamp in STCK format
+004C TPCPCLCK... B96A3411C73B9101      TPCPZONE... 00001AD2

```

Figure 71. ESAF Sync Point: IMS log code 5612

IMS system events

IMS log records related to IMS system events.

Table 9. IMS log records related to IMS system events

IMS log code	Description
06	IMS was started or stopped, plus other events
42	OLDS Switch

Example 1

The following type 06 log record identifies an IMS system event.

ACIDENT has a value of 04, indicating a FEOV on a System Log.

```
+0004 Code... 06      IMS Accounting
+0044 STCK... B7830830E9AD6943      LSN.... 00000000000012EF
      Date... 2011-04-21 Thursday      Time... 10.41.36.352982

+0000 ACLENG..... 0054      ACSPACE.... 0000      ACLFLAG.... 06      ACIMSID.... 'IMSA'      ACFFFF.... FFFFFF
+000F ACIDENT.... 04      ACSREN..... 0000000000000000      ACPRILOG_51..... 0000000000000000
+0024 ACDATE_51..... 00000000      ACTTIME_51..... 00000000
+002C ACPRILOG... PRILOG Start Time (UTC)
+002C ACPDATE.... 2011111F      ACPTIME.... 103507300000      ACPZONE.... 016D
+0038 ACDATE.... Current Time (UTC)
+0038 ACTDATE.... 2011111F      ACTTIME.... 104136352980      ACTZONE.... 016D
```

Figure 72. IMS system event: IMS log code 06

Example 2

The following type 42 log record is a Log Control record.

It includes information about the active IMS Log and the Restart Checkpoint Table, showing when system checkpoints were last taken.

```
+0004 Code... 42      Log Buffer Control
+0248 STCK... B78306DF269C1B41      LSN.... 00000000000000B6
      Date... 2011-04-21 Thursday      Time... 10.35.42.183873

+0000 ATLEN..... 0258      ATZZ..... 0000      ATFLAG.... 42      ATSYST.... 00      ATSYS..... 38
+0007 ATBATCH.... 00      ATBUFLEN... 00000600      ATDATE..... 00000224      ATRLNM.... 00000000      ATIMSNM.... 'IMSA'
+0020 ATRLID..... 0000      ATRLID.... 00      ATSHFL1.... 40      ATADDR.... 00B81000      ATDATESW... 00000230
+0030 ATLOGCTL... Start of section
+0030 ATPRITOK... 00000000      ATPRISTR... 0000023C      AT1STLSN... 0000000000000001      ATGSGNM.... '
+004C ATSGNM.... '      ATIMSID.... 'IMSA'      ATRSEN.... '

+0064 BCPBEGIN... Restart Checkpoint Table
+0064 BCPRVET.... 'RVET'      BCPOLRBN... 0200      BCPOFBYT... 0200      BCPOLBYT... 02B4      BCPBCPT.... 'BCPT'
+0078 BCPADDR... 0C26C000      BCPTRBN... 00000001      BCPTLRBN... 000000B4      BCPSIDX... 'SIDX'      BCPLCRE.... 'LCRE'
+00A4 BCPRE..... 'RRE'      BCPRVEND... FFFFFFFF      BCPIMSID... 'IMSA'      BCPIMSRL... 0121      BCPROLE... C1
+00E7 BCPCRTYP... 20      BCPSHDST... 01      BCPIRLM.... 00      BCPKCN... 00000000      BCPSSIDX... 00010040
+00F4 BCPDSETA... 00000002      BCPASTAB... 00000000      BCP42BLK... 00000000      BCP42OFF... 0000
+010C BCPSTCK... B78306DF269B8C01      BCPRSTID... 00000000000000000000000000000000
+0120 BCPOLDLG... 00000000000000000000000000000000
+013C BCPSTCK... 0000000000000000      BCPVUID... 0000000000000000      BCPRDSSW... 00000000
+0150 BCPSENEM... 'IMSA'      BCPCURR... 'CURR'      BCPCKID... 2011111F103541835653016D      BCPOLD... 'COLD'
+0178 BCPCKID... 2011111F103541835653016D      BCPOLCRE... 'LCRE'      BCPLCKID... 2011111F103541835653016D
+0194 BCPBMP.... 'OBMP'      BCPBMPID... 2011111F103541835653016D      BCPCCRB... 00000002      BCPCCRB... 00000002
+01AC BCPLCRBN... 00000002      BCPBMRBN... 00000002      BCPFPTH... 'FPTH'      BCPFCKID... 00000000000000000000000000000000
+01C4 BCPBCC.... 'BCC'      BCPMPID... 00000000000000000000000000000000
+01D8 BCPLDCID... 2011111F103541835653016D      BCPNPQ... 'SNPQ'      BCPNPID... 00000000000000000000000000000000
+01F4 BCPFCRBN... 00000000      BCPMPBN... 00000000      BCPLDRBN... 00000002      BCPNRRBN... 00000000      BCPDMPQ... 'DMPQ'
+0208 BCPQCKID... 2011111F103541835653016D      BCPQCRBN... 00000002
+0224 ATDATE.... Date/Time of Log
+0224 ATDATE.... 2011111F103201603517016D
+0230 ATDATESW... Time last Log Switch
+0230 ATDATESW... 2011111F103507300000016D
+023C ATPRISTR... PRILOG Start Time
+023C ATPRISTR... 2011111F103507300000016D
```

Figure 73. IMS system event: IMS log code 42

Traces

IMS log records related to traces.

Table 10. IMS log records related to traces

IMS log code	Description
67xx	Service trace. DFSERA10 and its associated exits can also format these records.

Example

The following type 6701 log record is a Communications Trace record.

DFSERA10 can also be used to analyze Trace records.

```
+0004 Code... 6701 Communications Trace
+0410 STCK... B78306F39A6D8F01 LSN.... 00000000000000D8
      Date... 2011-04-21 Thursday Time... 10.36.03.629784

+0000 CTLTH..... 0420      CTZZ..... 0000      CTTYPE.... 67      CTSUBTYP... 01      CTCALLID... 'CVCT'
+000C CTSEGN0.... 00
+0010 CTTUTC..... Time Stamp
+0010 CTDATE..... 2011111F      CTTIME..... 103603629775      CTTOFSET... 016D
+001C CTDUPID.... 'CVCT'

+0020 CTELDESC... Element Descriptor
+0020 CTELNAME... 'CLB'      CTELLEN.... 0100      CTELADDR... 115AF090
+0030 CTELDATA...
+0000 00000000 00000000 00000000 115C6720 00000000 00000000 00000000 00000000 * .....*.....*
+0020 0200003D 00000000 C3C5D5E3 D9C1D340 10020100 115AF190 00000000 00050007 *.....CENTRAL .... 1.....*
+0040 2011111F 10360354 115AF1F5 D1C3C800 00010000 115AF330 115AF190 80000000 *..... 15JCH..... 3.. 1.....*
+0060 00000000 00000007 00000000 115C6718 00000000 00000000 00000000 00000000 *.....*.....*
+0080 00000000 00000000 11543048 00000000 00000000 00000000 00000000 00000000 *.....*.....*
+00A0 00000400 00000000 000A000A 00000000 00000000 00000000 00000000 00000000 *.....*.....*
+00C0 00000000 14A0AA51 115AF140 E4E2C1C4 C5D7D6E3 00000000 00000000 00000000 *..... 1 USADEPOT.....*
+00E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*.....*

+0130 CTELDESC... Element Descriptor
+0130 CTELNAME... 'CTB'      CTELLEN.... 00E8      CTELADDR... 115AF190
+0140 CTELDATA...
+0000 115AF38C 115AF090 00000000 000B0000 00400000 002A0000 0000FFFF 00000000 *. 3.. 0.....*
+0020 00000000 115AF278 115AF2C8 00004040 40404040 40400000 00000000 00000000 *.... 2.. 2H..*
+0040 00000000 00000000 00000000 00000000 00000000 00000000 00008000 00000000 *.....*
+0060 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
+0080 00000000 00000000 00000000 20000000 00000000 00000000 00000000 00000000 *.....*
+00A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
+00C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
+00E0 00000000 00000000 *.....*

+0228 CTELDESC... Element Descriptor
+0228 CTELNAME... 'CRB'      CTELLEN.... 0050      CTELADDR... 115AF278
+0238 CTELDATA...
+0000 00000000 00000000 00000000 00008000 115AF190 00000000 00000000 00000000 *..... 1.....*
+0020 E3F3F2F7 F8D4E740 00000000 40404040 40404040 00000000 00000000 00000000 *T3278MX ....*
+0040 E3F3F2F7 F8D4E940 00000000 00000000 *T3278MZ .....*

+0288 CTELDESC... Element Descriptor
+0288 CTELNAME... 'O TP BUF' CTELLEN.... 02C8      CTELADDR... 115C6718
+0298 CTELDATA...
+0000 02C80088 00000000 00201770 80056F4E 115AF090 00100100 00001024 00800000 *.H.h.....?+. 0.....*
+0020 00053E9C 00000000 115C67A0 115C67A0 29800000 00000000 00000024 000000F1 *.....*.....*.....1*
+0040 90308450 00000000 80800000 44000000 00000000 00000000 00000000 00000000 *.d&.....*
+0060 0B35000E 00000000 00208012 00000000 00000000 00000000 00000000 00000000 *.....*
+0080 00000000 00440000 D0000040 0200003D 115AF090 C3C5D5E3 D9C1D340 D9C5C3D6 *..... 0.CENTRAL RECO*
+00A0 D9C44040 C06D0010 04800000 41080002 08000001 00000000 00000000 00000000 *RD .....*
+00C0 115C67E0 00000000 010303B1 90308000 01F88801 00020000 00000018 5018507F *.*. \.....8h.....&.*
+00E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
+0100 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
+0120 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
+0140 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
+0160 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
```

Figure 74. Communications trace: IMS log code 6701

Part 3. Transaction analysis

This part explores the versatility of IMS Problem Investigator in enabling comprehensive end-to-end analysis of IMS transactions.

Topics:

- Chapter 10, “Streamlining analysis using the IMS Transaction Index,” on page 149
- Chapter 11, “Analyzing CQS logs for IMS shared queue activity,” on page 163
- Chapter 12, “Analyzing IMS Connect Extensions journals,” on page 169
- Chapter 13, “Streamlining analysis using the IMS Connect Transaction Index,” on page 183
- Chapter 14, “Analyzing OMEGAMON TRF statistics,” on page 189
- Chapter 15, “Analyzing OMEGAMON ATF statistics,” on page 201
- Chapter 16, “Analyzing DB2 activity in IMS transactions,” on page 209
- Chapter 17, “Analyzing WebSphere MQ activity in IMS transactions,” on page 225
- Chapter 18, “Investigating IRLM Long Lock events,” on page 251
- Chapter 19, “Analyzing IMS trace table entries,” on page 263
- Chapter 20, “Analyzing IMS Repository Audit log streams and extracts,” on page 265

Chapter 10. Streamlining analysis using the IMS Transaction Index

The IMS Transaction Index is a specialized extract file created by IMS Performance Analyzer batch reporting from an IMS log file. Each record in the index represents an IMS transaction and contains cumulative information from the IMS log about that transaction.

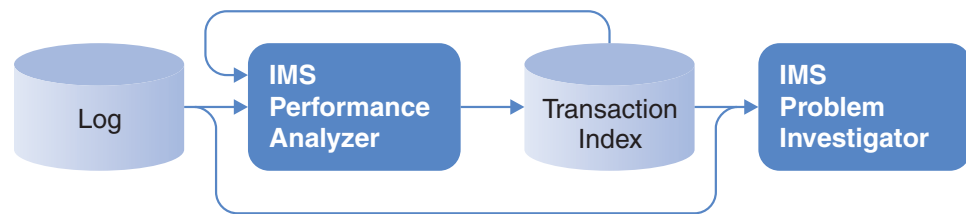


Figure 75. Creating and using an IMS Transaction Index

Uses of the IMS Transaction Index

After creating an IMS Transaction Index from IMS logs, you can save processing time by using it instead of, or together with, the logs for subsequent reporting.

The IMS Transaction Index can be used for the following purposes:

1. IMS Performance Analyzer (IMS PA) form-based transit reporting.

The IMS Transaction Index can replace the IMS log (SLDS) files as input for transit reporting. This significantly reduces the time and overhead of running IMS Performance Analyzer transit reports. It is recommended that you create the index once, either:

- At the end of the day in preparation for the next day.
- When the SLDS is created by the OLDS archive process for more timely analysis.

All subsequent transit report requests can use the index in place of the original IMS log files. The index will create reports in far less time because:

- The index is much smaller than the original log files, typically less than 10% in size.
- The IMS log records have already been interpreted, and all transaction report fields and performance metrics have been calculated and stored in the index.

2. IMS Problem Investigator (IMS PI) intelligent problem detection.

The IMS Transaction Index can be processed on its own or merged with the associated IMS log files in an interactive diagnosis session to provide improved levels of problem detection. For example, "Locate all transactions with response time greater than 1 second".

3. Generating your own reports using your favorite z/OS or PC-based reporting tool.

Record format and contents

IMS Transaction Index records have the format of IMS user log records, with a record code of X'CA01'.

The record mapping is provided by macro IPILCA01 in the IMS Performance Analyzer macro library. You can use IMS Performance Analyzer primary menu option 10 to create a new report form to view all the available transaction-level information that can be reported using form-based transit reporting.

The index record contains the information required to report all supported IMS Performance Analyzer report form fields, including:

1. Transaction identification
 - Transaction code, terminal, and other identifying names
 - Time stamp of when the transaction started or entered the system
 - All transaction types are comprehensively supported; including MPP, BMP, Fast Path, MSC (end-to-end), APPC (including CPI-CI), OTMA (including Connect and MQ)
2. Tracking tokens
 - Unit of work, recovery, OTMA, Connect, and other identifying tokens
3. Event time stamps
4. Performance metrics
 - Transit and response time breakdown
 - Processing delays, including Commit Mode 0 and 1 delays incurred while waiting for client acknowledgement
 - Additional response time components, including Resume Time elapsed time delays
 - ABEND and other processing failure indicators
5. Resource usage
 - CPU time
 - Full Function and Fast Path database calls
 - Database buffer, I/O and locking
 - Fast Path buffer, VSO and contention
 - External subsystem
 - Input and output message count and lengths

The inherent restrictions of form-based reporting still apply when using the IMS Transaction Index:

1. The type 07 application termination accounting record is required to provide resource usage estimates. In a WFI environment, these records may not be available in the log.
2. IMS V10+ type 56FA transaction-level accounting records are required for accurate and complete resource usage statistics.

Related reference:

“Displaying IMS Transaction Index record contents” on page 159

IMS Transaction Index records are processed like any other log record in IMS Problem Investigator. The index record is a consolidation of important information taken from the original log records for the transaction.

IMS PA: Creating and using the IMS Transaction Index for reporting

IMS Performance Analyzer creates the IMS Transaction Index. You can also use it for reporting.

The following topics explain how.

Creating the IMS Transaction Index

The IMS Transaction Index is requested from an IMS Performance Analyzer log report set and associated **INDEX** batch command.

Before you begin

Use the IMS Performance Analyzer dialog primary menu option 1 **System Definitions** to specify the IMS system details for the logs that will be used to create the IMS Transaction Index.

Procedure

1. From the IMS Performance Analyzer primary option menu, select option 3 **Report Sets** and then define a new log report set or edit an existing one.
2. From the log report set edit menu, select **IMS Transaction Index** in the form-based transit reports category.

EDIT Report Set - SAMPLOG Line 1 of 12
Command ==> Scroll ==> CSR
Description . . . Sample Log Report Set
Enter "/" to select action.

	** Reports **	Active
+ ---	Options	Yes
+ ---	Transaction Transit Reports	No
- ---	Transaction Transit Reports (Form-based)	Yes
---	Transit Options	No
---	List	Yes
---	Summary	Yes
S ---	Transaction Index	Yes
+ ---	Resource Usage & Availability Reports	Yes
+ ---	Fast Path Transit Reports	No
+ ---	Fast Path Resource Usage Reports	No
+ ---	Trace Reports	No
---	User-Written Reports	No
---	** End of Reports **	

Figure 76. IMS PA Log Report Set: select Transaction Index

3. Specify the name and disposition of the IMS Transaction Index output data set. Optionally, select additional data sections to include in the index.

SAMPLOG - Transaction Index

Command ==> RUN

Specify the Transaction Index data set name and disposition.

Name: 'JCH.WORKSHOP.INDEX' Disp: OLD

Optional Sections:

- ESAF (External Subsystems)
- Database Update Activity

Exception criteria for transactions:

- Abended
 - Exceeded elapsed time threshold
 - Processing . . 0.50 seconds (Time in dependent region)
 - Total 1.00 seconds (Input Q + Processing + Output Q)
- Include all transactions in the program switch sequence

Selection Criteria:

Object Type	Inc/Exc	Object +	List	Validation	Warning
Transaction Code	---	-----	-		
LTERM	---	-----	-		
Line	---	-----	-		
VTAM Node	---	-----	-		
Class	---	-----	-		
User ID	---	-----	-		

Figure 77. IMS PA: specify IMS Transaction Index data set name

4. Enter the RUN command to proceed with the request. When prompted, specify run-time options and press Enter to generate the JCL. The JCL is displayed in the ISPF editor.
5. Batch requests to create the IMS Transaction Index are submitted and processed in the same way as all other Report Set requests. For example, the following JCL generates the index file, writes it to data set JCH.WORKSHOP.INDEX, and also runs three additional reports:

```
//IMSPA   JOB ,NOTIFY=&SYSUID
//*
//IPI     EXEC PGM=IPIMAIN,PARM='V141'
//STEPLIB DD DSN=IMSPA.V440.SIPILINK,DISP=SHR
//* Input IMS log files
//LIZDE001 DD DISP=SHR,DSN=JCH.WORKSHOP.IZDE.SLDS
//LIZDF001 DD DISP=SHR,DSN=JCH.WORKSHOP.IZDF.SLDS
//* Transaction Index extract file
//IPITXOUT DD DSN=JCH.WORKSHOP.INDEX, 1
//          DISP=(NEW,CATLG), UNIT=SYSDA,SPACE=(TRK,(1,1),RLSE)
//TXRECAP DD SYSOUT=* 2
//SYSPRINT DD SYSOUT=*
//* Report Set Command Input
//IPICMD   DD *
          IMSPALOG INDEX( 3
                        [ESAF,] 4
                        [DBUPDATE,]
                        [ABEND,] 5
                        [PROCESS(9999),] default 0.50 seconds
                        [TOTAL(9999),] default 1.00 seconds
                        [PGMSWI,]
                        [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),] 6
                        [INCL(LTERM(list))|EXCL(LTERM(list)),]
                        [INCL(LINE(list))|EXCL(LINE(list)),]
                        [INCL(VTAMNODE(list))|EXCL(VTAMNODE(list)),]
                        [INCL(CLASS(list))|EXCL(CLASS(list)),]
```



```

                                [INCL(USERID(list))|EXCL(USERID(list))]]
IMSPALOG LIST,SUMMARY,IRUR 7
IMSPALOG EXECUTE

```

/*

- 1 The ddname IPITXOUT must be specified in the JCL to define the data set that will contain the IMS Transaction Index.
 - 2 The ddname TXRECAP must be specified in the JCL for the Recap report output.
 - 3 The INDEX batch command requests that the IMS Transaction Index is to be created.
 - 4 Specify ESAF or DBUPDATE or both to request that the index include additional information for external subsystems or database update activity or both.
 - 5 You can specify exception criteria so the index contains only problem transactions:
 - Specify ABEND to only include transactions that abended.
 - Specify one or both of the following options to only include transactions that exceed the specified elapsed time threshold (0.01 to 9999 seconds).
 - Specify PROCESS to only include transactions that have a processing elapsed time in the dependent region that exceeds the threshold (default 0.50 seconds).
 - Specify TOTAL to only include transactions that have a total transit time that exceeds the threshold (default 1.00 second).
 - Specify PGMSWI to include all transactions in the program switch sequence when at least one of them is an exception. This allows you to analyze the complete transaction set that resulted in the exception.
 - 6 Specify selection criteria to filter the input file by including or excluding records based on transaction code, LTERM, line, VTAM node, class, or user ID.
 - 7 Optional additional report requests.
6. Check or change the JCL, then on the ISPF editor command line, enter SUB to submit the job.
 7. When the IMS Performance Analyzer batch job has completed successfully, the Recap report gives the name of the IMS Transaction Index data set and the number of records written.

IMS Performance Analyzer	
<u>Transaction Index</u>	
IPITXOUT Transaction Index completed	
Data Set Name JCH.WORKSHOP.INDEX	
Record count:	
In	28
Filtered	27
Exceptions	3
Abend	1
Process Time	0
Total time	3
Out	4

Figure 78. IMS PA: IMS Transaction Index Recap report

8. The IMS Transaction Index is now ready to use.

Using the index for performance reporting

The IMS Transaction Index can be used in place of the IMS log (SLDS) files for subsequent IMS Performance Analyzer form-based transit report requests.

The following JCL shows the IMS log input files replaced by the IMS Transaction Index file (ddname LOGIN). The form-based SUMMARY and LIST report requests will use the index.

```
//IMSPA JOB ,NOTIFY=&SYSUID
/*
//IPI EXEC PGM=IPIMAIN,PARM='V141'
//STEPLIB DD DSN=IMSPA.V440.SIPLINK,DISP=SHR
/* IMS Transaction Index
//LOGIN DD DISP=SHR,DSN=JCH.WORKSHOP.INDEX
//SYSPRINT DD SYSOUT=*
/* Report Set Command Input
//IPICMD DD *
IMSPALOG SUMMARY(SECGROUP,PRECISION(6),
FIELDS(TRANCODE,TRANCNT,
INPUTQ,PROCESS,OUTPUTQ,TOTAL,CPU))
IMSPALOG LIST(SECGROUP,PRECISION(6),
FIELDS(LTERM,TRANCODE,STARTIMS,
INPUTQ,PROCESS,OUTPUTQ,TOTAL,CPU))
IMSPALOG EXECUTE
/*
```

The resulting reports will contain the same information as if they were created from the original IMS log files.

Note: The additional information for external subsystems or database update activity will only be available for reporting if the corresponding options (ESAF, DBUPDATE) were specified when the IMS Transaction Index was created.

IMS PI: Using the IMS Transaction Index to diagnose transaction problems

After creating an IMS Transaction Index using IMS Performance Analyzer, you can then use the index in IMS Problem Investigator to expedite transaction analysis.

The IMS Transaction Index can be analyzed on its own, or in conjunction with the IMS log files used to create it.

The following topics explain how to use the index in IMS Problem Investigator.

Preparing the IMS Transaction Index (optional)

IMS Performance Analyzer creates IMS Transaction Index records in the order that transactions complete their transit processing in the IMS log file, not when they start. You might find it best to work with a sorted index in IMS Problem Investigator so that records are in the more meaningful transaction arrival time sequence, particularly if merging with other log files.

IMS Problem Investigator expects log file data to be in time sequence so that:

1. Merging can display results in correct chronological order.
2. Time formatting aids (Relative and Elapsed) can display actual (positive) elapsed time deltas.
3. When merging IMS Transaction Index and IMS log files, the type CA01 index and the type 01 IMS transaction message records from which the index was derived, can be adjacent in the display.

Generate JCL to sort the IMS Transaction Index using the ISPF dialog:

1. From the IMS Problem Investigator primary option menu, select option 1 **Process**.
2. Enter the data set name of the IMS Transaction Index in the **Log File** column.
3. Enter line action SORT.

Note: Sorting the index is optional – IMS Problem Investigator can process an unsorted index. You might decide not to sort the index if you are processing it standalone and looking for individual transaction problems or issues, rather than viewing the file as a time line of system activity.

Example

The following JCL sorts the index file in (message arrival) time sequence using field ISO – the 26 character ISO date and time stamp.

```
//USR JOB (ACCOUNT), 'NAME'
//*
//*****
//* Sort the IMS transaction index
//*****
//SORT      EXEC PGM=SORT
//SORTIN    DD DISP=SHR,
//           DSN=JCH.WORKSHOP.INDEX
//SORTOUT    DD DISP=SHR,
//           DSN=JCH.WORKSHOP.INDEX.SORTED
//SYSOUT    DD SYSOUT=*
//SYSIN     DD *
            SORT FIELDS=(265,26,CH,A)
/*
```

Figure 79. Sample JCL to sort the index in transaction arrival time sequence

Related reference:

“Specifying log files” on page 73

From the IMS Problem Investigator Primary Option Menu, select option 1 **Process** to display the Process Log Files panel. Use this panel to explicitly specify log files

for interactive analysis or batch processing.

“IMS Transaction Index” on page 68

IMS Performance Analyzer creates IMS Transaction Index records in the order that transactions complete their transit processing in the IMS log file. The index is not sorted in transaction start time sequence. Sorting the index is optional, particularly if processing it standalone.

Starting to process the IMS Transaction Index

An IMS Problem Investigator diagnostic session is started by selecting one or more files to process. Typically for more efficient analysis, you might select the IMS Transaction Index together with the log files used to create the index. The files are merged and displayed as if they are a single data source.

In the following example, three files are selected: the (sorted) IMS Transaction Index and the two (shared queue sysplex) SLDS files used to create the index.

Process Log Files

Row 1 of 3 More: < >

Command ==> _____ Scroll ==> CSR

Select a Log File to browse. IMS Release 121 + Zone _____

/	Log File	Rel	+	Filter	+	Zone
S	'JCH.WORKSHOP.INDEX.SORTED'	_____	_____	CA01	_____	_____
S	'JCH.WORKSHOP.ICDE.SLDS'	_____	_____	_____	_____	_____
S	'JCH.WORKSHOP.ICDF.SLDS'	_____	_____	_____	_____	_____

***** Bottom of data *****

Figure 80. IMS PI: Merge the IMS Transaction Index and original log files

Notice the initial Filter setting of CA01. This instructs IMS Problem Investigator to display only the IMS Transaction Index records (their type is X'CA01' in the user log record range), hiding all other records from display until they are required.

Tip: Specify the index file before the IMS log files. This will ensure that the CA01 index record is displayed immediately above its associated type 01 IMS input message record.

The following browse panel is the list of all transactions contained in the index, matching the initial filter setting of CA01.

```

BROWSE      JCH.WORKSHOP.INDEX.SORTED                      Record 00000285 More: < >
Command ==> FILTER                                         Scroll ==> CSR
Forwards / Backwards . . .                               Time of Day . . 01.10.00.000000
Code Description                                         Date 2012-03-16 Friday      Time (LOCAL)
/ -----
-- CA01 Transaction TranCode=CEXTNONC Region=0001          01.09.31.616591
-- CA01 Transaction TranCode=CEXTNONC Region=0002          01.09.44.868338
-- CA01 Transaction TranCode=CEXTNONC Region=0001          01.09.55.133068
-- CA01 Transaction TranCode=CEXTNONC Region=0002          01.10.03.639285
-- CA01 Transaction TranCode=CEXTNONC Region=0001          01.10.49.089426
-- CA01 Transaction TranCode=ATMWDRAW Region=0002          01.10.56.568098
-- CA01 Transaction TranCode=CEXTNONC Region=0001          01.11.22.018775
-- CA01 Transaction TranCode=CEXTNONC Region=0002          01.11.33.341848
-- CA01 Transaction TranCode=CEXTNONC Region=0001          01.11.59.796991
-- CA01 Transaction TranCode=CEXTNONC Region=0001          01.12.38.636555
-- CA01 Transaction TranCode=CEXTNONC Region=0001          01.13.09.386813
. . .
***** Bottom of Data *****

```

Figure 81. IMS PI: Filtered list of IMS Transaction Index records

Locating the problem transaction using a filter

To narrow down the search for a problem transaction, you can use navigation aids and filtering criteria.

Navigate to a point in time in the log file using point-and-shoot to a time of day.

Use the **FILTER** command to change the active filtering criteria. Select the CA01 record in the filter to specify conditions that will help to locate the problem transaction.

```

File  Menu  View  Help
VIEW                                     Filter                      Row 1 of 1 More: < >
Command ==>                             Scroll ==> CSR

Filter . . . . . +
Description . . . New Log Record Filter      _ Activate Tracking

/ Log Code + Exc Description
S IMS CA01      Transaction
                Level 1   Conditions No   Form      + REXX
-----
***** Bottom of data *****

```

Figure 82. IMS PI: Specify a filter for the IMS Transaction Index CA01

Filtering against the IMS Transaction Index record type allows you to specify conditions based on any attribute of the transaction, including its performance.

The following condition requests that only transactions with a processing time greater than 2 seconds are selected for display.

Command ==> _____		Conditions	Row 1 to 1 of 1
			Scroll ==> <u>CSR</u>
Code: CA01 Transaction			
/	Field Name +	Oper Value +	
	PROCESS	GT 2.0	
***** Bottom of data *****			

Figure 83. IMS PI: Specify filter conditions for the IMS Transaction Index CA01

Tracking the problem transaction

When you have located the problem transaction, you can use tracking to view all IMS log records associated with the transaction.

Use the **TX** line action against the required IMS Transaction Index record to initiate transaction tracking, as shown in the following figure.

BROWSE	JCH.WORKSHOP.INDEX.SORTED	Record 00000317	More: < >
Command ==> _____		Scroll ==> <u>CSR</u>	
Forwards / Backwards . . .		Time of Day . . . 01.10.00.000000	
Code Description		Date 2014-03-17 Monday Time (LOCAL)	
/	-----		
—	CA01 Transaction	01.09.44.868338	
	UTC=17.09.44.868329 TranCode=CEXTN0NC Program=CEXTPGM Userid=FUNTRM46		
	LTerm=FUNTRM46 Terminal=SC0TCP46 Region=0002		
	OrgUOWID=ICDE/BE8300B0685A9642 IMSID=IZDE IMSRel=121		
	RecToken=ICDE/0000000300000000		
	CPU=199.999949 InputQ=0.007895 Process=2.645721		
	TotalTm=2.653616 RegTyp=MPP DBCalls=5		

TX	CA01 Transaction	01.10.56.568098	
	UTC=17.10.56.568088 TranCode=ATMWDRAW Program=ATMPROG Userid=NEWYORK		
	LTerm=NEWYORK Terminal=NYATM001 Region=0002		
	OrgUOWID=ICDE/BE8300F4C92D4A23 IMSID=ICDF IMSRel=121		
	RecToken=ICDF/0000000300000000		
	CPU=199.999949 InputQ=0.008634 Process=2.564080		
	TotalTm=2.572714 RegTyp=MPP DBCalls=5		

—	CA01 Transaction	01.12.38.636555	
	UTC=17.12.38.636547 TranCode=CEXTN0NC Program=CEXTPGM Userid=FUNTRM48		
	LTerm=FUNTRM48 Terminal=SC0TCP48 Region=0001		
	OrgUOWID=ICDE/BE830156203C5B20 IMSID=ICDE IMSRel=121		
	RecToken=ICDE/0000000900000001		
	CPU=66.666650 InputQ=75.978279 Process=2.186935		
	TotalTm=78.165214 RegTyp=MPP DBCalls=3		

***** Bottom of Data *****			

Figure 84. IMS PI: Initiate transaction tracking for the problem transaction

Transaction tracking displays only those records associated with the problem transaction.

If it is a long-running transaction with program switches, you can then use line action **TU** to isolate the units of recovery.

Analyzing transaction time line and event latencies

IMS Problem Investigator offers you alternative ways to analyze when events occurred and the elapse time between them.

1. Enter line action **R** to display relative time – for example, time since the start of the transaction – as shown in the following figure.

```

BROWSE   JCH.WORKSHOP.INDEX.SORTED                      Record 00000715 More: < >
Command ==>                                         Scroll ==> CSR
Forwards / Backwards . . . . . Time of Day . . . 01.10.00.000000
Code Description                               Date 2014-03-17 Monday Time (LOCAL)
/ -----
R CA01 Transaction TranCode=ATMWDRAW Region=0002      01.10.56.568098
  01  Input Message TranCode=ATMWDRAW                  +0.000000
  35  Input Message Enqueue TranCode=ATMWDRAW          +0.000016
  33  Free Message                                     +0.004522
  08  Application Start TranCode=ATMWDRAW Region=0002  +0.006010
 5607 Start of UOR Program=ATMPROG Region=0002        +0.006011
  01  Input Message TranCode=ATMWDRAW                  +0.008618
  31  DLI GU TranCode=ATMWDRAW Region=0002             +0.008628
 5616 Start of protected UOW Region=0002              +0.009376
  20  Database Open Database=ACCOUNTS Region=0002    +0.092504
  20  Database Open Database=ACCOUNTS Region=0002    +0.144345
  5E  SB Handler requests Image Capture Region=0002  +0.147327
  5E  SB Handler requests Image Capture Region=0002  +0.147329
  50  Database Update Database=ACCOUNTS Region=0002  +0.196349
  50  Database Update Database=ACCOUNTS Region=0002  +0.198155
  50  Database Update Database=ACCOUNTS Region=0002  +0.198195
  50  Database Update Database=ACCOUNTS Region=0002  +0.198618
  50  Database Update Database=ACCOUNTS Region=0002  +0.198678
  03  Output Message Response LTerm=NEWYORK           +2.219906
  35  Output Message Enqueue LTerm=NEWYORK Region=0002 +2.219921
  37  Syncpoint Region=0002                           +2.219941
  37  Syncpoint message transfer Region=0002          +2.234516
  33  Free Message                                     +2.238445
  03  Output Message Response LTerm=NEWYORK           +2.243091
  35  Output Message Enqueue LTerm=NEWYORK            +2.243123
  31  Communications GU LTerm=NEWYORK                 +2.243159
  36  Output Message Dequeue LTerm=NEWYORK            +2.246271
  33  Free Message                                     +2.247009
  33  Free Message                                     +2.571643
 5612 End of Phase 2 Syncpoint Program=ATMPROG        +2.572706
  07  Application Terminate TranCode=ATMWDRAW Region=0002 +2.575399
***** Bottom of Data *****

```

Figure 85. IMS PI: Analyze transaction time line and event latencies

2. Alternatively use the **E** line action to display event latency elapsed times – the elapsed time between log record events.
3. Use the **W** line action to revert back to wall clock time.

Displaying IMS Transaction Index record contents

IMS Transaction Index records are processed like any other log record in IMS Problem Investigator. The index record is a consolidation of important information taken from the original log records for the transaction.

The following figure shows a formatted IMS Transaction Index record displaying all the fields contained in the record.

```

BROWSE      JCH.WORKSHOP.INDEX.SORTED      Record 00000715 Line 00000000
Command ==>
Form ==> CA01 + _ Use Form in Filter      Scroll ==> CSR
Format ==> STD
***** Top of data *****
+0004 Code... CA01 Transaction
+03B8 STCK... BE8300F4C9322443      LSN.... 0000000000000028
      Date... 2012-03-16 Friday      Time... 01.10.56.568098.266

+0000 LL..... 03C8      ZZ..... 0000      Type..... CA
+0005 Subtype... 01      Vers..... 'IPI440'

+0078 ID..... Transaction Identification section
+0078 TranCode... 'ATMWDRAW' Program.... 'ATMPROG '
+0088 Userid..... 'NEWYORK ' ITerm..... 'NEWYORK '
+0098 LTerm..... 'NEWYORK ' LTermOut... 'NEWYORK '
+00A8 Terminal... 'NYATM001' LTermOvr... '
+00B8 TMember0... ' ParentTC... '
+00C8 FPRoutCd... '
+00D0 UTC..... IMS transaction start time (UTC)
+00D0 UTC..... 2012075F171056568088000C
+00DC ISO..... IMS transaction start time (local)
+00DC Date..... '2012-03-15'
+00E7 Time..... '17.10.56.568088'
+00F8 LogonTK.... 0000000000000000      OtmaSSN.... 00000000
+0104 CommitMd... ' SynchLvl... '

+0028 Base..... Transaction Tracking section
+0028 Org..... Originating Tracking Unit-of-Work (UOW) ID
+0028 OrgID..... 'ICDE ' OrgTK..... BE8300F4C92D4A23
+0038 Pro..... Processing Tracking Unit-of-Work (UOW) ID
+0038 ProID..... 'ICDE ' ProTK..... BE8300F4C92D4A23
+0106 RecToken... C9F9C4C6404040400000000300000000
+0116 IMSFE..... 'ICDE ' IMSID..... 'ICDF ' PSTID..... 0002
+0128 TrSeq#..... +1 TSSize..... +1 RegType.... 'MPP'
+0133 JobName.... 'ICDFMSG2' StepName... 'REGION '
+0143 DDname..... 'LICDE001' Class..... 0000 Priority... 08
+014E PgmSwit.... +0 OrgVRM..... 1110 ProVRM..... 1110

+0158 Transit.... Transaction Transit accounting section
+0158 InputQ..... 0.008634 Process.... 2.564080 OutputQ.... 0
+0170 OutputL.... 0.000038 OutputG.... 0.023201 TotalTm.... 2.572714
+0188 RespIMS.... 2.243167 SwitTime... 0 SchedTm.... 0.002622
+01A8 UORTTime... 2.566692 CM0Delay... 0 CM1Delay... 0
+01C0 OutRTIMS... 0 TotRTIMS... 0
+01D0 CPUtime.... 199.999949 WFitime.... 0 FPEMHIn.... 0
+01E8 FPEMHOut... 0 FPtermOt... 0 FPPH1Ph2... 0

+0200 Events..... Transaction Event Time section
+0200 T01..... 2012-03-15 17.10.56.568088
+0208 StartIMS... 2012-03-15 17.10.56.568088
+0210 T35In..... 2012-03-15 17.10.56.568088
+0218 T08..... 2012-03-15 17.10.56.574100
+0220 T5607..... 2012-03-15 17.10.56.574110
+0228 T31DLI..... 2012-03-15 17.10.56.576722
+0238 T37..... 2012-03-15 17.10.58.788038
+0240 T37Xfer.... 2012-03-15 17.10.58.802611
+0248 T5612..... 2012-03-15 17.10.59.140802
+0250 T07..... 2012-03-15 17.10.59.143494
+0258 T31DLInx... 2012-03-15 17.10.59.140802
+0260 T31Out1.... 2012-03-15 17.10.58.811255
+0268 T31Resp.... 2012-03-15 17.10.58.811255      Local..... +00:00

```

Figure 86. IMS PI: Analyze IMS Transaction Index record contents (1 of 2)


```

+0280 Calls..... DB call summary section
+0280 FFCalls.... +5          FFGets..... +2          FFUpdats... +3
+028C FFWaits.... +0          FFGNs..... +0          FFGUs..... +2
+0298 FPCalls.... +0          FPGets..... +0          FPUpdats... +0
+02A4 FPWaits.... +0          FPGNs..... +0          FPGUs..... +0

+02B0 TPSection..... Accounting section (07)
+02B0 TPMCNT..... +1
+02B4 TPACCT..... Accounting Statistics
+02B4 TPDGU..... +0          TPDGN..... +0          TPDGNP..... +0
+02C0 TPDGHU..... +2          TPDGHN..... +0          TPDGHN..... +0
+02CC TPDISRT.... +1          TPDDLET.... +1          TPDREPL.... +1
+02D8 TPCLCNT.... +5          TPMGU..... +2          TPMGN..... +0
+02E4 TPMISRT.... +1          TPMPURG.... +0          TPTSTNQ.... +0
+02F0 TPTSTWT.... +0          TPTSTDQ.... +0          TPQCONQ.... +0
+02FC TPQCOWT.... +0          TPQCODQ.... +0          TPSUPNQ.... +0
+0308 TPSUPWT.... +0          TPSUPDQ.... +0          TPXCNQ.... +0
+0314 TPEXCWT.... +0          TPEXCDQ.... +0          TPMCMD..... +0
+0320 TPMGCMD.... +0          TPMCHNG.... +0          TPMAUTH.... +0
+032C TPMSETO.... +0          TPSAPSB.... +0          TPSDPSB.... +0
+0338 TPSGMSG.... +0          TPSICMD.... +0          TPSRCMD.... +0
+0344 TPSCHKP.... +0          TPSXRST.... +0          TPSROLB.... +0
+0350 TPSROLS.... +0          TPSSETS.... +0          TPSSETU.... +0
+035C TPSINIT.... +0          TPSINQY.... +0          TPSLOG..... +0
+0368 TPDDEQ.... +0          TPVSAMR.... +0          TPVSAMW.... +0
+0374 TPOSAMR.... +0          TPOSAMW.... +0          TPTOTIO.... +0
+0380 TPESAF.... +0          TPFLD..... +0          TPPOS..... +0
+038C TPRLSE.... +0          TPXSAVE.... +0          TPXRSTR.... +0
+0398 TPXCOPY.... +0          TPTDBIO.... 0          TPTDBPL.... 0

+0048 Status..... Transaction Status section
+0048 CompLvl.... '5'          StartLvl... '1'          StaFlag1... DC
+004B StaFlag2... B0          StaFlag3... 40          StaFlag4... 00
+004E StaFlag5... 00          StaFlag6... 00          TACFlag1... D0
+0051 TACFlag2... FC          ErrFlag1... 00          ErrFlag2... 00
+0054 MSCFlag1... 40          SMQFlag1... B8          TypFlag1... 08
+0057 TypFlag2... 40          FPFlag1.... 00          FPFlag2.... 00
+005A ComHI..... '5'          ComLO..... '5'          CompCode... 00000000
+0060 RecCount... +1          MsgLin..... +424        MsgLOut.... +407
+006C OutEnq..... +1          OutDeq..... +1          FPBALGct... +0

```

Figure 87. IMS PI: Analyze IMS Transaction Index record contents (2 of 2)

The IMS Transaction Index is a useful diagnostic mechanism that provides a summary insight into the dynamics of the transaction and provides a shortcut to the cause of the problem.

Related reference:

“Record format and contents” on page 150

IMS Transaction Index records have the format of IMS user log records, with a record code of X'CA01'.

Chapter 11. Analyzing CQS logs for IMS shared queue activity

IMS uses CQS to manage its shared message queues and resources. IMS CQS events are written by the MVS logger to a CQS log stream. IMS PI can process CQS log streams in batch.

You can define CQS log streams to IMS Problem Investigator for batch report and extract processing:

- Report using the same filtering and formatting options available to IMS log files.
- Extract to a sequential data set which you can then use the dialog to analyze.

Related reference:

“CQS log stream data” on page 69

CQS records are written by the MVS System Logger, not IMS.

Special considerations when processing CQS records

Special characteristics of CQS log streams require special consideration when processing them.

IMS PI takes into consideration the following characteristics of CQS records:

- CQS records are written to an MVS log stream, not a data set. The log stream name is specified in the LOGNAME= parameter of the CQSSGnnn member:

```
*-----*
* CQS definition for IMS shared message queue structure *
*-----*
STRUCTURE (
  STRNAME=QMSGIMSP1,
  OVFLWSTR=QMSGIMSP10FLW,
  SRDSDSN1=IMSPROD.V121.MSG.SRDS1,
  SRDSDSN2=IMSPROD.V121.MSG.SRDS2,
  LOGNAME=IMSPROD.V121.MSGQ.LOG,    <== Shared MSGQ log stream name
  OBJAVGSZ=1024)
```

```
*-----*
* CQS definition for IMS shared EMHQ structure *
*-----*
STRUCTURE (
  STRNAME=QEMHIMSP1,
  OVFLWSTR=QEMHIMSP10FLW,
  SRDSDSN1=IMSPROD.V121.EMH.SRDS1,
  SRDSDSN2=IMSPROD.V121.EMH.SRDS2,
  LOGNAME=IMSPROD.V121.EMHQ.LOG,    <== Shared EMHQ log stream name
  OBJAVGSZ=1024)
```

- Log streams require the LOGR subsystem to be started before data can be read. Start the LOGR subsystem by issuing the following MVS command:

```
SETSSI ADD,SUBNAME=LOGR,INITRTN=IXGSSINT
```

- Log streams cannot be processed without the SUBSYS DD parameter specified:

```
//LOGIN    DD  DSN=CQS.logstream.name,
//          SUBSYS=(LOGR,IXGSEXIT,
//          'FROM=(<yyyy/ddd, hh.mm>),TO=(<yyyy/ddd, hh.mm>),LOCAL '),
//          DCB=(BLKSIZE=32760)
```

- CQS records:
 - Start with a 2 byte record code similar to IMS log records
 - Do not have a 16 byte log record suffix

- Have time stamps located at the fixed offset 8
- Do not have a log sequence number, instead IMS PI substitutes the relative record number
- CQS log streams extracted to a data set have RECFM=U, not the usual RECFM=VB for IMS log files. For this reason it is not possible to extract IMS and CQS records into the same data set.

Related reading: For more information on CQS diagnosis, refer to the *IMS Common Queue Server Guide and Reference*.

Submit CQS log stream batch request

To request a report, extract or CSV, enter line action **SUB** next to a CQS log stream or extract data set in the Process Log Files panel.

Process Log Files		Row 1 of 2 More: < >
Command ==>		Scroll ==> CSR
Select a Log File to browse.	IMS Release 121 +	Zone _____
/ Log File	Rel + Filter +	Zone
SUB 'IXGLOGR.CQS1.MSG1.LOGOFFLD'	_____	_____
_____	_____	_____

Figure 88. Submit CQS log stream batch request

Prior to submission, you are prompted to enter your run-time options.

Refer to “Creating a report, extract, or CSV from specified log files” on page 98 for a description of the options. However, there is one option that applies exclusively to CQS log processing:

Log Input File option

Enter / to select the option **File is a log stream** when the Log input file requested for batch reporting is a CQS log stream.

IMS PI will insert the following statements into the JCL:

```
//LOGIN DD DSN=CQS.logstream.name,
// SUBSYS=(LOGR,IXGSEXIT,
// 'FROM=(2013/164,10:00:00),TO=(2013/164,10:05:00),LOCAL'),
// DCB=(BLKSIZE=32760)
```

When the specification of your run-time options is complete, press Enter. You will be prompted to Press Enter to proceed with request. This provides a last opportunity to review and change your submit request.

If you did not request to Edit the JCL, the job is submitted immediately. If an Extract was requested, the name of the Extract Data Set will be added automatically to the list of log files on the Process Log Files panel.

If you selected Edit the JCL, the generated JCL is displayed in an ISPF edit session from where you then enter the SUB command to submit the job.

JCL using CQS log stream

The JCL to produce a report, extract or CSV from a CQS log stream is based on the SALZSAMP library member ALZCQS.

If you requested to Edit the JCL, an ISPF-style Edit panel will display the generated JCL like that in the following example. You can review or modify the JCL, then enter SUB in the Edit command line to submit the job.

```
//ALZCQS JOB ,CLASS=A,NOTIFY=&SYSUID
//*****
/* Job statement and values in < ... > are specified in the dialog. *
//*****
//ALZCQS EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrm>[,UPPER] [,NOHEAD] '
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//ALZCDS DD DISP=SHR,DSN=<prefix.IMSPI.CDS>
//LOGIN DD DSN=<CQS.logstream>,
//          SUBSYS=(LOGR,IXGSEXIT,
//          'FROM=(<yyyy/ddd,hh.mm>),TO=(<yyyy/ddd,hh.mm>),LOCAL'),
//          DCB=(BLKSIZE=32760)
//SYSPRINT DD SYSOUT=*
//LOGRPT DD SYSOUT=*
//EXTRACT DD DISP=OLD,DSN=<prefix.IMSPI.EXTRACT>
//SYSIN DD *
PAGELIM(10000)
[START <yyyy-mm-dd-hh.mm.ss.th>] ... For example, 2013-06-24-10.00
[STOP <yyyy-mm-dd-hh.mm.ss.th>] 2013-06-24-10.05
REPORT [OUTPUT(LOGRPT)] [FILTER(<filter>)]
EXTRACT [OUTPUT(EXTRACT)] [FILTER(<filter>)]
CSV FORM(<form>) [OUTPUT(CSV)] [FILTER(<filter>)] [DELIMITER(<;>)] [LABELS]
/*
```

Figure 89. JCL using CQS log stream

The JCL is similar to that described in “ALZBATCH JCL statements” on page 103. However, take particular note of the CQS log stream DD statement:

LOGIN DD

The name of the CQS log stream to be processed by IMS PI. This is the name that was specified in the LOGNAME= parameter in the CQSSGxxx PROCLIB member.

LOGIN is the default ddname, however you can specify multiple files with ddnames of your choosing.

Note: The LOGR subsystem must be active. Start LOGR using the MVS command:

```
SETSSI ADD,SUBNAME=LOGR,INITRTN=IXGSSINT
```

Merging CQS and IMS log records

The inclusion of IMS log data in the CQS records provides the identification fields necessary for tracking, for example transaction code, user ID, tracking unit-of-work ID and recovery token. Identification fields allow you to “connect” IMS and CQS events using the batch merge and tracking functions.

For shared MSGQ messages put onto the CQS log stream, the IMS message (01/03) log record is stored in the X'0702' CQSPUT COMMIT completed record.

For global EMHQ messages put onto the CQS log stream, the global shared EMHQ message (similar to, but not an actual X'59' IMS log record) is stored in the X'0702' CQSPUT COMMIT completed record.

The following JCL demonstrates how to run a combined CQS and IMS report by merging the CQS log stream (ddname LCQS001) with IMS log files (LIMSA001 and LIMSB001). Tracking is activated for user ID JOHN.

```
//JOBNAME JOB (ACCOUNT), 'NAME'
//IMSPI EXEC PGM=ALZBATCH, PARM=V121
//STEPLIB DD DISP=SHR, DSN=ALZ.V2R4M0.SALZLINK
//ALZCDS DD DISP=SHR, DSN=ALZ.IMSPI.CDS
//LCQS001 DD DSN=IXGLOGR.CQS1.MSG.LOGOFFLD,
//          SUBSYS=(LOGR,IXGSEXIT,
//          'FROM=(2013/154,10:00:00),TO=(2013/154,11:00:00),LOCAL'),
//          DCB=(BLKSIZE=32760)
//LIMSA001 DD DISP=SHR, DSN=IMSA.SLDS
//LIMSB001 DD DISP=SHR, DSN=IMSB.SLDS
//LOGRPT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
START 2013-06-03-10.00.00.00
STOP 2013-06-03-11.00.00.00
REPORT
TRACK
CODE(ALL)
COND USERID EQ 'JOHN'
/*
```

Figure 90. JCL for combined CQS and IMS report

Restriction: CQS log streams extracted to a data set have RECFM=U, not the usual RECFM=VB for IMS log files. For this reason it is not possible to merge IMS and CQS records into the same extract data set. However, batch reporting is available.

CQS log report output

Batch processing can generate formatted record reports from CQS log streams and extracts.

The following example shows a formatted report produced from a CQS log stream or extract data set.

```

V2R4M0                IMS V12.1                IMS Problem Investigator - Log Report

+0004 Code... 0703 CQSPUT START completed
+0008 STCK... BCE1B86C98D17543 LSN.... 0000000000000001 Record... 1
      Date... 2010-04-18 Sunday Time... 19.46.04.611863

+0000 LGPRCDLN... 00000074 LGPTYPE... 07 LGPSTYPE... 03 LGPTSTMP... BCE1B86C98D17543
+0010 LGPCQSID... 'CT8QCQS ' LGPCQSVN... 00010300 LGPOFSET... 00000040 LGPSTRNM... 'IT1QEMHQ '
+0030 LGPSTRTP... 01 LGPCLNTN... 'IT8Q '
+0040 LGPTSUOW... Unit of Work (UOW)
      +0000 C9E3F8D8 40404040 BCE1B86C 626A1783 40404040 40404040 40404040 *IT8Q ...%...c *
+0060 LGPTSQNM... QNAME
      +0000 01C4C2C6 E2C1D4D7 F3404040 40404040 *.DBFSAMP3 *
+0070 LGPTSFLG... 00

+0004 Code... 0801 CQSREAD completed
+0008 STCK... BCE1B86C9C0E5240 LSN.... 0000000000000002 Record... 2
      Date... 2010-04-18 Sunday Time... 19.46.04.625125

+0000 LGPRCDLN... 00000088 LGPTYPE... 08 LGPSTYPE... 01 LGPTSTMP... BCE1B86C9C0E5240
+0010 LGPCQSID... 'CT7QCQS ' LGPCQSVN... 00010200 LGPOFSET... 00000040 LGPSTRNM... 'IT1QEMHQ '
+0030 LGPSTRTP... 01 LGPCLNTN... 'IT7Q '
+0040 LGRCQNM... QNAME
      +0000 01C4C2C6 E2C1D4D7 F3404040 40404040 *.DBFSAMP3 *
+0050 LGRCOLCK... Lock key
      +0000 C3E3F7D8 C3D8E240 1CE1AA7A 180B5288 *CT7QCQS ....%...h *
+0060 LGRCUOW... Unit of Work (UOW)
      +0000 C9E3F8D8 40404040 BCE1B86C 626A1783 40404040 40404040 40404040 *IT8Q ...%...c *
+0080 LGRCOFLG... 00

+0004 Code... 0702 CQSPUT COMMIT completed
+0008 STCK... BCE1B86CB9D9AB61 LSN.... 0000000000000003 Record... 3
      Date... 2010-04-18 Sunday Time... 19.46.04.747162

+0000 LGPRCDLN... 0000027E LGPTYPE... 07 LGPSTYPE... 02 LGPTSTMP... BCE1B86CB9D9AB61
+0010 LGPCQSID... 'CT7QCQS ' LGPCQSVN... 00010200 LGPOFSET... 00000040 LGPSTRNM... 'IT1QEMHQ '
+0030 LGPSTRTP... 01 LGPCLNTN... 'IT7Q '
+0040 LGPTCUOW... Unit of work (UOW)
      +0000 C9E3F8D8 40404040 BCE1B86C 626A1783 C9E3F7D8 40404040 BCE1B86C 9CB8A041 *IT8Q ...%...cIT7Q ...%...%*
+0060 LGPTCQNM... QNAME
      +0000 05C6E4D5 E3D9D4F2 F3404040 40404040 *.FUNTRM23 *
+0070 LGPTCQWR... QNAME Object PUT on (LOCKQ if LOCAL=YES)
      +0000 05C6E4D5 E3D9D4F2 F3404040 40404040 *.FUNTRM23 *
+0080 LGPTCFLG... 00 LGPTCOFF... 00000088
+0088 LGPTCOBJ... Object Prefix
      +0000 000001F6 00000020 00010200 80000000 BCE1B86C B9D96821 BCE1B86C B9D96821 *...6.....%.R.....%.R..*

+00A8 EMHBGBL.... Object Data - Global Shared EMHQ message
+00A8 EMHBMSG0... 0000015C EMHBSDLO... 00000114 EMHBGLVL... 03 EMHBFL3.... 40 EMHBFL4.... 20
+00B6 EMHBSEQ... 0011 EMHBMXLN... 0100 EMHBINVL... 0075 EMHBSTCK... BCE1B86C EMHBTIME... 86E1B2E7
. . .

```

Figure 91. Formatted report: CQS log

CQS log formatted browse

Formatted reporting of CQS log streams is only available in batch. However, you can use the dialog to analyze CQS data by first creating extracts.

To view CQS data from the dialog:

1. First SUB the CQS log stream and request an extract data set.
2. Then enter line action S against the CQS log extract data set in the Process Log Files panel.

```

File  Menu  Edit  Help
-----
                                Process Log Files          Row 1 of 2 More: < >
Command ==> _____ Scroll ==> CSR

Select a Log File to browse.          IMS Release 121 +      Zone _____

/   Log File                          Rel + Filter + Zone
   'IXGLOGR.CQS1.MSGL.LOGOFFLD'        121 _____
S   'ALZX.IMS121.SEMHQ.CQS5.EXTRACT'  _____

```

Figure 92. Select a CQS log extract data set to process

The following example shows a formatted browse produced from a CQS extract data set.

```

File  Menu  Edit  Mode  Navigate  Filter  Time  Labels  Options  Help
-----
BROWSE  ALZX.IMS121.SEMHQ.CQS5.EXTRACT          Record 00000001 More: < >
Command ==> _____ Scroll ==> PAGE

Forwards / Backwards . . HH.MM.SS.THMIJU  Time of Day . . HH.MM.SS.THMIJU
Code Description                      Date 2010-04-18 Sunday      Time (LOCAL)
-----
/   -----
   0703 CQSPUT START completed                      19.46.04.611863
      OrgUOWID=IT8Q/BCE1B86C626A1783
   -----
   0801 CQSREAD completed                      19.46.04.625125
      OrgUOWID=IT8Q/BCE1B86C626A1783
   -----
   0702 CQSPUT COMMIT completed                      19.46.04.747162
      TranCode=FPSAMP1 Terminal=SC0TCP23 OrgUOWID=IT8Q/BCE1B86C626A1783
      RecToken=IT7Q/0000000F
   -----
   0801 CQSREAD completed                      19.46.04.752972
      OrgUOWID=IT8Q/BCE1B86C626A1783
   -----
   0703 CQSPUT START completed                      19.48.02.303636
      OrgUOWID=IT8Q/BCE1B8DCA5483C83
   -----
   0801 CQSREAD completed                      19.48.02.310761
      OrgUOWID=IT8Q/BCE1B8DCA5483C83
   -----
   0702 CQSPUT COMMIT completed                      19.48.02.452519
      TranCode=FPSAMP1 Terminal=SC0TCP23 OrgUOWID=IT8Q/BCE1B8DCA5483C83
      RecToken=IT7Q/0000000F
   -----
   0801 CQSREAD completed                      19.48.02.463957
      OrgUOWID=IT8Q/BCE1B8DCA5483C83
   -----

```

Figure 93. Browse CQS log extract data set

Restriction: CQS data cannot be merged with IMS or Connect data into the one extract data set and therefore cannot be viewed using the dialog. However, batch reporting is available.

Chapter 12. Analyzing IMS Connect Extensions journals

You can use IMS Problem Investigator to analyze IMS Connect events that have been recorded in an IMS Connect Extensions journal data set. IMS Connect Extensions is an IBM tool that provides instrumentation for IMS Connect. The tool collects realtime data about IMS Connect events, which it then regularly archives.

IMS Connect event data is collected by IMS Connect Extensions. IMS Performance Analyzer (IMS PA) and IMS Problem Investigator (IMS PI) provide enhanced reporting and analysis capability.

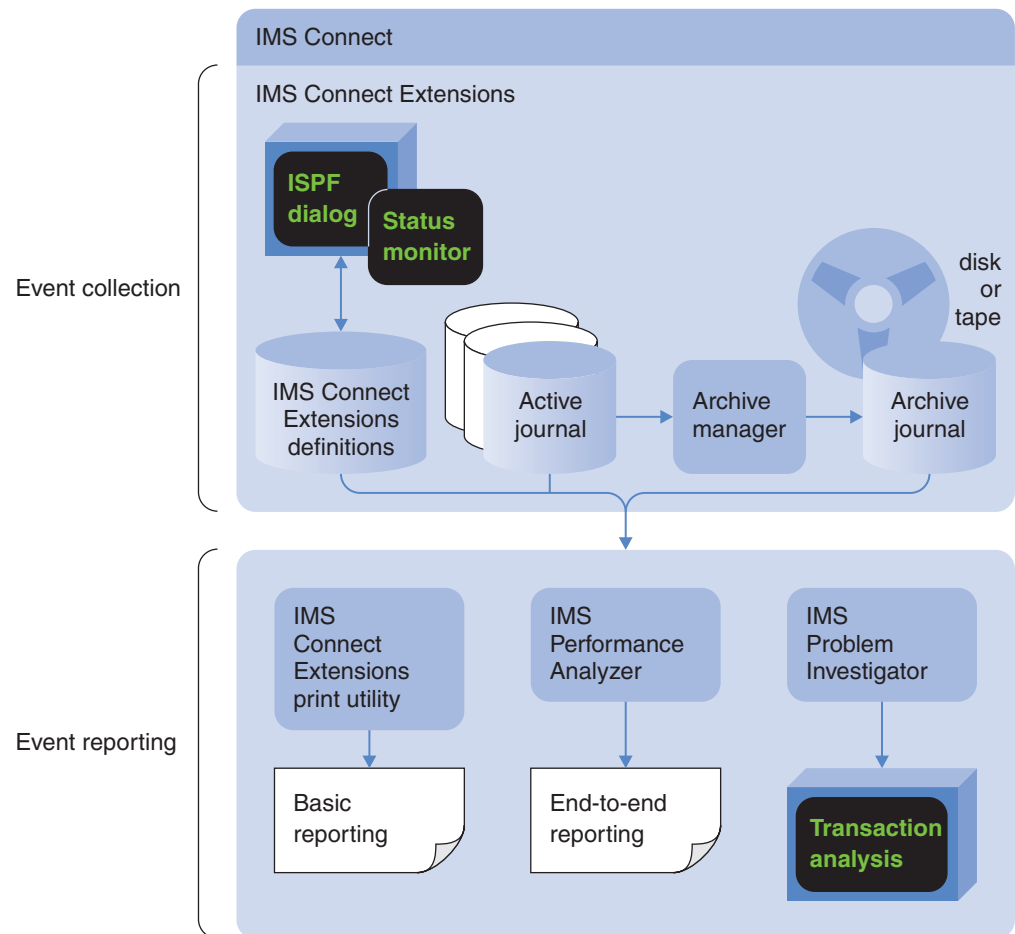


Figure 94. IMS Connect Extensions event collection with reporting by IMS PA and IMS PI

IMS Performance Analyzer provides end-to-end reporting of IMS Connect activity and resource usage.

IMS Problem Investigator allows interactive analysis of the journals and event records for detailed investigation of transaction activity. For example:

- Pinpoint TCP/IP performance problems.
- Debug transactions by tracking event flow through IMS Connect and IMS.
- Audit TCP/IP security.

Related reference:

“IMS Connect event data” on page 69

IMS PI can process IMS Connect event data collected by IMS Connect Extensions in journal data sets.

Setting the repository and record code to process IMS Connect event data

To enable IMS Problem Investigator to analyze IMS Connect event data in IMS Connect Extensions journal data sets, you must first specify the data set name of the IMS Connect Extensions definitions repository and the record code.

Procedure

1. From the IMS Problem Investigator primary options menu, select option **0.3 IMS Connect Extensions Settings**.
2. Enter the one-byte prefix of the IMS Connect event records (default A0), and the data set name of the default IMS Connect Extensions definitions repository, then press the Exit function key (F3). If a Connect system definition is maintained in a different repository, it can be specified on the Connect System Definition panel for that system.
3. From the IMS Problem Investigator primary option menu, select option **6 Connect**. The names of the IMS Connect systems stored in the default definitions repository are listed.
4. From the system list, you can request a report, extract or CSV for a particular system by entering line action **SUB** and when prompted, a report interval and extract data set name. The batch processor automatically selects the relevant journal data sets, archive or active, for input to the report, extract or CSV.
5. From the system list, you can select an IMS Connect system using line action **S** to list the IMS Connect Extensions archive journal data sets for that system.
6. By entering a line action next to a data set name, you can do any of the following actions:
 - Analyze IMS Connect events stored in the data set by entering an **S** next to it.
 - Add the data set to the process panel (option **1 Process**) by entering a **P** next to it.
 - Generate a report, extract or CSV for the data set by entering **SUB** next to the data set name.

Note: The definitions repository can contain references to journal data sets that are no longer cataloged, pending IMS Connect Extensions housekeeping. IMS Problem Investigator tells you if you try to process uncataloged data sets.

Related reference:

“IMS Connect Extensions Settings” on page 278

To process IMS Connect Extensions data, provide the log record code prefix of the IMS Connect event records and the data set name of the default IMS Connect Extensions definitions repository

Reporting from a selected journal

IMS Problem Investigator provides read-only access to system definitions in IMS Connect Extensions repositories. You can view the list of systems and select journal data sets for processing.

Option **6 Connect** on the IMS Problem Investigator Primary Option Menu displays the list of IMS Connect systems defined in the IMS Connect Extensions repository specified in your profile settings.

```

File  Menu  Help
-----
                    IMS Connect System Definitions                    Row 1 to 4 of 4

Command ==> _____

Definitions Repository . . : CEX.REPOSTRY

/      Name                Description                Changed                ID
-----
F1      Stats collection system 1                2014/03/25 13:46:02 CEB
HWSO    Test1                                2014/03/28 14:37:10 CEB
QA01    Test2                                2014/01/20 16:44:42 CEB
S       TRICKLE    Stats collection system 2                2014/03/29 10:36:41 CEB
***** Bottom of data *****

```

Figure 95. IMS Connect Systems

Line Actions: The valid line actions for the list of subsystems are:

- / Display the menu of line actions.
- S Display the list of Archive Data Sets for the system as shown in Figure 96.
- SUB** Submit a report, extract or CSV request for the system. See “Reporting from a selected IMS Connect system” on page 174 for available run-time options. Automated File Selection will be used to locate the journal data sets, archive or active, in a specified reporting interval.

```

File  Menu  Help
-----
                Archive Data Sets for TRICKLE                Row 1 to 16 of 16

Command ==> _____ Scroll ==> PAGE

Select to browse Archive data set.

Data Set Name                                ----- From ----- To
___ CEX999.TEST.TRICKLE.D090323.T143727      2014-03-23 13.51  14.37
___ CEX999.TEST.TRICKLE.D090324.T095211      2014-03-23 14.37  09.52
S ___ CEX999.TEST.TRICKLE.D090324.T111624      2014-03-24 09.54  10.13
___ CEX999.TEST.TRICKLE.D090324.T113311      2014-03-24 11.16  11.33
___ CEX999.TEST.TRICKLE.D090324.T115845      2014-03-24 11.33  11.58
___ CEX999.TEST.TRICKLE.D090324.T120450      2014-03-24 11.58  12.04
___ CEX999.TEST.TRICKLE.D090324.T121311      2014-03-24 12.05  12.13
SUB ___ CEX999.TEST.TRICKLE.D090324.T121656      2014-03-24 12.13  12.16
___ CEX999.TEST.TRICKLE.D090324.T125935      2014-03-24 12.17  12.59
___ CEX999.TEST.TRICKLE.D090324.T130328      2014-03-24 12.59  13.03
___ CEX999.TEST.TRICKLE.D090324.T132657      2014-03-24 13.04  13.26
___ CEX999.TEST.TRICKLE.D090324.T133926      2014-03-24 13.27  13.39
___ CEX999.TEST.TRICKLE.D090324.T134154      2014-03-24 13.40  13.41
___ CEX999.TEST.TRICKLE.D090324.T140219      2014-03-24 13.45  14.02
___ CEX999.TEST.TRICKLE.D090324.T142133      2014-03-24 14.09  14.21
___ CEX999.TEST.TRICKLE.D090324.T142936      2014-03-24 14.22  14.29

***** End of list *****

```

Figure 96. IMS Connect System Archive Data Sets

Line Actions: The following line actions are valid for a data set in the list:

- / Display the menu of line actions
- S Select this data set for processing (IMS PI Formatted Browse).
- P Add file to the Process Log Files list. The data set name is placed at the top of the list from where you can then select it for dialog or batch processing.
- SUB Submit report, extract or CSV request for a particular data set. The run-time options are displayed as shown in the following example.

Submit Batch Request

SUBMIT CEX999.TEST.TRICKLE.D090324.T121656

Command ==> _____

Filtering Criteria:

Filter . . . _____ +

----- Report Interval -----

YYYY-MM-DD HH.MM.SS.TH

From 2014-03-24 12:13:32:05

To 2014-03-24 12:16:27:88

- Extract

Data Set . . . _____

- CSV

Form _____ + - Include field labels

Delimiter . . ;

Data Set . . . _____

/ Report

/ Form / STD - Brief

/ Dump - HEX0 - HEX1

Enter "/" to select option

/ File is a log stream

/ Edit JCL before submit

/ Scrub sensitive data

Figure 97. Submit IMS Connect journal data set report request

When reporting on a selected journal data set, the **Report Interval** is optional. If blank, the entire file is processed.

When reporting on an IMS Connect system, the **Report Interval** is required so that IMS Connect Journal File Selection can locate the data sets that are relevant to that time period.

JCL using specified journal data set

The JCL to produce a report, extract or CSV from an IMS Connect Extensions journal data set is based on the SALZSAMP library member ALZCON.

If you requested to Edit the JCL, an ISPF-style Edit panel will display the generated JCL like that in the following example. You can review or modify the JCL, then enter SUB in the Edit command line to submit the job.

```

//ALZCON JOB ,NOTIFY=&SYSUID
//IMSPI EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vr>[,UPPER] [,NOHEAD] ' 1
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//ALZCDS DD DISP=SHR,DSN=<prefix.IMSPI.CDS>
//LOGIN DD DISP=SHR,DSN=<IMS.Connect.Journal.Data.Set> 1
//SYSPRINT DD SYSOUT=*
//LOGRPT DD SYSOUT=*
//EXTRACT DD DISP=<OLD,DSN=IMSPI.CONNECT.EXTRACT>
//SYSIN DD *
START <yyyy-mm-dd-hh.mm.ss.thmiju> ... For example, 2009-06-24-10.00
STOP <yyyy-mm-dd-hh.mm.ss.thmiju> 2009-06-24-10.05
REPORT OUTPUT(LOGRPT)
EXTRACT OUTPUT(EXTRACT)
CONNECT(A0)
/*

```

Figure 98. JCL using specified IMS Connect journal data set

Note:

- 1** When using primary menu option **6 Connect** and requesting automated journal file selection for an IMS Connect system, the JCL is generated with ddname CEXIN or CEXxxxxnn (instead of LOGIN or Lxxxxnnn). In which case, there are only IMS Connect Extensions journal data sets and therefore PARM='V<vr>' is not required.

Related reference:

“ALZBATCH JCL statements” on page 103

Explanation of ALZBATCH JCL which is used to process explicitly specified log files.

Merging journal and IMS log records to an extract data set

For end-to-end transaction analysis across systems, IMS Problem Investigator can merge different types of logs in time sequence. An extract data set created from multiple file input can then be analyzed using dialog or batch processing.

This sample JCL demonstrates how to create an extract data set by merging IMS Connect event records and IMS log records (system or user) in time sequence.

```

//ALZ120G JOB (ACCOUNT), 'NAME'
//IMSPI EXEC PGM=ALZBATCH,PARM=V121
//STEPLIB DD DSN=ALZ.V2R4M0.SALZLINK,
// DISP=SHR
//SYSPRINT DD SYSOUT=*
//ALZCDS DD DSN=ALZ.IMSPI.CDS,DISP=SHR
//LOGIN001 DD DSN=IMSX.SYSTEM.LOG(FF123940),DISP=SHR
//CEXIN001 DD DSN=IMSP.CEXPROD,DISP=SHR
//EXTRACT DD DSN=ALZ.V2R4M0.EXTRACT1,
// DISP=SHR
//LOGRPT DD SYSOUT=*
//SYSIN DD *
PAGELIM(10000)
EXTRACT
FORMAT(FORM)
CONNECT(A0)
/*

```

Figure 99. JCL for combined IMS log and IMS Connect extract data set

The processing results are shown in the following example.

```

PAGELIM(10000)
EXTRACT
FORMAT(FORM)
CONNECT(A0)
0005I Log File processing has started; DDname=LOGIN001, Time=2008-10-21 18.04.33.418744, LSN=000000000060C72C ALZ
0005I Log File processing has started; DDname=CEXIN001, Time=2008-10-21 18.55.18.327522, LSN=000000000000405 ALZ
0008I Extract processing has ended; DDname=EXTRACT , Record count=82464 ALZ
0009I IMS PI processing has completed, RC=00

```

Figure 100. System messages: Combined IMS log and Connect extract data set

The extract data set can be specified on the Process Log Files panel and analyzed in the usual way using the formatting and navigation facilities of the dialog.

BROWSE	ALZ.V2R4M0.EXTRACT1	Record 00067274	More: < >
Command ==>		Scroll ==>	PAGE
Forwards / Backwards . .	HH.MM.SS.THMIJU	Time of Day . .	HH.MM.SS.THMIJU
Code Description	Date 2014-03-17 Monday	Time (LOCAL)	
/	----		
— 03	IMS Message	18.05.21.833384	
	UTC=18.05.21.833376 Userid=DFSMT CNT LTerm=MTOPRT		
	OrgUOWID=IMS1/BA3469718B178CC8		
— 35	Enqueue or Re-Enqueue a Message	18.05.21.833409	
	UTC=18.05.21.833403 LTerm=MTOPRT OrgUOWID=IMS1/BA3469718B178CC8		
— 03	IMS Message	18.05.21.833465	
	UTC=18.05.21.833461 Userid=DFSMT CNT LTerm=MTO		
	OrgUOWID=IMS1/BA3469718B154108		
— 35	Enqueue or Re-Enqueue a Message	18.05.21.833479	
	UTC=18.05.21.833475 LTerm=MTO OrgUOWID=IMS1/BA3469718B154108		
— 31	GU from the Message Queue	18.05.21.833624	
	UTC=18.05.21.833619 LTerm=MTOPRT OrgUOWID=IMS1/BA3469718B178CC8		
— 36	Dequeue/Save/Delete a Message on a Permanent Dest	18.05.21.838526	
	UTC=18.05.21.838516 Userid=DFSMT CNT LTerm=MTOPRT		
	OrgUOWID=IMS1/BA3469718B178CC8		
— 33	Free Message	18.05.21.838544	
	OrgUOWID=IMS1/BA3469718B178CC8		
— A000	IMS Connect Extensions Control Information	18.58.36.659122	
— A082	Event Collection Status	18.58.36.741620	
— A001	Connect Region Initialization	18.58.36.738480	
— A003	Support Task created	18.58.36.918194	
— A012	TMEMBER joins XCF Group	18.58.38.314514	

Figure 101. Formatted Browse: Combined IMS log and IMS Connect extract data set

Reporting from a selected IMS Connect system

The IMS Problem Investigator dialog generates the JCL for IMS Connect batch reporting. You can request batch processing by entering the SUB command against an IMS Connect system or journal data set.

The following example shows how to select a system for batch reporting. For an example of how to request a report for a particular data set, see “Reporting from a selected journal” on page 170.

```

IMS Connect System Definitions                                Row 1 to 4 of 4

Command ==> _____

Definitions Repository . . : CEX.REPOSTRY

/      Name      Description      Changed      ID
---
F1      Stats collection system 1  2014/03/25 13:46:02 CEB
SUB     HWSD      Test1           2014/03/28 14:37:10 CEB
---     QA01      Test2           2014/01/20 16:44:42 CEB
---     TRICKLE   Stats collection system 2  2014/03/29 10:36:41 CEB

```

Figure 102. SUB an IMS Connect system

Before IMS Problem Investigator generates the JCL, the Submit panel is displayed to prompt you to specify run-time options.

```

Submit Batch Request

SUBMIT      System - HWSO
Command ==> _____

Filtering Criteria:          ----- Report Interval -----
Filter . . . _____ +   YYYY-MM-DD  HH.MM.SS.TH
                             From -999      00.00.00.00
                             To   0         00.00.00.00

- Extract
  Data Set . . . _____

- CSV
  Form . . . . . _____ + - Include field labels
  Delimiter . . ;
  Data Set . . . _____

/ Report                      Enter "/" to select option
- Form / STD - Brief       - File is a log stream
- Dump - HEX0 - HEX1      / Edit JCL before submit
                          / Scrub sensitive data

```

Figure 103. Submit IMS Connect System report request

The Submit options are the same as for IMS log reporting (see “Creating a report, extract, or CSV from specified log files” on page 98), but observe the Connect-specific description for the Report Interval:

Report Interval

When reporting on an IMS Connect System, the **Report Interval** is required so that IMS Connect Journal File Selection can locate the data sets that are relevant to that time period. When reporting on a specific Journal Data Set, the **Report Interval** is optional. If blank, the entire file is processed.

Default: As previously saved.

The **Report Interval** allows selection of a subset of the input data for passing to the report processors. Records with time stamps on or after the From date/time and before the To date/time are selected for processing. Reducing the time period can significantly reduce processing time for generating the reports.

Date can be either a calendar date or a relative date. Relative dates are specified as 0, -1, -2, ... to signify a date relative to the current date. 0 represents today, -1 yesterday, -2 two days ago, and so on. If both From and To dates are specified, they must be in the same format.

If date is specified without time, the time defaults to 00.00.00.00. Time is expressed as hh:mm:ss:th for hours, minutes, seconds, tenths and hundredths of a second using the colon delimiter.

The date/time range is generated as parameter input in the JCL:

- For IMS Connect Journal File Selection:

```
//ALZPARM DD *  
FROM=(yyyy/mm/dd,hh:mm:ss:th)  
TO=(yyyy/mm/dd,hh:mm:ss:th)  
HWSID=HWSID
```

OR

```
//ALZPARM DD *  
FROM=(-nnn,hh:mm:ss:th)  
TO=(-nnn,hh:mm:ss:th)  
HWSID=HWSID
```

- For IMS Connect Archive Data Set processing:

```
//SYSIN DD *  
START yyyy/mm/dd,hh:mm:ss:th  
STOP yyyy/mm/dd,hh:mm:ss:th  
REPORT  
EXTRACT  
CONNECT(A0)
```

OR

```
//SYSIN DD *  
START -nnn,hh:mm:ss:th  
STOP -nnn,hh:mm:ss:th  
REPORT  
EXTRACT  
CONNECT(A0)
```

When the specification of your run-time options is complete, press Enter. You will be prompted to Press Enter to proceed with request. This provides a last opportunity to review and change your submit request.

If you did not request to Edit the JCL, the job is submitted immediately. If an Extract was requested, the name of the Extract Data Set will be added automatically to the list of log files on the Process Log Files panel.

If you selected to Edit the JCL, the generated JCL is displayed in an ISPF edit session from where you then enter the SUB command to submit the job.

IMS Connect Journal File Selection

IMS Connect Extensions Journal File Selection is an IMS Problem Investigator facility that automatically selects the Journal files for report processing. It offers an alternative to having to explicitly specify or select the Journal input files. Simply specify the IMS Connect system and the time period for which reporting is required, and IMS Problem Investigator will select the Journal files covering that time period.

IMS Connect Journal File Selection can be used as:

- An alternative to specifying or selecting Journal input file names prior to report submission
- A facility to generate report JCL for submission by an automated job scheduler

IMS Problem Investigator Journal File Selection is performed in batch by the Automated File Selection utility, ALZDBRC. Report JCL built by the dialog when Journal File Selection is used differs from Report JCL for explicitly specified Journal files.

Using Journal File Selection causes IMS Problem Investigator to execute two jobs:

1. The Automated File Selection utility to select the required Journal files and build then submit the Report JCL
2. Report processing, as submitted by the Automated File Selection utility

The Journal File Selection JCL is a single step job whose JCL is constructed from the options specified in the dialog.

The Automated File Selection utility performs the following tasks:

- Selects the required Journal files for processing
- Constructs the Report JCL, appending Journal file DD statements at the end of the Report JCL skeleton
- Submits the constructed Report JCL

The execution of the batch commands takes place in a second job, submitted by the Automated File Selection utility.

Splitting Journal selection and Report processing into two jobs enables IMS Problem Investigator to avoid dynamic allocation of Journal files on tape devices. Leaving allocation of tape devices to JES or the initiator avoids potential job failures.

Related reference:

“START, STOP (FROM, TO) command” on page 405

START and STOP specify a report interval. Only log records with a STCK time stamp within the report interval are included in the report, extract or CSV. The report interval is optional when processing a specific log file, but mandatory for automated file selection or processing a log stream.

“ALZDBRC: DBRC Log Selection” on page 415

Generic JCL to run Automated File Selection (DBRC Log Selection for IMS log data and Journal File Selection for Connect data), then automatically submit a job to run the IMS PI Log Reporter for the selected files.

JCL using Journal File Selection

Using options specified from the dialog, IMS Problem Investigator builds the JCL to execute the Automated File Selection utility ALZDBRC.

IMS Connect Extensions Automated File Selection performs the following tasks:

1. Selects the Journal files for processing by invoking ALZDBRC
2. Constructs the Report JCL
3. Submits the Report JCL

```

//ALZ#CEXM JOB (ACCOUNT),'NAME'
//*
/* IMS Connect Archive and Active Journal File Selection
/*
//ALZCEX EXEC PGM=ALZDBRC
//STEPLIB DD DSN=ALZ.V2R4M0.SALZLINK,
// DISP=SHR
//SYSUDUMP DD SYSOUT=*
//ALZPRINT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//CEXDEF DD DSN=CEX.REPOSTRY,
// DISP=SHR
//ALZRDR DD SYSOUT=(*,INTRDR)
//ALZWRK1 DD SPACE=(TRK,(1,1,1)),UNIT=SYSDA
//ALZWRK2 DD SPACE=(TRK,(3,1)),UNIT=SYSDA
//SYSIN DD SPACE=(TRK,(3,1)),UNIT=SYSDA
//ALZPARM DD *
FROM=(2014-04-19,15.27.00.00)
TO=(2014-04-21,11.59.00.00)
HWSID=IMSPAHS
/*
//ALZSKEL DD DATA,DLM=$$
//ALZ#CEXM JOB (ACCOUNT),'NAME'
//IMSPI EXEC PGM=ALZBATCH
//STEPLIB DD DSN=ALZ.V2R4M0.SALZLINK,
// DISP=SHR
//SYSPRINT DD SYSOUT=*
//ALZCDS DD DSN=IMSPI.CDS,
// DISP=SHR
//LOGRPT DD SYSOUT=*
//CEXIN DD DUMMY /* Connect journal file insert point */
//SYSIN DD *
PAGELIM(10000)
START 2014-04-19-15.27.00.00
STOP 2014-04-21-11.59.00.00
REPORT
FORMAT(STD)
CONNECT
$$

```

Figure 104. JCL for IMS Connect Journal File Selection

where:

JOB Job Statement Information in IMS PI Settings.

ALZCEX EXEC PGM=ALZDBRC,PARM='parameter list'

The IMS Connect Journal File Selection program with parameters:

UPPER Print reports in upper case if **Reports in Upper Case** is YES in IMS PI Settings.

NOHEAD Specify only if you want the report to have no page headings. To specify this option from the dialog, select Edit JCL before submit, then add it to the EXEC PARM before submitting.

STEPLIB DD

IMS PI Load Library in IMS PI Settings.

ALZPRINT DD

The data set used by Journal File Selection for its messages and runtime information. It must be specified and should be checked for error messages. For an explanation of these error messages, see "Message descriptions" on page 354.

SYSPRINT DD

ALZDBRC API message output file.

CEXDEF DD

IMS Connect Extensions Definitions Repository specified in your profile settings. This data set contains the IMS Connect Extensions system definitions.

ALZRDR DD

Internal Reader file. IMS Problem Investigator submits report JCL to this file after Journal File Selection has completed.

You can also specify a data set or SYSOUT class instead of the Internal Reader. If you do so, ALZDBRC will write the report JCL to the nominated destination but will not submit the JCL. This facility allows you to generate and save the required JCL, including required Journal files, for editing without having the job submitted.

ALZWRK1 DD and ALZWRK2 DD

Work file data sets.

SYSIN DD

Work file data set.

ALZPARM DD *

Journal File Selection parameter input.

Execution parameters are passed to the Automated File Selection utility in ddname ALZPARM:

FROM=(yyyymmdd,hh:mm:ss:th)

Reporting start date/time. Date is required, and can be an actual date specification or a relative date. Relative dates are specified as 0, -1, -2, ... , and signify a date relative to the current date. 0 represents today, -1 yesterday, -2 two days ago, and so on. Time is optional, and if not specified, defaults at run time to the start of the day.

TO=(yyyymmdd,hh:mm:ss:th)

Reporting end date/time. Date is required, and must be in the same format as the FROM specification. Time is optional, and if not specified, defaults to the end of the day.

HWSID=ccccccc

IMS Connect system ID. The name of the IMS Connect system that you submitted for reporting. If more than one system, specify a separate HWSID for each.

ALZSKEL DD

IMS Connect report JCL skeleton for the second job. Automated file selection appends DD statements for the selected files and then submits the job.

JCL for the second job is similar to that shown in "JCL using specified journal data set" on page 172 but with an additional feature. The CEXIN DD statement for the one IMS Connect Extensions journal file is replaced by one or more CEXxxnnn DD statements for the journal data sets selected by the first job. These data sets may be on DASD, tape or cartridge.

To produce the reports, extracts or CSV output, IMS PI merges the journal files in time sequence. For more information on the specialized DD statements for merge processing, see “Merging logs from multiple systems” on page 106.

Related reference:

“ALZDBRC: DBRC Log Selection” on page 415

Generic JCL to run Automated File Selection (DBRC Log Selection for IMS log data and Journal File Selection for Connect data), then automatically submit a job to run the IMS PI Log Reporter for the selected files.

“IMS PI Settings” on page 273

You can adjust the settings to customize the IMS PI dialog and batch JCL for running reports and extracts. All required options have initial settings so you can start using IMS PI immediately.

“IMS Connect Extensions Settings” on page 278

To process IMS Connect Extensions data, provide the log record code prefix of the IMS Connect event records and the data set name of the default IMS Connect Extensions definitions repository

Viewing report output

The formatted records are reported in time sequence. When reporting from merged files, the ddname identifies the source file.

The following example shows a formatted report produced from an IMS Connect Journal file.

```

V2R4M0                                IMS Problem Investigator - System Messages

PAGELIM(10000)
REPORT
CONNECT
FORMAT(STD)
ALZ0005I  Log File processing has started; DDname=LOGIN   , Time=2014-04-16 16.12.05.378988, LSN=0000000000000001
ALZ0007I  Report processing has ended; DDname=LOGRPT   , Record count=152
ALZ0009I  IMS PI processing has completed, RC=00

V2R4M0                                IMS Problem Investigator - Log Report

+0004  Code... A000  IMS Connect Extensions Control Information
+0030  STCK... BB014022127ACA40      LSN.... 0000000000000001      Record... 1
      Date... 2014-04-16 Wednesday Time... 16.12.05.378988

+0000  CERE_00_LL..... 0040                      CERE_00_ZZ..... 0000          CERE_00_RECID..... A0
+0005  CERE_00_EVTID..... 00  CERE_00_PFXLL..... 0014          CERE_00_EFLAG..... 00  CERE_00_VER#..... 01
+000A  CERE_00_TASKID..... ID of Task recording Event
+000A  CERE_00_COL#..... 00  CERE_00_TKS#..... 01
+000C  CERE_00_EVKEY..... 'EVNT'                      CERE_00_VAR_LL..... 001C          CERE_00_VAR_APAR... 0001
+0018  CERE_00_VAR_CNAME..... 'IMSPAHWS'
+0020  CERE_00_VAR_TZ0.... Time zone offset fields
+0020  CERE_00_VAR_LSO.... 0000000000000000          CERE_00_VAR_LDTO... 0000000000000000

+0004  Code... A082  Event Collection Status
+0036  STCK... BB01402226274A80      LSN.... 0000000000000002      Record... 2
      Date... 2014-04-16 Wednesday Time... 16.12.05.459572

+0000  CERE_82_LL..... 0046                      CERE_82_ZZ..... 0000          CERE_82_RECID..... A0
+0005  CERE_82_EVTID..... 82  CERE_82_PFXLL..... 0014          CERE_82_EFLAG..... 00  CERE_82_VER#..... 01
+000A  CERE_82_TASKID..... ID of task recording event
+000A  CERE_82_COL#..... 01  CERE_82_TKS#..... 01
+000C  CERE_82_EVKEY..... 'EVNT'                      CERE_82_VAR_LL..... 0022          CERE_82_VAR_APAR... 0001
+0018  CERE_82_VAR_RSN.... 00000000          CERE_82_VAR_FLAG3..... 80
+001E  CERE_82_VAR_NAME... 'COLTSK01'          CERE_82_VAR_PRODID..... 'CEX '
+002A  CERE_82_VAR_HWSID..... 'IMSPAHWS'          CERE_82_VAR_CTLWORD..... C0040000

+0004  Code... A001  Connect Region Initialization
+001A  STCK... BB01402225CB0B80      LSN.... 0000000000000003      Record... 3
      Date... 2014-04-16 Wednesday Time... 16.12.05.458096

+0000  CERE_01_LL..... 002A                      CERE_01_ZZ..... 0000          CERE_01_RECID..... A0
+0005  CERE_01_EVTID..... 01  CERE_01_PFXLL..... 0014          CERE_01_EFLAG..... 00  CERE_01_VER#..... 01
+000A  CERE_01_TASKID..... ID of Task recording Event
+000A  CERE_01_COL#..... 01  CERE_01_TKS#..... 01
+000C  CERE_01_EVKEY..... 'EVNT'                      CERE_01_VAR_LL..... 0006          CERE_01_VAR_APAR... 0001
+0018  CERE_01_VAR_VVRR... 0201

```

Figure 105. Formatted report: IMS Connect Journal data set

The following example shows a formatted report produced from an IMS Connect system where the files are selected for you using Automated File Selection.

```

V2R4M0                      IMS Problem Investigator - Log Report

+0004 Code... A014 Begin SCI Registration
+004C STCK... C62E370E31584643 LSN.... 0000000000000245 Record... 581 DDname... CEX01001 / Record... 581
Date... 2014-03-17 Monday Time... 12.25.11.556484.391

+0000 CERE_14_LL..... 005C CERE_14_ZZ..... 0000 CERE_14_RECID..... A0
+0005 CERE_14_EVTID..... 14 CERE_14_PFXLL..... 0014 CERE_14_EFLAG..... 00 CERE_14_VER#..... 22
+000A CERE_14_TASKID..... ID of Task recording event
+000A CERE_14_COL#..... 01 CERE_14_TKS#..... 04
+000C CERE_14_EVKEY..... 'EVNT'

+0014 CERE_14_DSIB..... Datastore Information Block
+0014 CERE_14_DLL..... 0038 CERE_14_BLKID..... 02 CERE_14_FLAG..... 40 CERE_14_VVRR..... 1110
+001A CERE_14_APAR_SEQ... 0002 CERE_14_DS_NAME.... 'PLXD4'
+002C CERE_14_DATA_LEN... 00000000 CERE_14_DATA_ADDR..... 00000000
+0034 CERE_14_RC..... 00000000 CERE_14_RSN..... 00000000
+003C CERE_14_TPIPE_NAME..... ' ' CERE_14_SVTOKEN.... 0000000000000000

+0004 Code... A000 IMS Connect Extensions Control Information
+0030 STCK... C62E370E32DFF462 LSN.... 0000000000000246 Record... 582 DDname... CEX01002 / Record... 1
Date... 2014-03-17 Monday Time... 12.25.11.562751.273

+0000 CERE_00_LL..... 0040 CERE_00_ZZ..... 0000 CERE_00_RECID..... A0
+0005 CERE_00_EVTID..... 00 CERE_00_PFXLL..... 0014 CERE_00_EFLAG..... 00 CERE_00_VER#..... 22
+000A CERE_00_TASKID..... ID of Task recording Event
+000A CERE_00_COL#..... 00 CERE_00_TKS#..... 01
+000C CERE_00_EVKEY..... 'EVNT' CERE_00_VAR_LL..... 001C CERE_00_VAR_APAR... 0001
+0018 CERE_00_VAR_CNAME..... 'CMWHWS1'
+0020 CERE_00_VAR_TZ0.... Time zone offset fields
+0020 CERE_00_VAR_LSO.... 0000000000000000 CERE_00_VAR_LDT0... 00006B49D2000000

+0004 Code... A015 End SCI Registration
+0058 STCK... C62E370E32D1F802 LSN.... 0000000000000247 Record... 583 DDname... CEX01002 / Record... 2
Date... 2014-03-17 Monday Time... 12.25.11.562527.500

+0000 CERE_15_LL..... 0068 CERE_15_ZZ..... 0000 CERE_15_RECID..... A0
+0005 CERE_15_EVTID..... 15 CERE_15_PFXLL..... 0014 CERE_15_EFLAG..... 00 CERE_15_VER#..... 22
+000A CERE_15_TASKID..... ID of Task recording event
+000A CERE_15_COL#..... 01 CERE_15_TKS#..... 04
+000C CERE_15_EVKEY..... 'EVNT' CERE_15_VAR_LL..... 000C CERE_15_VAR_APAR... 0001
+0018 CERE_15_VAR_RC..... 01000010 CERE_15_VAR_RSN.... 01000010

+0020 CERE_15_DSIB..... Datastore Information Block
+0020 CERE_15_DLL..... 0038 CERE_15_BLKID..... 02 CERE_15_FLAG..... 40 CERE_15_VVRR..... 1110
+0026 CERE_15_APAR_SEQ... 0001 CERE_15_DS_NAME.... 'PLXD4'
+0038 CERE_15_DATA_LEN... 00000000 CERE_15_DATA_ADDR..... 00000000
+0040 CERE_15_RC..... 01000010 CERE_15_RSN..... 01000010
+0048 CERE_15_TPIPE_NAME..... ' ' CERE_15_SVTOKEN.... 0000000000000000

```

Figure 106. Formatted report: IMS Connect system using Automated File Selection

```

//SYSIN DD *
//*
//* CMWHWS1 FROM=2014/06/25,12:11:59:5-->T0=2014/06/25,12:25:11:5
//CEX01001 DD DSN=CMW.DEVT.ACTIVE.CMWHWS1.P01,
// DISP=SHR
//*
//* CMWHWS1 FROM=2014/06/25,12:25:11:5-->T0=2014/06/25,12:34:10:0
//CEX01002 DD DSN=CMW.DEVT.ACTIVE.CMWHWS1.P02,
// DISP=SHR

```

Figure 107. Automated File Selection: ddnames identify selected files

Related information:

“ALZ0005I” on page 355

Log File processing has started; DDname=xxxxxxx, Time=yyyy-mm-dd
hh.mm.ss.thmiju, LSN=xxxxxxxxxxxxxxxx

“ALZ0007I” on page 355

xxxxxx processing has ended; DDname=xxxxxxx, Record count=xxxxxxxxxx

“ALZ0009I” on page 355

IMS PI processing has completed, RC=xx

Chapter 13. Streamlining analysis using the IMS Connect Transaction Index

The IMS Connect Transaction Index is a specialized extract file created by IMS Performance Analyzer batch reporting. Each record in the index represents an IMS transaction and contains cumulative information from the IMS Connect Extensions journal about that transaction.

IMS PA: Creating an IMS Connect Transaction Index

The IMS Connect Transaction Index is requested from an IMS Performance Analyzer CEX report set and associated INDEX batch command.

Procedure

1. On the IMS Performance Analyzer Primary Option Menu, select option 3 **Report Sets**.
2. Select or create a CEX report set.
3. In the **Transaction Transit Reports (Form-based)** category, select **Transaction Index**.

EDIT Report Set - SAMPCEX Line 1 of 8
Command ==> Scroll ==> CSR

Description . . . Sample CEX Report Set

Enter "/" to select action.

** Reports **		Active
+	Options	Yes
+	Transaction Transit Reports	No
-	Transaction Transit Reports (Form-based)	Yes
	List	No
	Summary	No
	Transaction Index	Yes
+	Resource Usage Reports	No
+	Trace Reports	No
** End of Reports **		

Figure 108. IMS Performance Analyzer CEX Report Set: Select Transaction Index

4. Specify the IMS Connect Transaction Index data set name and disposition.

SAMPCEX - Transaction Index

Command ==>

Specify the Transaction Index data set name and disposition.

Name: 'IPI000.QADATA.I2CEXIDX' Disp: OLD

Figure 109. IMS Performance Analyzer: Specify IMS Connect Transaction Index data set name

5. Enter RUN to run the report set, including the IMS Connect Transaction Index request. The generated command is IMSPACEX INDEX.
6. Specify report set run-time options, and then press Enter to submit the job.

IMS PI: Using the IMS Connect Transaction Index to diagnose transaction problems

After creating an IMS Connect Transaction Index with IMS Performance Analyzer, you can then use it in IMS Problem Investigator to diagnose problem transactions.

The IMS Connect Transaction Index can be analyzed on its own, or in conjunction with the IMS Connect Extensions journals and IMS log files used to create it. The index is a useful diagnostic mechanism that provides a summary insight into the dynamics of the transaction and provides a shortcut to the cause of the problem.

Processing the IMS Connect Transaction Index

Select the IMS Connect Transaction Index together with the IMS Connect Extensions journals used to create the index. The files are merged and displayed as if they are a single data source.

In the following example, a CA20 filter is specified to display just the index records, hiding all other records from display until they are required.

File Menu Edit Help

Process Log Files Row 33 of 38 More: < >

Command ==> _____ Scroll ==> CSR

Select a Log File to browse. IMS Release 121 + Zone _____

/	Log File	Rel	Filter	Zone
	*CEX INDEX			
ss	'IPI000.QADATA.DGNCEX01.ICON220.JRNL010'		CA20	
	'IPI000.QADATA.DGNCEX01.ICON220.JRNL011'			
	'IPI000.QADATA.DGNCEX01.ICON220.JRNL012'			
	'IPI000.QADATA.DGNCEX01.ICON220.JRNL013'			
ss	'IPI000.QADATA.I2CEXIDX'			

Figure 110. IMS PI: Merge the IMS Connect Transaction Index and original journal files

The following browse panel is the list of all transactions contained in the index, matching the initial filter setting of CA20.

File Menu Edit Mode Navigate Filter Time Labels Options Help			
BROWSE	IPI000.QADATA.DGNCEX01.ICON220.JRNL010	Record 00000055	More: < >
Command ==>	F PART	Scroll ==>	CSR
Forwards / Backwards . .		Time of Day . .	18.00.00.000000
Code Description		Date 2011-09-08 Thursday	Time (Local)
/ -----			
—	CA20 Connect Transaction	TranCode=CEXTCONV	09.26.53.841714
—	CA20 Connect Transaction	TranCode=TIME	09.26.53.973130
—	CA20 Connect Transaction	TranCode=WAIT(5)	09.26.54.131862
—	CA20 Connect Transaction	TranCode=WAIT(20)	09.26.54.165552
—	CA20 Connect Transaction	TranCode=SWITCH	09.26.54.196957
—	CA20 Connect Transaction	TranCode=SWITCH	09.26.54.245134
—	CA20 Connect Transaction	TranCode=SWITCH	09.26.54.296699
—	CA20 Connect Transaction	TranCode=SWITCH	09.26.54.357403
—	CA20 Connect Transaction	TranCode=TIME	09.26.54.416015
—	CA20 Connect Transaction	TranCode=ABEND(40)	09.26.54.442242
—	CA20 Connect Transaction	TranCode=CEXSCONV	09.27.21.150298
—	CA20 Connect Transaction	TranCode=TIME	09.27.21.184749
—	CA20 Connect Transaction	TranCode=WAIT(5)	09.27.21.246913
—	CA20 Connect Transaction	TranCode=SWITCH	09.27.21.280837
—	CA20 Connect Transaction	TranCode=SWITCH	09.27.21.335215

Figure 111. IMS PI: Filtered list of IMS Connect Transaction Index records

Locate a record of interest. In this example, we have entered a FIND command to locate the PART transaction.

Formatting IMS Connect Transaction Index records

You can use IMS Problem Investigator to format and browse the contents of the index records in the same way as any other log record.

The following figure shows formatted records in the IMS Connect Transaction Index.

File				Menu	Edit	Mode	Navigate	Filter	Time	Labels	Options	Help
BROWSE				IPI000.QADATA.I2CEXIDX				Record 000024 String found				
Command ==>								Scroll ==> CSR				
Forwards / Backwards . .								Time of Day . .		18.00.00.000000		
Code Description				Date 2011-09-08 Thursday				Time (Local)				

S_	CA20	Connect Transaction							09.30.08.996476			
TranCode=PART Userid=CEX001 ClientID=IPIPT11 Port=3101												
LogToken=C8574490FB91B742 SSN=0B7 Response=0.420973 CM=0 SYNCLEVEL=1												
TOV=DEFAULT Socket=Tran												

_	CA20	Connect Transaction							09.30.09.279825			
TranCode=PART Userid=CEX001 ClientID=IPIPT12 Port=3101												
LogToken=C857449140A3D201 SSN=0B9 Response=0.279710 CM=0 SYNCLEVEL=1												
TOV=DEFAULT Socket=Tran												

_	CA20	Connect Transaction							09.30.09.368052			
TranCode=PART Userid=CEX001 ClientID=IPIPT13 Port=3101												
LogToken=C857449156428201 SSN=0BB Response=0.289590 CM=0 SYNCLEVEL=1												
TOV=DEFAULT Socket=Tran												

Figure 112. IMS PI: Select an index record

Select an index record to view its contents. All the fields in the record are displayed.

```

BROWSE      IPI000.QADATA.I2CEXIDX                      Record 00002497 Line 00000000
Command ==>                                     Scroll ==> CSR
Form ==> + Use Form in Filter                      Format ==> STD
***** Top of data *****
+0004 Code... CA20 Connect Transaction
+01FC STCK... C8574490FBC7C041 LSN.... 0000000000000076
      Date... 2011-09-08 Thursday Time... 09.30.08.996476.015

+0000 LL..... 020C          ZZ..... 0000          Type..... CA
+0005 Subtype... 20          Ver..... 03

+0030 Base..... Base section
+0030 TASKid.... 0104      CollectTask..... +1
+0033 CEXTECLTask..... +4          CompLvl.... F4
+0038 Key..... Connect Identification key
+0038 HWSname... 'HWSVDP4 ' LogonTK.... C8574490FB91B742
+0048 OTMASSN... 000000B7      InputTK.... 0000000000000000
+0058 EVIDfirst..... 3C      EVIDprev... 48          Aflag1.... 51
+005B Aflag2.... 04          Pflag1.... 38          Pflag2.... 30
+44F2 TOValue... ' 0.00'
+005F TranStart..... '2011-09-08-09.30.08.996476'
+0079 TraceStart..... '09.30.08.996476'          NAKSC..... 0000
+008A Port..... +3101      Socket..... +4          Eflag1.... 73
+008F Eflag2.... EC
+0090 SVTData.... SVT/IRM Data
+0090 Trancode... 'PART ' Userid..... 'CEX001 '
+00A0 OriginDS... 'ICDE ' TargetDS... '
+00B0 ClientID... 'IPIPR11' Tpibe..... 'IPIPR11'
+00C0 XMLadapter.....
+00C8 Tmember... 'XCFMICDE' AltLterm... '
+00D8 ReRoute... ' ReadExit... 'HWSSMPL1' SyncFlag... 41
+00F9 SockFlag... 00      DSIDFlag... 10
+00FB ClientFlag..... 00      IRMTimer... 00
+00FE SenseCode..... 0000
+00D0 IPaddress..... '172.17.69.25 '
+01E8 PortDepth..... +7          RTPmsgct... +0
+01F0 CliACKct... +1      CliNAKct... +0
+01F4 OTMANAKct..... +0

+0110 Events.... Transaction Event Time section
+0110 StartTime..... 09.30.08.996476
+0118 ExitTime... 09.30.09.416929
+0128 OTMAinTime..... 09.30.09.166282
+0130 OTMAoutTime..... 09.30.09.416882
+0140 RdSockTime..... 09.30.09.417186
+0138 TriggerTime..... 09.30.09.417449
+0160 Timezone... Time zone offset fields
+0160 LSOffset... 0      LDTOffset..... 08.00.00.000000

+0170 Transit.... Transaction Transit accounting section
+0170 OTMAdelay..... 0      InputElap..... 0.000282
+0180 RdSockElap..... 0.000073
+0188 READxElap..... 0.000080          RXMLxElap..... 0
+0198 SAFelap... 0      OTMAelap... 0.166945
+01A8 XMITxElap..... 0.000073
+01B0 RdACKelap..... 0.001903          CONFelap... 0.002578
+01C0 TrACKelap..... 0.250599          RTPelap... 0
+01D0 OutputElap..... 0.000567          RespTime... 0.420973

```

Figure 113. IMS PI: IMS Connect Transaction Index record contents

Tab to any point-and-shoot field and press Enter to zoom for more information about the field.

Press the Switch function key (F4) to switch to dump format. Press the SkipPrev function key (F10) to skip to the previous record or the SkipNext function key (F11) to skip to the next record in the index.

Tracking the problem transaction

When you have located the problem transaction, you can use tracking to view all event records associated with the transaction.

Use the TX line action against the relevant IMS Connect Transaction Index record to start tracking that transaction.

File Menu Edit Mode Navigate Filter Time Labels Options Help						
BROWSE IPI000.QADATA.DGNCEX01.ICON220.JRNL010						String found
Command ==>						Scroll ==> CSR
Forwards / Backwards . .				Time of Day . .		18.00.00.000000
Code Description				Date 2011-09-08 Thursday		Time (Local)
/ -----						
tx	CA20	Connect Transaction	TranCode=PART	09.30.08.996476		
—	CA20	Connect Transaction	TranCode=PART	09.30.09.279825		
—	CA20	Connect Transaction	TranCode=PART	09.30.09.368052		
—	CA20	Connect Transaction	TranCode=PART	09.30.09.464258		
—	CA20	Connect Transaction	TranCode=PART	09.30.09.554185		
—	CA20	Connect Transaction	TranCode=DSPALLI	09.30.09.930922		
—	CA20	Connect Transaction	TranCode=DSPALLI	09.30.10.089499		
—	CA20	Connect Transaction	TranCode=DSPALLI	09.30.10.200529		
—	CA20	Connect Transaction	TranCode=ADDINV	09.30.11.979080		
—	CA20	Connect Transaction	TranCode=ADDINV	09.30.12.125252		
—	CA20	Connect Transaction	TranCode=ADDINV	09.30.12.477113		
—	CA20	Connect Transaction	TranCode=ADDINV	09.30.12.570718		
—	CA20	Connect Transaction	TranCode=ADDINV	09.30.12.651367		

Figure 114. IMS PI: Initiate transaction tracking against the index

All Connect event records associated with that transaction are displayed.

File Menu Edit Mode Navigate Filter Time Labels Options Help			
BROWSE IPI000.QADATA.DGNCEX01.ICON220.JRNL010			Tracking active
Command ==>			Scroll ==> CSR
Forwards / Backwards . .		Time of Day . .	18.00.00.000000
Code Description		Date 2011-09-08 Thursday	Time (Local)
/ -----			
—	CA20 Connect Transaction TranCode=PART		09.30.08.996476
—	A049 READ Socket		09.30.08.996549
—	A0A4 Event Collection IRM Trace		09.30.08.996581
—	A03D Message Exit called for READ		09.30.08.996584
—	A0A3 Event Collection OTMA Trace		09.30.08.996626
—	A03E Message Exit returned from READ TranCode=PART		09.30.08.996632
—	A0A3 Event Collection OTMA Trace		09.30.08.996709
—	A041 Message sent to OTMA		09.30.08.996758
—	A0A3 Event Collection OTMA Trace		09.30.09.163681
—	A042 Message received from OTMA		09.30.09.163703
—	A0A3 Event Collection OTMA Trace		09.30.09.163967
—	A0A3 Event Collection OTMA Trace		09.30.09.163975
—	A0A3 Event Collection OTMA Trace		09.30.09.163979
—	A03D Message Exit called for XMIT		09.30.09.163982
—	A0A6 Event Recording EXIT Output Message Trace		09.30.09.164019
—	A03E Message Exit returned from XMIT		09.30.09.164023
—	A04A WRITE Socket		09.30.09.164182
—	A049 READ Socket		09.30.09.166044
—	A049 READ Socket		09.30.09.166085
—	A0A4 Event Collection IRM Trace		09.30.09.166107
—	A03D Message Exit called for READ		09.30.09.166110
—	A0A3 Event Collection OTMA Trace		09.30.09.166139
—	A03E Message Exit returned from READ TranCode=PART		09.30.09.166143
—	A0A3 Event Collection OTMA Trace		09.30.09.166275
—	A041 Message sent to OTMA Resp=ACK		09.30.09.166282
—	A045 OTMA Time-out		09.30.09.416882
—	A0A3 Event Collection OTMA Trace		09.30.09.416925

Figure 115. IMS PI: Track against the index to see the Connect events for the transaction

Problem detection can be done with the IMS Connect Transaction Index on its own or merged with the associated IMS Connect Extensions journals and IMS log files.

Chapter 14. Analyzing OMEGAMON TRF statistics

IMS Problem Investigator complements IBM Tivoli OMEGAMON XE for IMS on z/OS, reporting transaction accounting statistics collected by the Transaction Reporting Facility (TRF).

With the TRF trace running, event statistics are collected by OMEGAMON subsystems and written to the IMS log (TRF Collector records). Subsequently, you can run the TRF post-processor to extract the TRF records for processing independently of the IMS log (TRF Extractor records).

OMEGAMON TRF data

The OMEGAMON Transaction Reporting Facility (TRF) provides detailed transaction accounting by collecting performance and resource utilization data for every IMS transaction.

TRF collects the following data for all transactions within IMS:

1. Transaction response time breakdown, CPU time, and other resource usage statistics
2. Full Function and Fast Path database DL/I call count and elapsed time
3. DB2 database call count and elapsed time

Event statistics are collected by OMEGAMON subsystems with the TRF Trace running. You can control the type of data collected (BMP, DBD, DB2, DLI, FP), the destination to which the TRF data is written (LOGS=IMS or SMF, but IMS Problem Investigator only supports IMS), and the record ID (RECID=160 to 255 decimal, ensuring that it is different to the record ID of other applications that write to the log). The format of the TRF Collector log records is mapped by the Tivoli-supplied macro OMTRF560.

You can then run the TRF post-processor to extract the TRF records from the IMS log data sets. The format of the TRF Extractor output records is mapped by the Tivoli-supplied macro KI2TRFDS.

IMS Problem Investigator supports both record formats.

Note: IMS Performance Analyzer (IMS PA) supports only TRF Extractor output records.

Related reference:

“TRF: OMEGAMON for IMS TRF record codes” on page 392

Transaction performance and resource utilization statistics are collected by OMEGAMON subsystems with the Transaction Reporting Facility (TRF) Trace running. IMS Problem Investigator can process records written by the TRF Collector to the IMS log. IMS Problem Investigator can also process TRF Extractor output records after running the TRF post-processor to extract the TRF records from the IMS log.

Processing OMEGAMON TRF records

OMEGAMON TRF records are formatted and processed by IMS Problem Investigator in a similar way to other record types including IMS log records and IMS Connect Extensions event records.

The steps are:

1. Set the log record code for TRF Collector records in IMS log files. Note that this step is not required for TRF Extractor output records.
2. Define the TRF files to IMS Problem Investigator, either by specifying the individual files in the **Process** panel, or by using the **Systems** and **Groups** facility that is optionally shared with IMS Performance Analyzer.
3. Drill-down from file to record to data field to pursue the cause of problems.
4. Merge files to get a comprehensive view of events over time or across systems in an IMSPLEX.
5. Define filters and forms as required for refining your analysis.
6. Use navigation aids such as tracking and skipping to a point in time to explore the TRF data.
7. Set up batch reporting as required for your job scheduler.

Setting the TRF Collector log record code

If processing TRF Collector records, tell IMS PI the ID of the TRF records written to the IMS log. This step is not required for TRF Extractor output records as they can be identified from the records themselves.

From the IMS Problem Investigator primary option menu, select option **0.4 OMEGAMON for IMS TRF Settings**.

```
IMS PI Profile Options Menu
Option ==> 4
1 IMS PI Settings
2 Extract Allocation Settings
3 IMS Connect Extensions Settings
4 OMEGAMON for IMS TRF Settings
```

Figure 116. Select OMEGAMON for IMS TRF Settings

Specify the record code used by OMEGAMON for IMS Transaction Reporting Facility to prefix the TRF Collector records written to the IMS log.

```
OMEGAMON for IMS TRF Settings
Command ==>
Specify OMEGAMON for IMS TRF settings.
Log Record Code . . . B0 (Hex A0-FF)
```

Figure 117. Specify TRF log record code

Tip: Ideally, OMEGAMON TRF and IMS Connect Extensions use different and unique log record code settings.

Related reference:

“OMEGAMON TRF data” on page 70

IMS PI can process both OMEGAMON Transaction Reporting Facility (TRF) Collector records from the IMS log, and also TRF records extracted from the IMS log by the TRF Extractor utility. Before processing TRF records from the IMS log, you must specify the log code prefix that identifies these records in the log.

Processing TRF Collector records in IMS log files

TRF Collector records are those written to the IMS log by IMS subsystems when TRF is running. For IMS Problem Investigator to process TRF records in IMS logs, first specify the TRF record code and the IMS log files (or systems), then analyze them in the usual way.

From the IMS Problem Investigator primary option menu, select option **0 Profile**.

Specify the data set name of the IMS log file containing the OMEGAMON TRF data and enter line action **S** to display the formatted records.

Process Log Files		Row 24 of 36 More: < >
Command ==>		Scroll ==> CSR
Select a Log File to browse.	IMS Release 121 +	Zone
/	Log File	Rel + Filter + Zone
S	'IPI000.QADATA.TCOMG007.IZDE.OMGLOG'	B0

Figure 118. Selecting a log file to browse

To view only the OMEGAMON TRF records, you can filter by the log record code. In this example, we have specified B0 in the Filter column.

BROWSE	IPI000.QADATA.TCOMG007.IZDE.OMGLOG	Record 00002280 More: < >
Command ==>		Scroll ==> PAGE
Forwards / Backwards . .	HH.MM.SS.THMIJU	Time of Day . . HH.MM.SS.THMIJU
Code Description	Date 2014-04-16 Wednesday	Time (Local)
/	-----	
— B001 Resource Trace		09.40.32.663780
	Region=0001 IMSID=IZDE RecToken=IZDE/0000000A00000000	
— B021 DLI Database Trace		09.40.46.026537
	LTerm=DI21PART Database=DI21PART Region=0001	
	RecToken=IZDE/0000000B00000000 Func=GHU Elapsed=00.001188	

Figure 119. Filtering by log record code B0

Use the Left function key (F10) and the Right function key (F11) to view compact or expanded details, by time or by LSN (log record sequence number).

Enter line action **S** to format a particular record.

Figure 120. Formatting a record using line action **S**

```
BROWSE      IPI000.QADATA.TCOMG007.IZDE.OMGL0G      Record 00002314 Line 00000000  
Command ==> _____ Scroll ==> PAGE  
Form ==> + Use Form in Filter Format ==> STD  
***** Top of data *****  
+0004 Code... B021 DLI Database Trace  
+0064 STCK... C076975928B29B42 LSN.... 0000000000001444  
Date... 2014-04-16 Wednesday Time... 09.40.46.026537.703  
  
+0000 OMLDRECLL..... 0074  
+0002 OMLDRECZZ..... 0000  
+0004 OMLDRECID..... B0 OMLDSUBID..... 21  
+0006 OMLDFLAG1..... 00 OMLDFLAG2..... 00  
+0008 OMLDRSV.... 00000000000000000000000000000000  
+001C OMLDPSTNR..... 0001  
+001E OMLDDBD.... 'DI21PART' OMLDCTIME..... C076975928645402  
+0030 OMLDRTIME..... C076975928AE9802 OMLDIO..... 00000000  
+0040 OMLDFUNC... 'GHU ' OMLDRCODE..... ' '  
+001E OMLDLTERM..... 'DI21PART'  
+0046 OMLDUSID... 'FUNTRM65'  
+0052 OMLDRKTKN..... C9F9C4C54040404000000000B00000000  
+0062 OMLDEPCBT..... 00  
***** End of data *****
```

Figure 121. Formatted record content showing field labels and values

You can press the Switch function key (F4) to switch to DUMP format.

```

BROWSE          IPI000.QADATA.TCOMG007.IZDE.OMGL0G      Record 00002314 Line 00000000
Command ==> _____ Scroll ==> PAGE
                                   Format ==> DUMP

***** Top of data *****
+0000  00740000  B0210000  00000000  00000000  *.....*
+0010  00000000  00000000  00000000  0001C4C9  *.....DI*
+0020  F2F1D7C1  D9E30000  C0769759  28645402  *21PART...p....*
+0030  C0769759  28AE9802  00000000  00000000  *..p...q.....*
+0040  C7C8E440  4040C6E4  D5E3D9D4  F6F50000  *GHU  FUNTRM65..*
+0050  0000C9F9  C4C54040  40400000  000B0000  *..IZDE  .....*
+0060  00000000  C0769759  28B29B42  00000000  *.....p.....*
+0070  00001444  *.....*

***** End of data *****

```

Figure 122. DUMP format

Press the Switch function key (F4) to switch back to standard format.

Position the cursor on a point-and-shoot field name and press Enter to zoom for more details on a particular field.

```

Field Zoom
BROWSE      IPI000.QADATA.TCOMG007.IZDE.OMGLOG      Line 00000000
Command ==> _____ Scroll ==> PAGE
***** Top of data *****
+0030 OMLDRTIME..... C076975928AE9802

Time (LOCAL)... 2014-04-16 09.40.46.026473.500 Wednesday

Return time
***** End of data *****

```

Figure 123. Field Zoom

Processing TRF Extractor output files

TRF Extractor records are those extracted from the IMS log using the TRF post-processor utility.

Specify the data set name of the TRF Extractor output file containing the data that you want to analyze.

```

Process Log Files      Row 9 of 36 More: < >
Command ==> _____ Scroll ==> CSR

Select a Log File to browse.      IMS Release 121 +      Zone _____

/      Log File      Rel + Filter + Zone
S      'IPI000.QADATA.TCOMG008.IZDE.TRF.DET1'
      'IPI000.QADATA.TCOMG008.IZDE.TRF.SUM1'

```

Figure 124. Specifying the data set name of the TRF Extractor output file

Drill down for record and field details.

```

BROWSE      IPI000.QADATA.TCOMG008.IZDE.TRF.DET1      Record 00000006 More: < >
Command ==> _____ Scroll ==> CSR
Forwards / Backwards . .      Time of Day . .
Code Description      Date 2014-04-16 Wednesday      Time (Local)
/ -----
11  Output Message      02.54.21.200000
    Userid=IZDE LTerm=IZDE IMSID=IZDE
-----
S 10  Transaction Message      02.06.14.500000
    TranCode=CEXTCONV Program=CEXTPGM Userid=DVP LTerm=FUNTRM95 Region=0003
    IMSID=IZDE RecToken=IZDE/0000000300000000 InputQ=2.93E+06 CPU=0.774467
    ABEND=U3042
-----
12  IMS System Message      06.12.05.100000
    FS554A IZDEMPPI 00003 REGION CEXTPGM (1) CEXTCONV 000,3042 PSB SMB
-----

```

Figure 125. TRF Extractor output viewed in IMS Problem Investigator

Note: The Zone setting is not relevant to TRF Extractor records as they are written to the file with STCK time stamps in local time.

Processing merged TRF and IMS log files

IMS Problem Investigator can process multiple files, merging them into time sequence according to their STCK time stamps. It is valuable to view TRF log data in conjunction with IMS log data to see, for example, the additional information about DLI and DB2 calls such as response times.

Note: Not all TRF Extractor output records have a time stamp. For any record that does not have a time stamp, IMS Problem Investigator assumes that it has the same time stamp as that of the immediately preceding record.

Enter multiple line actions **S** to select all the files you wish to merge. Alternatively, you can use Move, Copy, and Repeat line actions to bunch the data set names in the Process list, then use the block line action **SS** to browse the merged files.

Process Log Files		Row 7 of 36 More: < >
Command ==> _____		Scroll ==> <u>CSR</u>
Select a Log File to browse.		IMS Release <u>121</u> + Zone _____
/	Log File	Rel + Filter + Zone
SS	'IPI000.QADATA.TCOMG008.IZDE.LOG001'	_____
	'IPI000.QADATA.TCOMG008.IZDE.LOG002'	_____ <u>B0</u> _____
SS	'ALZ000.QADATA.IMS121.LOG.TEST'	_____
	_____	_____

Figure 126. Browsing merged files using block line action **SS**

Defining TRF files for an IMS subsystem

From the IMS Problem Investigator Primary Option Menu, select option **4 Systems** and **5 Groups** to associate TRF data sets with an IMS subsystem.

From the IMS Problem Investigator Primary Option Menu, select option **4 Systems** to display the list of system definitions.

Enter line action **S** to select the IMS subsystem.

File Menu Edit Help			
System Definitions		Row 1 of 1 More: < >	
Command ==> _____		Scroll ==> <u>PAGE</u>	
Specify IMS and Connect systems.			
/	System	Type	VRM + Description
S	<u>IZDE</u>	<u>IMS</u>	<u>131 TRF extractor detail & logs</u>
***** Bottom of data *****			

Figure 127. Selecting an IMS subsystem

Use the Left function key (F10) and the Right function key (F11) to scroll left and right, or specify view 5 to display the list of OMEGAMON TRF Extractor output files.

Note: OMEGAMON TRF Collector records are available from IMS log files which are defined in view 1.

IMS Subsystem		Row 1 of 1 More: < >
Command ==>		Scroll ==> PAGE
 IMS Subsystem definition:		
IMS Subsystem ID	IZDE	IMS Version (VRM) . . . 131 +
Description	TRF extractor detail & logs	
RESLIB Data Set		
Specify required view . . 5	1. DBRC Settings	4. Groups
	2. Log Files	5. OMEGAMON TRF Files
	3. Monitor Files	6. OMEGAMON ATF Journals
Specify the OMEGAMON TRF Files (in time sequence) for this collection:		
/ Exc	Data Set Name (DSN)	UNIT + SEQ VOLSER +
P	'IPI000.QADATA.TCOMG008.IZDE.TRF.DET2'	
***** Bottom of data *****		

Figure 128. Specifying OMEGAMON TRF Extractor output files

Enter line action **S** to select the TRF file for format processing, or line action **P** to add the data set name to the Process list for later format processing with other files.

Investigating particular problems

By processing OMEGAMON TRF data, IMS Problem Investigator can provide a useful insight into DLI and DB2 call activity.

The IMS Problem Investigator dialog provides a number of facilities for exploring log data interactively to help you determine the history of events and the cause of problems; facilities such as tracking transactions and units of work, applying filters and forms, calculating relative times, accommodating different time zones, navigating to a particular time of day or record number, and skipping forwards or backwards through the file by specified time intervals.

Select the relevant group of log files for IMS Problem Investigator to merge and format in time sequence.

Process Log Files			
Command ==>			
		Scroll ==> CSR	
Select a Log File to browse.		IMS Release 121 +	Zone
/	Log File	Rel +	Filter + Zone
SS	'IPI000.QADATA.TCOMG008.IZDE.LOG001'	—	B0 -8
	'IPI000.QADATA.TCOMG008.IZDE.LOG002'	—	
	'IPI000.QADATA.TCOMG008.IZDE.TRF.DET1'	—	10 -8
	'IPI000.QADATA.TCOMG008.IZDE.TRF.SUM1'	—	
	'IPI000.QADATA.TCOMG008.IZDE.TRF.DET2'	—	
SS	'IPI000.QADATA.TCOMG008.IZDE.TRF.SUM2'	—	
		—	

Figure 129. Merge OMEGAMON TRF and IMS log files

Use line action **R** to display relative times.

```

BROWSE      IPI000.QADATA.TCOMG008.IZDE.LOG001      Record 00001368 More: < >
Command ==>                                         Scroll ==> CSR
Forwards / Backwards . . HH.MM.SS.THMIJU      Time of Day . . 17.10.56.568098
Code Description                                Date 2014-05-20 Tuesday      LSN
/ ---- Search limit reached (+5000) -----
R 01      Input Message TranCode=DSN8CS                                18.41.21.202126
 35      Input Message Enqueue TranCode=DSN8CS                        +0.006686
 08      Application Start TranCode=DSN8CS Region=0002                +0.007295
5607     Start of UOR Program=DSN8IC0 Region=0002                    +0.007297
 31      DLI GU TranCode=DSN8CS Region=0002                          +0.009474
5616     Start of protected UOW Region=0002                          +0.009729
5600     Sign-on to ESAF Region=0002 SSID=DB2P                        +0.107514
5600     Thread created for ESAF SSID=DB2P                            +0.107547
5600     Commit Prepare starting Region=0002 SSID=DB2P              +0.131012
 03      Output Message Response LTerm=FUNTRM91                      +0.143590
 35      Output Message Enqueue LTerm=FUNTRM91 Region=0002          +0.143621
 37      Syncpoint Region=0002                                        +0.143659
 37      Syncpoint message transfer Region=0002                      +0.156987
 33      Free Message                                                +0.161589
 03      Output Message Response LTerm=FUNTRM91                      +0.168504
 35      Output Message Enqueue LTerm=FUNTRM91                      +0.168548
 31      Communications GU LTerm=FUNTRM91                            +0.168606
 36      Output Message Dequeue LTerm=FUNTRM91                      +0.173863
 33      Free Message                                                +0.174405
 33      Free Message                                                +0.355563
5600     Commit Continue completed Region=0002 SSID=DB2P            +0.358252
5612     End of Phase 2 Syncpoint Program=DSN8IC0                    +0.358260
S B032 DB2 Summary                                                +0.358998
   Program=DSN8IC0 Region=0002 RecToken=IZDE/0000000600000000
   Calls=2 Shortest=0.000683 Longest=0.017887 Total=0.018570 SSID=DB2P
-----
  B001 Resource Trace                                                +0.358999
        Region=0002 IMSID=IZDE RecToken=IZDE/0000000600000000
-----
 07      Application Terminate                                        +0.359074
        UTC=10.41.21.560995 TranCode=DSN8CS Program=DSN8IC0 Region=0002
        RecToken=IZDE/0000000600000000
        RegTyp=MPP MCNT=1 DBDLI=0 DCDLI=2 CPU=00.015391

```

Figure 130. Displaying relative time

Looking at TRF Collector records, select DB2 Summary to format the field contents of that record.

```

BROWSE      IPI000.QADATA.TCOMG008.IZDE.LOG002      Record 00000877 Line 00000000
Command ==>                                     Scroll ==> PAGE
Form      ==>      +      Use Form in Filter      Format ==> STD
***** Top of data *****
+0004 Code... B032 DB2 Summary
+003C STCK... C0A2A62B68624740      LSN.... 00000000000036D
      Date... 2014-05-21 Wednesday Time... 10.41.21.561124.453

+0000 OMLSRECLL..... 004C
+0002 OMLSRECZZ..... 0000
+0004 OMLSRECID..... B0 OMLSSUBID..... 32
+0006 OMLSPSTNR..... 0002
+0008 OMLSDBD.... 'DSN8IC0 '
+0010 OMLSRKTKN..... C9F9C4C5404040400000000600000000
+0020 OMLSREGN... 80      OMLSI0..... 000000
+0024 OMLSNCALL..... +2
+0028 OMLSQCALL..... 000002AB
+002C OMLSLCALL..... 000045DF
+0030 OMLSETIME..... 0000488A
+0038 OMLSESSNM..... 'DB2P'
***** End of data *****

```

Figure 131. Displaying DB2 Summary

Scroll further along the list of records.

```

BROWSE      IPI000.QADATA.TCOMG008.IZDE.LOG001      Record 00002658 More: < >
Command ==>                                         Scroll ==> CSR
Forwards / Backwards . . HH.MM.SS.THMIJU      Time of Day . . 17.10.56.568098
Code Description                               Date 2014-05-20 Tuesday      Time (Relative)
/ -----
R 01      Input Message TranCode=DSN8PT                               18.49.31.459649
 35      Input Message Enqueue TranCode=DSN8PT                        +0.005759
 08      Application Start TranCode=DSN8PT Region=0002                +0.007010
5607     Start of UOR Program=DSN8IH0 Region=0002                    +0.007011
 31      DLI GU TranCode=DSN8PT Region=0002                          +0.008623
5616     Start of protected UOW Region=0002                          +0.008879
5600     Sign-on to ESAF Region=0002 SSID=DB2P                        +0.038723
5600     Thread created for ESAF SSID=DB2P                            +0.038755
B024     TRF Region=0002 Func=ISRT                                    +0.122059
5600     Commit Prepare starting Region=0002 SSID=DB2P              +0.124209
 03      Output Message Response LTerm=FUNTRM91                      +0.125751
 35      Output Message Enqueue LTerm=FUNTRM91 Region=0002          +0.125774
 37      Syncpoint Region=0002                                        +0.125799
 37      Syncpoint message transfer Region=0002                      +0.126782
 33      Free Message                                                +0.131170
 03      Output Message Response LTerm=FUNTRM91                      +0.137627
 35      Output Message Enqueue LTerm=FUNTRM91                      +0.137659
 31      Communications GU LTerm=FUNTRM91                            +0.137707
 36      Output Message Dequeue LTerm=FUNTRM91                      +0.149798
 33      Free Message                                                +0.151134
 33      Free Message                                                +0.414816
5600     Commit Continue completed Region=0002 SSID=DB2P            +0.415403
5612     End of Phase 2 Syncpoint Program=DSN8IH0                    +0.415410
 07      Application Terminate TranCode=DSN8PT Region=0002          +0.425672
 20      Database Open Database=IVPDB2 Region=0002                  +8.58.169502
 20      Database Open Database=IVPDB1 Region=0002                  +16.06.668420
 21      Database Close Database=IVPDB1I Region=0002                +16.07.046363
 20      Database Open Database=IVPDB1I Region=0002                +16.07.160150
 20      Database Open Database=IVPDB1I Region=0002                +16.07.160162
5957     FP Database Update - DMAC Database=IVPDB3 Region=0002      +24.42.681967
5957     FP Database Update - DMAC Database=IVPDB3 Region=0002      +25.46.148751
S 10      Transaction Message                                     +25.46.148776
          TranCode=DSN8PT Program=DSN8IH0 Userid=DVP LTerm=FUNTRM91 Region=0002
          IMSID=IZDE RecToken=IZDE/0000005000000000 InputQ=0.008629 CPU=0.418659
          -----

```

Figure 132. Scroll to find Transaction Message

Looking at TRF Extractor records, select Transaction Message to format the field contents of that record.

```

BROWSE      IPI000.QADATA.TCOMG008.IZDE.LOG001      Record 00007240 Line 00000000
Command ==>                                     Scroll ==> CSR
Form ==> + Use Form in Filter                      Format ==> STD
***** Top of data *****
+001C Code... 10      Transaction Message
+000C STCK... C0A313485FF40000      LSN.... 0000000000000042
      Date... 2014-05-21 Wednesday Time... 02.49.31.400000.000

+0000 TRFLL..... 01CC      TRFZZ..... 0000
+0004 TRFICNT.... 'FUNTRM91' TRFDT..... 2007143F0249314F
+0014 TRFSMBNM... 'DSN8PT ' TRFTYPE.... 10      TRFRTYPE... 80
+001E TRFRNJOB... 'IZDEMPP2' TRFRNSTP... 'REGION '
+002E TRFRNPGM... 'DSN8IH0 ' TRFRACUS... 'DVP '
+003E TRFSMBCLS..... 00 TRFIMSNM... 'IZDE'
+0043 TRFIMSVER..... 09 TRFIMSREL..... 01
+0045 TRFIMSLEV..... 00 TRFUNIQUE..... 00000000
+004A TRFRESV1... 00000000 TRFSMBCLS9..... 0001
+0050 TRFPSTNR... 0002
+0052 TRFUSRKEY..... Reserved for User EXIT programs
      +0000 00000000 00000000 00000000 00000000 *.....*
      +0010 00000000 00000000 00000000 00000000 *.....*
      +0020 00000000 0000 *.....*

+0078 TRFCOM1.... Common fields for message record
+0078 TRFFILL.... 00000000000000000000 TRFRESV2... 0000
+0084 TRFACCPU... 0000000000000000
+008C TRFSRBTME..... 0000000000000000
+0094 TRFPGMSZE..... 00000000
+0098 TRFLOALOC..... 00000000
+009C TRFHIALOC..... 00000000 TRFIN..... 00000023
+00A4 TRFOUT..... 00000098 TRFOUTQ.... 00000000

+00AC TRFCOM2.... MSG only fields
+00AC TRFALTOUT..... 00000000
+00B0 TRFALTNUM..... +0 TRFINQ..... 00000000
+00B8 TRFPI..... 00000000 TRFPT..... 00000004 TRFR0..... 00000001
+00C4 TRFR1..... 00000001 TRFALTO.... 00000000 TRFMINSY... +0
+00CE TRFMAXSY... +0 TRFNUMSY... +0
+00D2 TRFPSAFLG..... 00 TRFPSABND..... ' '
+00D7 TRFSCCFLG..... 00 TRFSCC..... ' '
+00DB TRFUABEND..... ' '
+00DF TRFSAPTRN..... 0000000000000000
+00E7 TRFSAPTKN..... 0000000000000000
+00EF TRFINODE... 'SC0TCP91'

+00F8 TRFCOM3.... Shared IMS data
+00F8 TRFCOT..... 000000000000000000002E6E
+0104 TRFLOQT.... 000000000000000000000032
+0110 TRFOQT..... 00000000000000000000000032
+011C TRFRKTKN... C9F9C4C54040404000000050 TRFSMFID... 00000000
+012C TRFBQCT.... +0 TRFIQTM.... 0000 TRFOQT2.... 0000
+0132 TRFOQT3.... 0000 TRFVSOR.... +0 TRFVSRD.... +0
+0138 TRFVSWT.... +0
+013A TRFUTC..... UTC of 01 record
+013A TRFUDATE... 2007143F TRFUTIME... 024931459637
+0144 TRFUTODZ... 032C
+0146 TRFIQT1.... 0000000000000000000001B69
+0152 TRFIQT2.... 00000000000000000000021B5
+015E TRFPET..... 0000000000000000000066363
+016A TRFENDTIME..... Process termination UTC (07)
+016A TRFENDTIME..... 2007143F024931885313032C
+0176 TRFSTARTTIME..... Process schedule UTC (08)
. . .

```

Figure 133. Selecting Transaction Message

Zoom on a particular field. In this case, zoom on a flag field for explanation of the bit settings.

```

BROWSE      IPI000.QADATA.TCOMG008.IZDE.LOG001                      Line 00000000
Command ==> _____ Scroll ==> CSR
***** Top of data *****
+001D TRFRTYPE... 80      Region type (MPP, BMP, DBCTL)

On  R@SMPP..... 80      MPP
Off R@SBMP..... 40      BMP
Off R@SFP..... 10      Fast Path
Off R@SDBCTL... 01      DBCTL Thread
Off R@SMSGSW... FF      Region type value for message switch
                          (MSGOUT record only)
***** End of data *****

```

Figure 134. Zooming on a flag field

TRF batch reporting

Batch processing provides formatted record reports similar to the dialog but without the advantage of interactivity. You can also create smaller, filtered extract data sets that can be further analyzed using IMS Problem Investigator.

Line action **SUB** is used to request batch reporting. The dialog generates the JCL which you can edit before submitting the job or before saving elsewhere for later submission by your job scheduler.

The batch operand for OMEGAMON TRF reporting is TRF(xx) where xx denotes the user-specified log code prefix **A0-FF** that identifies OMEGAMON TRF records written to the IMS log.

This is the code specified in your profile settings in “Setting the TRF Collector log record code” on page 190. For example, the following JCL requests a formatted report of TRF records with log record code B0.

```

//ALZTRF JOB (ACCOUNT), 'NAME'
//IMSPI   EXEC PGM=ALZBATCH,PARM=V141
//STEPLIB DD DSN=ALZ.V2R4M0.SALZLINK,DISP=SHR
//SYSPRINT DD SYSOUT=*
//ALZCDS  DD DSN=USER.TRF.SUPPORT.CDS,DISP=SHR
//LOGIN   DD DSN=IPI000.QADATA.TCOMG008.IZDE.LOG002,
//         DISP=SHR
//LOGRPT  DD SYSOUT=*
//SYSIN   DD *
PAGELIM(10000)
ZONE(LOCAL)
CODE(B0)
REPORT
TRF(B0)

```

Related reference:

“TRF command” on page 407

The TRF command is used to request OMEGAMON TRF reporting from IMS logs.

Chapter 15. Analyzing OMEGAMON ATF statistics

OMEGAMON XE for IMS on z/OS Version 4.2 introduces Application Trace Facility (ATF) to provide detailed application-level monitoring of database calls and CPU utilization.

When monitoring, ATF writes near-term history records to active journals (VSAM KSDS). IMS Problem Investigator can process these journals offline.

OMEGAMON ATF data

OMEGAMON ATF complements the summary-level transaction data collected by the Transaction Reporting Facility (TRF).

OMEGAMON ATF provides the following data:

- Application-level detailed monitoring:
 - DLI calls, including SSA, KFBA and I/O area
 - DB2 calls
- DLI call times and CPU utilization (in each IMS region)

The analysis of the data collected by ATF can be used to:

- Identify transaction response-time components
- Fine-tune applications
- Understand how application programs operate

For IMS Problem Investigator analysis, it is recommended to use the journals when ATF is offline (and not actively recording) or copy the journals to offline data sets before processing.

Related reference:

“ATF: OMEGAMON for IMS ATF codes” on page 387

The ATF log type consists of log codes for Tivoli OMEGAMON XE for IMS Application Trace Facility journal records.

Processing OMEGAMON ATF records

OMEGAMON ATF records are formatted and processed by IMS Problem Investigator in a similar way to IMS log records.

Procedure

1. Define the ATF files to IMS Problem Investigator, either by specifying the individual files in the Process panel, or by using the Systems and Groups facility that is shared (optionally) with IMS Performance Analyzer.
2. Drill-down from file to record to data field to pursue the cause of problems.
3. Merge files to get a comprehensive view of events over time or across systems in an IMSplex.
4. Use with filtering and tracking to proactively identify problems.
5. Resolve problems by tracking from ATF records to all other available records (in the IMS log, DB2, and so on).
6. Set up batch reporting as required for your job scheduler.

Browsing records in ATF journals

Use IMS Problem Investigator to browse OMEGAMON ATF journals.

Procedure

1. From the IMS Problem Investigator primary option menu, select option **1 Process**.
2. Specify the data set name of the OMEGAMON ATF journal and enter line action **S** to display the formatted records.

File Menu Edit Mode Navigate Filter Time Labels Options Help									

BROWSE IPI000.ATF.JOURNAL1				Record 00000001 More: < >					
Command ==>				Scroll ==> CSR					
Forwards / Backwards . .				Time of Day . . 12.00.00.000000					
Code Description				Date 2010-10-20 Wednesday Time (Local)					

/									
— 06	PSB Block Loader IWAIT start							12.36.17.385914	
	TranCode=CEXTNONC Program=CEXTPGM Region=0001 IMSID=IBDE								
	RecToken=IBDE/0000000100000000 Elapse=0.002149								

— 06	MPP Scheduling start							12.36.17.499511	
	TranCode=CEXTNONC Program=CEXTPGM Userid=DVP LTerm=FUNTRM65 Region=0001								
	IMSID=IBDE RecToken=IBDE/0000000100000000								

— 06	VSAM IWAIT start							12.36.17.603465	
	TranCode=CEXTNONC Program=CEXTPGM Userid=DVP LTerm=FUNTRM65 Region=0001								
	IMSID=IBDE RecToken=IBDE/0000000100000000 Elapse=0.007777								

— 06	MPP Termination start							12.36.33.192527	
	TranCode=CEXTNONC Program=CEXTPGM Userid=DVP LTerm=FUNTRM65 Region=0001								
	IMSID=IBDE RecToken=IBDE/0000000100000005								

— 06	MPP Scheduling start							12.36.33.195674	
	TranCode=CEXTCONV Program=CEXTPGM Userid=DVP LTerm=FUNTRM65 Region=0001								
	IMSID=IBDE RecToken=IBDE/0000000200000000								

Figure 135. Browsing an ATF journal

3. Press the Left function key (F10) and the Right function key (F11) to view compact or expanded details, by time or by LSN (log record sequence number).
4. Enter line action **S** to select particular records to view the application-level detail.

```

BROWSE      IPI000.QADATA.TCATF001.ATF.IADG01      Record 00012556 Line 00000000
Command ==>                                     Scroll ==> CSR
Form ==> ATF01 + Use Form in Filter              Format ==> STD
***** Top of data *****
+0012 Code... 01      DLI GHU
+0034 STCK... C519C82C909C1B83      LSN.... 00000000000011ED
      Date... 2009-11-17 Tuesday      Time... 15.39.31.489217.719

+0000 ATRRLL..... 0175
+0004 ATRRKEY.... Record Key
+0004 ATRRDATE... 20091117      ATRRTIME... 073931497932
+000E ATRRECL1... 0167      ATRRECLN... 0165      ATRTYPE.... 01
+0013 ATRSTYPE... 62      ATRPST..... 0004
+0016 ATRCOR..... Correlation Id
+0016 ATRCORID... 'IADG'      ATRCORPST..... 0004
+001C ATRCORTIME..... C519C82B98B4EC40
+0024 ATRCRE..... Recovery Token
+0024 ATRCREID... 'IADG'      ATRCREOASN..... 000001E7
+0030 ATRCRECOMN..... 00000002
+0034 ATRSTART... C519C82C909C1B83      ATRRELAPS... 0.000145
+0044 ATRSEQNR... +0      ATRRECNR... +1223      ATRPSTN.... 0000
+004E ATRTRAN.... 'CEXTCONV' ATRPSB..... 'CEXTPGM '
+005E ATRLTERM... 'GPL2'      ATRUSRID... 'GPL2'
+006E ATRDNAME... 0000000000000000      ATRRCVER... 00
+0077 ATRLVL..... +0      ATRJLFKY... 00000000000000000000

+0082 ATRVAR..... Variable Trace Data
+0082 ATRLL..... 00F3

+0084 ATRMONS.... Resource Trace Data
+0084 ATRRSRC1... 'DI21PART' ATRRSRC2... 'PARTROOT'

+0094 ATRDLIS.... DL/I Trace Data
+0094 ATRVERB.... 'GHU'      ATRRC..... ' '
+00CC ATRDXEL.... DL/I Trace Element
+00CC ATRDX@E.... 0001B1F4      ATRDXTY.... 02      ATRDXF..... 00
+00D2 ATRDX#..... 0011
+00D4 ATRDXV..... Element Data - Key Feedback Area 1
      +0000 C3C5E740 E3C5E2E3 40D2C5E8 40000000 *CEX TEST KEY ...*
      +0010 00 *
+00E5 ATRDXEL.... DL/I Trace Element
+00E5 ATRDX@E.... 1BD63390      ATRDXTY.... 01      ATRDXF..... 00
+00EB ATRDX#..... 004C
+00ED ATRDXV..... Element Data - I/O Area 2
      +0000 C3C5E740 E3C5E2E3 40D2C5E8 40000000 *CEX TEST KEY ...*
      +0010 0040F2F0 F0F94BF1 F14BF1F7 4040F0F7 *. 2009.11.17 07*
      +0020 7AF3F97A F3F10000 00000000 00000000 *:39:31.....*
      +0030 00000000 00000000 00000000 00000000 *. ....*
      +0040 00000000 00000000 00000000 *. ....*

+0139 ATRDXEL.... DL/I Trace Element
+0139 ATRDX@E.... 9BD7177D      ATRDXTY.... 04      ATRDXF..... 00
+013F ATRDX#..... 0034
+0141 ATRDXV..... Element Data - Qualified SSA 3
      +0000 D7C1D9E3 D9D6D6E3 4DD7C1D9 E3D2C5E8 *PARTROOT(PARTKEY*
      +0010 40407EC3 C5E740E3 C5E2E340 D2C5E840 * =CEX TEST KEY *
      +0020 00000000 5D00001B D716FC00 01B1D01B *. ....)....P.....*
      +0030 D633909B *0... *

```

Figure 136. Formatted ATF record display

5. Observe **1** the Key Feedback Area, **2** the I/O area, and **3** the Segment Search Argument.

Filtering ATF records

To view only the OMEGAMON ATF records, filter by the log record code.

In this example, we have specified a dynamic filter to display all the transaction summary 04 event records.

VIEW	Filter	Row 1 of 1 More: < >
Command ==>		Scroll ==> CSR
Filter ATF04 +		
Description . . . ATF Summary record filter _ Activate Tracking		
/ Log Code + Exc Description		
- ATF 04	Summary	
Level 1	Conditions No	Form + REXX

Figure 137. ATF filter

Tracking a transaction

To analyze an individual transaction, you can launch tracking from an ATF record and show event times relative to that record.

BROWSE	IPI000.QADATA.TCATF001.ATF.IADG01	Record 00012552 More: < >
Command ==>	FILTER	Scroll ==> CSR
Forwards / Backwards . .	00.05.00.000000	Time of Day . . 09.58.17.780783
Code Description	Date 2009-11-17 Tuesday	Time (Relative)
/ -----		
R 05	DLI IOPCB GU SC=' '	15.39.31.488654
05	DLI IOPCB GN SC=' ' Elapse=0.000035	+0.000041.679
01	DLI GHU Database=DI21PART SC=' ' Elapse=0.000281	+0.000097.859
01	DLI REPL Database=DI21PART SC=' ' Elapse=0.000144	+0.000403.992
01	DLI GHU Database=DI21PART SC=' ' Elapse=0.000145	+0.000562.953
01	DLI DLET Database=DI21PART SC=' ' Elapse=0.000152	+0.000725.421
01	DLI ISRT Database=DI21PART SC=' ' Elapse=0.000230	+0.000890.492
87	ESS Signon SSID=DB2A Elapse=0.000658	+0.001285.242
82	DB2 OPEN SSID=DB2A Stmt#=939 Code=0 Elapse=0.000203	+0.001994.484
82	DB2 FETCH SSID=DB2A Stmt#=941 Code=0 Elapse=0.000810	+0.002425.867
82	DB2 FETCH SSID=DB2A Stmt#=941 Code=0 Elapse=0.000066	+0.003472.671
82	DB2 FETCH SSID=DB2A Stmt#=941 Code=0 Elapse=0.000068	+0.003718.296
82	DB2 FETCH SSID=DB2A Stmt#=941 Code=0 Elapse=0.000045	+0.003968.984
82	DB2 FETCH SSID=DB2A Stmt#=941 Code=0 Elapse=0.000046	+0.004224.679
82	DB2 FETCH SSID=DB2A Stmt#=941 Code=0 Elapse=0.000045	+0.004470.875
82	DB2 FETCH SSID=DB2A Stmt#=941 Code=0 Elapse=0.000044	+0.004692.125
82	DB2 FETCH SSID=DB2A Stmt#=941 Code=0 Elapse=0.000047	+0.004961.750
82	DB2 FETCH SSID=DB2A Stmt#=941 Code=0 Elapse=0.000085	+0.005335.070
82	DB2 UPDATE SSID=DB2A Stmt#=961 Code=0 Elapse=0.000350	+0.005675.687
82	DB2 CLOSE SSID=DB2A Stmt#=966 Code=0 Elapse=0.001755	+0.006229.874
82	DB2 DELETE SSID=DB2A Stmt#=983 Code=0 Elapse=0.001585	+0.008212.366
82	DB2 INSERT SSID=DB2A Stmt#=996 Code=0 Elapse=0.000318	+0.010040.804
05	DLI IOPCB ISRT SC=' ' Elapse=0.000114	+0.010580.484
05	DLI IOPCB ISRT SC=' ' Elapse=0.000168	+0.010711.546
TX 04	Summary TranCode=CEXTCONV Region=0004 Elapse=0.018417	-0.000551.937
***** Bottom of Data *****		

Figure 138. Tracking from an ATF record

Investigating particular activity

IMS Problem Investigator provides both drill-down and merge facilities to help you investigate activity within transactions and across systems.

Drill-down from file to record to data field to show activity at various levels of detail.

Merge files to get a comprehensive view of events over time or across systems in an IMSplex.

Showing DLI call KFBA, I/O area, SSA

OMEGAMON ATF records have useful DLI call information, including the key feedback area (KFBA), I/O area, and the SSA specification.

```
BROWSE      IPI000.QADATA.TVFG2B03.V420.ATF001      Record 00000395 Line 00000027
Command ==>
Form      ==> ATF01      + / Use Form in Filter      Scroll ==> CSR
Format ==> FORM

+00A4  ATRDLIS.... DL/I Trace Data
+00A4  ATRVERB.... 'GU '      ATRRC..... ' '      ATRDXLL.... 00D9

+00E4  ATRDXV..... Key Feedback Area
+0000  F0F2C1D5 F9F6F0C3 F1F04040 40404040      *02AN960C10      *
+0010  40      *      *

+00FD  ATRDXV..... I/O Area
+0000  F0F2C1D5 F9F6F0C3 F1F04040 40404040      *02AN960C10      *
+0010  40404040 40404040 4040E6C1 E2C8C5D9      *      WASHER*
+0020  40404040 40404040 40404040 40404040      *      *
+0030  40400000 00000000 00000000 00000000      * .....*
+0040  00000000 00000000 00000000      *......*

+0151  ATRDXV..... Qualified SSA
+0000  D7C1D9E3 D9D6D6E3 4DD7C1D9 E3D2C5E8      *PARTROOT(PARTKEY*
+0010  40407EF0 F2C1D5F9 F6F0C3F1 F0404040      * =02AN960C10      *
+0020  40404040 5D000000 00000000 00000000      * .....*
+0030  00000000      *. ....*

***** End of data *****
```

Figure 139. OMEGAMON ATF records

Combining ATF with Open Database

IMS Problem Investigator can process multiple files, merging them into time sequence according to their STCK time stamps. It is valuable to view ATF journal data in conjunction with IMS log data or Connect event journals to see, for example, additional information about ODBM activity.

File Menu Edit Mode Navigate Filter Time Labels Options Help			

BROWSE	QADATA.DRDAT111.ICON.D1003	Record 00000308	More: < >
Command ==>		Scroll ==>	CSR
Forwards / Backwards . . 00.00.00.000100		Time of Day . . 16.46.22.845746	
Code Description		Date 2010-03-31 Wednesday Time (LOCAL)	
/-----			
—	A049 READ Socket		13.46.47.095038
—	A05B DRDA CC06 SSALIST-List of segment search argument		13.46.47.095045
—	A0AA ODBM Trace: Message sent to ODBM		13.46.47.095985
—	A069 Message sent to ODBM		13.46.47.096016
—	06 OSAM IWAIT start TranCode=ODBA02CD Region=0003		13.46.47.142891
—	20 Database Open Database=EMPDB2 Region=0003		13.46.47.143647
—	06 OSAM IWAIT start TranCode=ODBA02CD Region=0003		13.46.47.181506
—	20 Database Open Database=AUTODB Region=0003		13.46.47.182252
—	06 OSAM IWAIT start TranCode=ODBA02CD Region=0003		13.46.47.191442
—	01 DLI GHU Database=EMPLDB2 SC=' ' Elapse=0.095875		13.46.47.096570
—	B021 DLI Database Trace Database=EMPLDB2 Func=GHU		13.46.47.192378
—	A0AA ODBM Trace: Message received from ODBM		13.46.47.192881
—	A06A Message received from ODBM		13.46.47.192909
—	A05C DRDA 2205 OPNQRYRM-Open Query Complete		13.46.47.193186
—	A04A WRITE Socket		13.46.47.193515
—	A048 Trigger Event for ODBMMSG		13.46.47.193554
—	A03C Prepare READ Socket		13.46.48.120636

Figure 140. Combining ATF with Open Database

Defining ATF files for an IMS subsystem

How to define ATF files to IMS Problem Investigator.

About this task

Primary menu options **4 Systems** and **5 Groups** allow you to associate ATF data sets with an IMS subsystem.

Procedure

1. From the Primary Option Menu, select option **4 Systems** to display the list of system definitions.
2. Enter line action **S** to select the IMS subsystem.

File Menu Edit Help			

System Definitions			Row 1 of 1 More: < >
Command ==>		Scroll ==>	PAGE
Select to specify input files.			
		Auto_File	
		----- Files -----	Selection
/ System	Type	VRM + Log	Mon CEX TRF ATF DBRC CEX
S IZDX	IMS	121	Yes No Yes Yes Yes
***** End of list *****			

Figure 141. Selecting an IMS subsystem

3. Use the Left function key (F10) and the Right function key (F11) to scroll, or specify view 6 to display the list of OMEGAMON ATF journal data sets.

```

                                IMS Subsystem          Row 1 of 1 More: < >
Command ==> _____ Scroll ==> PAGE

IMS Subsystem definition:
IMS Subsystem ID . . . . IZDX  IMS Version (VRM) . . . 121  +
Description . . . . . System with ATF tracing
RESLIB Data Set . . . . 'IMS.V1210DEV.SDFSRESL'
-----
Specify required view . . 6  1. DBRC Settings      4. Groups
                             2. Log Files          5. OMEGAMON TRF Files
                             3. Monitor Files      6. OMEGAMON ATF Journals
-----
Specify the OMEGAMON ATF Journals for this system:

/  Exc      Data Set Name (DSN)
S      'JCH.ATF.JOURNAL1'
***** Bottom of data *****

```

Figure 142. Listing OMEGAMON ATF journal data sets

4. Enter line action **S** to select the ATF file for format processing, or line action **P** to add the data set name to the Process list for later format processing with other files.

Chapter 16. Analyzing DB2 activity in IMS transactions

IMS Problem Investigator can be used to report records in DB2 log files. It also can report IMS and DB2 events within a single IMS transaction by merging IMS and DB2 log files. This allows you to measure transaction event latencies and to investigate performance problems when IMS transactions use DB2 databases.

IMS Problem Investigator supports DB2 versions 10, and 11, and both DB2 archive and active log files.

IMS Problem Investigator helps you analyze IMS transactions that use DB2. When merged with the IMS log file, DB2 and IMS events associated with IMS transactions can be viewed together in a single diagnostic session.

Merging DB2 with IMS log data allows you to:

- Track both IMS and DB2 events associated with an IMS transaction, to help determine whether DB2 is the cause of a problem in IMS.
- Measure DB2 and IMS event latencies that can be the cause of poor performance.
- Investigate the type of DB2 activity undertaken by IMS transactions.
- Review update activity against DB2 databases.
- Identify the DB2 URID and LUWID tokens associated with an IMS transaction, then use this information to investigate the problem further with tools like the DB2 Log Analyzer.

DB2 log record data

DB2 log records provide detailed recovery information about each change operation performed against DB2 database objects.

These changes are recorded as database *undo* (backout) records, *redo* (reapply) records, or a combination of both. The presence of these log records allows DB2 to either commit or back out in-doubt database changes encountered during DB2 system restart or after an application or transaction failure. DB2 log records are initially written to a VSAM linear data set and then later offloaded, via an automatic archiving process, to a sequential data set called a DB2 archive log file. IMS PI is now able to read and interpret the DB2 log records, whether archive or active. The format of DB2 log records is mapped by the DB2-supplied macro DSNDQJ00 in data set DSN.SDSNMACS.

Umbrella log record codes

IMS Problem Investigator has introduced umbrella log codes specifically for DB2 to enable you to view and process the various log records written by DB2.

Each umbrella code represents a category of DB2 log record. Each DB2 record type belongs to an umbrella code, enabling you to filter against DB2 records. This technique is especially useful when applied to the category of DB2 checkpoint records which are many in both form and number. You can choose to exclude all DB2 checkpoint records from this view and thereby create a more transaction-centric view of the log data.

Table 12 on page 388 lists the DB2 umbrella log record codes used by IMS PI and the corresponding actual DB2 log record codes included under that umbrella.

Related reference:

“DB2: DB2 log record codes” on page 388

The following table describes the DB2 umbrella log record codes used by IMS PI and the corresponding actual DB2 log record codes included under that umbrella.

DB2 correlation tokens

DB2 uses three correlation tokens to uniquely identify DB2 transactional updates – RBA, URID and LUWID.

IMS PI uses these tokens for:

1. Tracking – Connecting IMS and DB2 event records to report the complete end-to-end picture for a transaction.
2. Identification – Locating the problem IMS transaction using IMS PI, then using identification information to relate it to more in-depth reporting provided by DB2 tools such as the DB2 Log Analyzer.

RBA - Relative byte address

IMS PI reports the DB2 log record relative byte address (RBA) as the log sequence number, not the usual record sequence number normally associated with the IMS log. DB2 log records are blocked into 4K physical records. DB2 uses the relative byte offset (RBA) in the physical log file to access the record directly. RBA values enable you to pinpoint particular areas of interest in the DB2 log, relevant when investigating problems using other complementary DB2 log reporting products.

URID - Unit of recovery identifier

DB2 unit of recovery records are cut by transactional DB2 database change (insert, delete, update) operations. A DB2 unit of recovery is uniquely identified by a 6-byte unit of recovery identifier (URID). The URID represents the position (RBA) of the first log record for this unit of work. The sequence of DB2 records for a unit of recovery is bound by a begin unit of recovery record and an end commit phase 2 record. Each DB2 log record associated with the unit of recovery contains the identifying URID.

A global field called URID is introduced for reporting, filtering and tracking purposes. You can use Track Transaction (TX line action) or Track Unit of Recovery (TU line action) to display only those records associated with the required DB2 unit of recovery.

Merging IMS and DB2 logs extends tracking to display IMS and DB2 events associated with an individual transaction. The IMS Recovery Token (Global field RECTOKEN) is present in the DB2 Unit of Recovery Control - End Commit Phase 1 record, effectively tying related DB2 and IMS event records together and allowing this enhanced tracking to occur.

LUWID - Logical unit of work identifier

The DB2 logical unit of work ID (LUWID) is a composite correlation token that also uniquely identifies the transaction (along with the URID). It can be used to correlate the analysis of IMS transactions using IMS PI with more in-depth DB2 log analysis using tools such as the DB2 Log Analyzer.

The type 0020 DB2 begin unit of recovery record contains both the URID and LUWID tokens. Observe the RBA in the LSN column.

Code	Description	Date	2008-01-25 Friday	LSN
0020	DB2 Unit of Recovery Control - Begin UR			000000000291A400
	Userid=SYSOPR SSID=DB3A LUWID=FTS3 /DB3ALU /C1D9273DAF76/0001			
	URID=00000291A400			

Figure 143. Type 0020 DB2 begin unit of recovery record

DB2 log record formatting

Limited formatting of DB2 log records is provided. The information provided is useful for the DB2 systems programmer or database administrator to identify a problem.

To investigate further and obtain a more complete picture of the DB2 activity associated with the IMS transaction, use other tools like the IBM DB2 Log Analysis Tool for z/OS (program number 5655-T56).

You can use the LUWID to correlate the IMS transaction to the associated DB2 update report.

IMS Problem Investigator DB2 log record formatting shows:

- Database identifier (DBID), pageset identifier (PSID), page number and the action performed (insert/delete/update). These become useful when investigating a problem for a particular transaction update.
- The complete DB2 table row being inserted or deleted, including the row header clearly identified. However, not all DB2 database changes include the full row image in the log and often only a partial update image is available – DB2 only provides what it needs to recover the update. Full or partial update data is shown in hexadecimal dump notation for clarity.
- Compressed data. The log data may be compressed (if the database administrator has selected that functionality) and IMS PI will only be able to show what is actually in the log (i.e. compressed data).
- Compensation log records (CLR) – records written during system recovery to compensate for backed out log changes or committed indoubt changes.

The type 0020 DB2 update Data Page record shows database identification and data change information.

```

BROWSE      JCH.IMSPI.MQ.DB2                      Record 00000759 Line 00000000
Command ==>                                     Scroll ==> CSR
Form ==> DB2 + _ Use Form in Filter              Format ==> STD
***** Top of data *****
+0004 Code... 0020 DB2 Update In-Place in a Data Page
+001E STCK... C1D9273DB2F40002      LSN.... 000000000291A894
      Date... 2008-01-25 Friday      Time... 09.49.26.702912.000

+0000 LRHLL..... 004C
+0004 LRHRTYPE... 0600      LRHSTYPE... 0001      LRHRMID.... 0E
+0009 LRHFLAGS... 80      LRHURID.... 00000291A804
+0010 LRHLINK.... 00000291A804      LRHREL..... 05
+0017 LRHLEN..... 26      LRHUNLSN... 00000291A804
+001E LRHTIME.... C1D9273DB2F40002
+001E LRHLRSN.... C1D9273DB2F4      LRHMEMID... 0002

+0026 LRHDBHDR... Database identification
+0027 LRHDBID.... 0105      LRHPSID.... 0002      LRHDFLAG... 01

+0038 LRHUPDTH... Update information
      LRHACTN.... 'Update'
      LRHDESC... 'Partial user row update
      LRHVARNO... +2      LRHUFLAG... C0

+0040 LRHUPDTE... Update data
+0040 LRHOSSET.... +52
+0042 LRHREDOD... Redo Data
      +0000 F140      *1      *
+0044 LRHUNDOD... Undo Data
      +0000 F240      *2      *

***** End of data *****

```

Figure 144. Type 0020 DB2 update Data Page record

Locating the DB2 log files for analysis

You can use the DB2-supplied print log map utility DSNJU004 to determine the DB2 log files and date ranges.

```

//DB2LOG1 JOB ,NOTIFY=&SYSUID
//*
//STEP1 EXEC PGM=DSNJU004
//STEPLIB DD DISP=SHR,DSN=DB2.SDSNLOAD
//SYSPRINT DD SYSOUT=*
//SYSUT1 DD DISP=SHR,DSN=DB2P.BSDS01

```

Figure 145. JCL to list the DB2 log files and their time span

In a data sharing environment, use the following JCL.

```
//DB2LOG2 JOB ,NOTIFY=&SYSUID
//*
//STEP1 EXEC PGM=DSNJU004
//STEPLIB DD DISP=SHR,DSN=DB2.SDSNLOAD
//SYSPRINT DD SYSOUT=*
//GROUP DD DISP=SHR,DSN=DB2G.BSDS01
//SYSIN DD *
        MEMBER (DB2P)
/*
```

Figure 146. JCL to list the DB2 log files and their time span in a data sharing environment

Sample job output showing DSN and time span:

```
000AA94BB000      000AAB67AFF      2008.002 21:25 DSN=DB2P.ARCHLOG1.A0001645
2008.002 05:29:00.0 2008.002 12:17:07.4      PASSWORD=(NULL) VOL=DATA08 UNIT=SYSALLDA
                                           CATALOGUED
```

Figure 147. DB2 log data set name and time span

Related reference:

“DB2 log data” on page 70

To specify DB2 log files for analysis, you must first determine the name of the relevant DB2 log data sets and their date ranges. You can use the supplied sample JCL to run the DB2-supplied print log map utility DSNJU004.

Processing DB2 log files

You can browse merged IMS and DB2 logs to see all the IMS and DB2 database activity that occurred during an IMS unit of work.

The steps to analyze DB2 activity in IMS transactions include:

1. Define the IMS and DB2 log files to IMS PI.
2. Merge the IMS and DB2 log records in time sequence.
3. Exclude DB2 log records not associated with transaction activity.
4. Locate and track the problem transaction.

Merging IMS and DB2 log files

To analyze DB2 activity in IMS transactions, specify the data set names of the IMS and DB2 log files containing the data to be analyzed.

From the IMS Problem Investigator Primary Option Menu, select option **1 Process**.

To merge the IMS and DB2 log files, select them all using line action **S** or the block line action **SS**.

Process Log Files			
Command ==>			Scroll ==> <u>CSR</u>
Select a Log File to browse.		IMS Release <u>121</u> +	Zone _____
/	Log File	Rel	+ Filter + Zone
S	'IPI000.QADATA.SLDSP.IZDE.D08311.T0548030.V00'	_____	<u>01</u> _____
S	'IPI000.QADATA.TCN000N.DB2P.ARCHLOG1.A0000826'	_____	_____

Figure 148. Merge IMS and DB2 log files

Excluding records of no interest to the analysis

IMS transactions mainly generate type 0020 unit of recovery DB2 log records. If other record types clutter your analysis, you can exclude (hide) them from the display.

Enter line action **X** to exclude particular record types to hide information that is not relevant to transaction activity. For example, DB2 checkpoint records (log record code 0100) and DB2 system event records (log code 0010).

```
BROWSE      IPI000.QADATA.SLDSP.IZDE.D08311.T0548030.  Record 00000003 More: < >
Command ==>                                     Scroll ==> CSR
Forwards / Backwards . . HH.MM.SS.THMIJU   Time of Day . . 06.39.08.873946
Code Description                               Date 2014-03-17 Monday   LSN
/ -----
X 0100 DB2 Checkpoint - Inactive UR           2-000003EC723AF8
— 0100 DB2 Checkpoint - Inactive UR           2-000003EC723B22
— 0100 DB2 Checkpoint - Inactive UR           2-000003EC723B4C
— 0100 DB2 Checkpoint - Inactive UR           2-000003EC723B76
```

Figure 149. Exclude DB2 log records not associated with transaction activity

Locating and tracking the problem transaction

To analyze a problem transaction, use any of the interactive navigation aids to position on a record in the transaction, then use tracking to exclude all records not in the transaction or unit of recovery.

Navigate to the point in the log file and locate the problem transaction. You can navigate to the particular IMS unit of work that you are interested in by using either the navigation bar (to skip forward/backward in time, or to a particular time) or by scrolling using the Backward function key (F7) and the Forward function key (F8). Navigation can be made easier by using the **F11** key to toggle from the compact view to the expanded view showing the global field values.

Then use transaction tracking (line action **TX**) to isolate all IMS and DB2 log records associated with the transaction. If program switches are involved, you can use line action **TU** to track a single unit of recovery.

```
BROWSE      IPI000.QADATA.SLDSP.IZDE.D08311.T0548030.  Record 00000670 More: < >
Command ==>                                     Scroll ==> CSR
Forwards / Backwards . . _____ Time of Day . . 06.39.08.873946
Code Description                               Date 2014-03-17 Monday   Time (LOCAL)
/ -----
TX 01      Input Message TranCode=DSN8CS           06.39.08.873946
      TranCode=DSN8CS Userid=MKR LTerm=FUNTRM69 Terminal=SC0TCP69
      OrgUOWID=IZDE/BFAAB15B1C05B220
-----
— 01      Input Message TranCode=DSN8PS           06.39.35.053974
— 01      Input Message TranCode=DSN8PS           06.39.39.351761
— 01      Input Message TranCode=DSN8PS           06.39.44.980011
— 01      Input Message TranCode=DSN8PS           06.39.46.715577
— 01      Input Message TranCode=DSN8CS           06.40.07.252390
```

Figure 150. Use transaction tracking to isolate records for this transaction

Measuring IMS and DB2 event latencies

You can view record time stamps as a time of day, the elapsed time relative to a selected record, or the elapsed time between records.

Use relative time (line action **R**) to observe the elapsed time of each event since the start of the IMS transaction. This enables detailed transaction component response time to be shown.

```

BROWSE      IPI000.QADATA.SLDSP.IZDE.D08311.T0548030.  Record 00000670 More: < >
Command ==>                                     Scroll ==> CSR
Forwards / Backwards . . HH.MM.SS.THMIJU   Time of Day . . 13.00.22.619912
Code Description                               Date 2014-03-17 Monday   Time (Relative)
/ -----
R 01  Input Message TranCode=DSN8CS                               06.39.08.873946
 35  Input Message Enqueue TranCode=DSN8CS                       +0.004810
 08  Application Start TranCode=DSN8CS Region=0001                +0.005704
5607 Start of UOR Program=DSN8IC0 Region=0001                    +0.005705
 31  DLI GU TranCode=DSN8CS Region=0001                          +0.011000
5616 Start of protected UOW Region=0001                          +0.011259
5600 Sign-on to ESAF Region=0001 SSID=DB2P                       +0.108747
5600 Thread created for ESAF SSID=DB2P                           +0.108783
 0020 DB2 Unit of Recovery Control - Begin UR                     +0.111003
 0020 DB2 Exclusive Lock on Pageset Partition or DBD              +0.111019
 0010 DB2 Savepoint                                               +0.111019
 0020 DB2 Type 2 Index Update                                     +0.111035
 0020 DB2 Delete from a Data Page                                +0.111051
 0020 DB2 Update Area Map/Spacemap Bit Changes or Whole Byte     +0.111067
5600 Commit Prepare starting Region=0001 SSID=DB2P               +0.120304
 0020 DB2 Unit of Recovery Control - End Commit Phase 1           +0.121547
 03  Output Message Response LTerm=FUNTRM69                      +0.124069
 35  Output Message Enqueue LTerm=FUNTRM69 Region=0001           +0.124090
 37  Syncpoint Region=0001                                        +0.124114
 37  Syncpoint message transfer Region=0001                       +0.147954
 33  Free Message                                                +0.151686
 03  Output Message Response LTerm=FUNTRM69                      +0.158232
 35  Output Message Enqueue LTerm=FUNTRM69                       +0.158268
 31  Communications GU LTerm=FUNTRM69                             +0.158315
 36  Output Message Dequeue LTerm=FUNTRM69                       +0.191468
 33  Free Message                                                +0.194561
 33  Free Message                                                +0.485870
 0020 DB2 Unit of Recovery Control - Begin Commit Phase 2         +0.486011
 0020 DB2 Unit of Recovery Control - End Commit Phase 2           +0.487803
5600 Commit Continue completed Region=0001 SSID=DB2P             +0.488264
5612 End of Phase 2 Syncpoint Program=DSN8IC0                    +0.488271
 07  Application Terminate TranCode=DSN8CS Region=0001            +0.488743
***** Bottom of Data *****

```

Figure 151. Measure IMS and DB2 event latencies using relative time

Alternatively, use elapsed time (line action **E**) to view event latencies. This shows the actual elapsed times of the transactional components. By comparing all IMS and DB2 component timings, any latencies and transactional delays can be identified.

Use the Right function key (F11) to view additional record information.


```

BROWSE      IPI000.QADATA.SLDSP.IZDE.D08311.T0548030.  Record 00000670 More: < >
Command ==> Scroll ==> CSR
Forwards / Backwards . . HH.MM.SS.THMIJU  Time of Day . . HH.MM.SS.THMIJU
Code Description                      Date 2014-03-17 Monday  Time (Elapsed)
/-----
E 01  Input Message TranCode=DSN8CS                      06.39.08.873946
_ 35  Input Message Enqueue TranCode=DSN8CS                0.004810
_ 08  Application Start TranCode=DSN8CS Region=0001        0.000894
_ 5607 Start of UOR Program=DSN8IC0 Region=0001           0.000000
_ 31  DLI GU TranCode=DSN8CS Region=0001                  0.005295
_ 5616 Start of protected UOW Region=0001                 0.000258
_ 5600 Sign-on to ESAF Region=0001 SSID=DB2P              0.097488
_ 5600 Thread created for ESAF SSID=DB2P                  0.000035
-----
_ 0020 DB2 Unit of Recovery Control - Begin UR              0.002220
      Userid=MKR IMSID=IZDE LUWID=FTS1 /DB2PLU /BFAAB15B369A/0001
      URID=0003EC72C7E3 1
-----
_ 0020 DB2 Exclusive Lock on Pageset Partition or DBD      0.000016
_ 0010 DB2 Savepoint                                     0.000000
_ 0020 DB2 Type 2 Index Update                             0.000016
S 0020 DB2 Delete from a Data Page                         0.000016
_ 0020 DB2 Update Area Map/Spacemap Bit Changes or Whole Byte 0.000016
_ 5600 Commit Prepare starting Region=0001 SSID=DB2P      0.009237
_ 0020 DB2 Unit of Recovery Control - End Commit Phase 1   0.001242
_ 03  Output Message Response LTerm=FUNTRM69              0.002521
_ 35  Output Message Enqueue LTerm=FUNTRM69 Region=0001   0.000021
_ 37  Syncpoint Region=0001                               0.000023
_ 37  Syncpoint message transfer Region=0001              0.023839
_ 33  Free Message                                         0.003732
_ 03  Output Message Response LTerm=FUNTRM69              0.006545
_ 35  Output Message Enqueue LTerm=FUNTRM69              0.000036
_ 31  Communications GU LTerm=FUNTRM69                    0.000047
_ 36  Output Message Dequeue LTerm=FUNTRM69               0.033152
_ 33  Free Message                                         0.003093
_ 33  Free Message                                         0.291309
_ 0020 DB2 Unit of Recovery Control - Begin Commit Phase 2 0.000140
_ 0020 DB2 Unit of Recovery Control - End Commit Phase 2   0.001792
_ 5600 Commit Continue completed Region=0001 SSID=DB2P    0.000460
_ 5612 End of Phase 2 Syncpoint Program=DSN8IC0           0.000007
_ 07  Application Terminate TranCode=DSN8CS Region=0001   0.000471
***** Bottom of Data *****

```

Figure 152. Measure IMS and DB2 event latencies using elapsed time

- 1** Note that the Begin UR record contains the DB2 LUWID. This token uniquely identifies the DB2 unit of work.

Select records of interest (line action S) to view their details.

Formatting DB2 records using the RBA

For DB2 log records, the RBA is more helpful than the LSN to locate and identify records in the DB2 log.

The following example shows records after merging an IMS log and a DB2 log. IMS Problem Investigator displays the log sequence number (LSN) for IMS log records but substitutes the relative byte address (RBA) for DB2 log records.


```

BROWSE      IPI000.QADATA.SLDSP.IZDE.D08311.T0548030.  Record 00000670 More: < >
Command ==> _____ Scroll ==> CSR
Forwards / Backwards . . HH.MM.SS.THMIJU  Time of Day . . 06.39.08.873946
Code Description                      Date 2014-03-17 Monday  LSN
/ -----
__ 01  Input Message TranCode=DSN8CS                      1-000000000000E5
__ 35  Input Message Enqueue TranCode=DSN8CS              1-000000000000E6
__ 08  Application Start TranCode=DSN8CS Region=0001      1-000000000000E7
__ 5607 Start of UOR Program=DSN8IC0 Region=0001          1-000000000000E8
__ 31  DLI GU TranCode=DSN8CS Region=0001                1-000000000000E9
__ 5616 Start of protected UOW Region=0001               1-000000000000EA
__ 5600 Sign-on to ESAF Region=0001 SSID=DB2P             1-000000000000EB
__ 5600 Thread created for ESAF SSID=DB2P                 1-000000000000EC
__ 0020 DB2 Unit of Recovery Control - Begin UR           2-000003EC72C7E3
__ 0020 DB2 Exclusive Lock on Pageset Partition or DBD    2-000003EC72C873
__ 0010 DB2 Savepoint                                    2-000003EC72C8B1
__ 0020 DB2 Type 2 Index Update                          2-000003EC72C8E0
S 0020 DB2 Delete from a Data Page                      2-000003EC72C958
__ 0020 DB2 Update Area Map/Spacemap Bit Changes or Whole Byte 2-000003EC72D216

```

Figure 153. Format IMS and DB2 logs showing 1- IMS LSN and 2- DB2 RBA

Use the Left function key (F10) and the Right function key (F11) to step through the logs and line action **S** to look inside a particular record.

```

BROWSE      IPI000.QADATA.SLDSP.IZDE.D08311.T0548 Record 00000682 Line 00000000
Command ==> _____ Scroll ==> CSR
Form ==> _____ + / Use Form in Filter  Format ==> FORM
***** Top of data *****
+0004 Code... 0020 DB2 Delete from a Data Page
+001E STCK... BFAAB15B37270000 LSN.... 00000003EC72C958 1
      Date... 2014-03-17 Monday Time... 06.39.08.984998.186

+0000 LRHLL..... 08AB          LRHPREV1... 02          LRHPREV.... 0216
+0004 LRHRTYPE... 0600          LRHSTYPE... 0001          LRHRMID.... 0E
+0009 LRHFLAGS... 80           LRHURID.... 0003EC72C7E3
+0010 LRHLINK.... 0003EC72C8E0          LRHREL..... 05
+0017 LRHLEN..... 26           LRHUNLSN... 0003EC72C8E0
+001E LRHTIME.... BFAAB15B37270000
+001E LRHLRSN.... BFAAB15B3727          LRHMEMID... 0000

+0026 LRHDBHDR... Database identification
+0027 LRHDBID.... 0104          LRHPSID.... 0002          LRHDFLAG... 40

+0038 LRHUPDTH... Update information
      LRHACTN.... 'Delete'
      LRHDESC... 'Full user row delete (UNDO)'

+0040 LRHUPDTE... Update data
+0040 LRHRHDR.... Row Header
      +0000 02086500 0501          *.....          *
+0046 LRHRDATA... Row Data
      +0000 C6E4D5E3 D9D4F6F9 D4D2D940 40404040 *FUNTRM69MKR *
      +0010 C4E2D5F8 F0F0F140 E2F1F200 016C4040 *DSN8001 S12..% *
      +0020 00016C40 40404040 40404040 40404040 *..% *
      +0030 40404040 40404040 40404040 40404040 * *

```

Figure 154. Format DB2 log record

- 1** The 6-byte log RBA value added by IMS Problem Investigator to make log record identification easier.

Scroll left/right for alternate views

Use the Left function key (F10) or the Right function key (F11) to view compact or expanded record details, by time or by LSN/RBA.

Switch to dump format

Press the Switch function key (F4) to show the DB2 data in dump format.

```
BROWSE      IPI000.QADATA.TCN000N.DB2P.ARCHLOG1.A Record 00000422 Line 00000000
Command ==> _____ Scroll ==> CSR
                                      Format ==> DUMP

***** Top of data *****
+0000 00B000AA 00020001 0E800000 00000000 *.....*
+0010 00000000 00000526 00000000 0000BFAA *.....*
+0020 B158390C 00000104 00026C01 01010000 *.....%.....*
+0030 000000B8 C4E2D5F8 C4F8F1D7 C4E2D5F8 *...DSN8D81PDSN8*
+0040 E2F8F1C3 00010000 00001000 84000013 *S81C.....d...*
+0050 00200000 00000000 00000004 000006B0 *.....*
+0060 00000000 00000000 00000000 00000030 *.....*
+0070 01000000 00000000 00000000 00000000 *.....*
+0080 00000000 00000000 03E79439 490003E7 *.....Xm...X*
+0090 9C9F7F00 00000000 00000028 00000014 *.."......*
+00A0 D7D7C4C2 F2D74040 40400003 EC72B6DC *PPDB2P .....*
***** End of data *****
```

Figure 155. DB2 record in dump format

Press the Switch function key (F4) again to switch back to the standard format display.

Analyzing activity using the DB2 unit of recovery

You can analyze activity using the DB2 unit of recovery. Data update records within a unit of recovery detail exactly the data that has changed.

Navigate to the start of a unit of recovery (log record code 0020, DB2 Unit of Recovery Control – Begin UR).

Enter line action **S** to format the record.

```

BROWSE      IPI000.QADATA.TCN000N.DB2P.ARCHLOG1.A0000  Record 00000437 More: < >
Command ==> Scroll ==> CSR
Forwards / Backwards . . HH.MM.SS.THMIJU  Time of Day . . HH.MM.SS.THMIJU
Code Description                      Date 2014-03-17 Monday  LSN
/ -----
-- 0002 DB2 Pageset Control - Open Pageset                      00000003EC72C5FD
-- 0020 DB2 Type 2 Index Update                                00000003EC72C6A7
-- 0020 DB2 Unit of Recovery Control - End Commit Phase 1      00000003EC72C71F
-- 0020 DB2 Unit of Recovery Control - Begin Commit Phase 2    00000003EC72C77B
-- 0020 DB2 Unit of Recovery Control - End Commit Phase 2      00000003EC72C7AF
S 0020 DB2 Unit of Recovery Control - Begin UR                  00000003EC72C7E3
-- 0020 DB2 Exclusive Lock on Pageset Partition or DBD          00000003EC72C873
-- 0020 DB2 Type 2 Index Update                                00000003EC72C8E0
-- 0020 DB2 Delete from a Data Page                            00000003EC72C958
-- 0020 DB2 Update Area Map/Spacemap Bit Changes or Whole Byte 00000003EC72D216
-- 0020 DB2 Unit of Recovery Control - End Commit Phase 1      00000003EC72D253
-- 0020 DB2 Unit of Recovery Control - Begin Commit Phase 2    00000003EC72D2AF
-- 0020 DB2 Unit of Recovery Control - End Commit Phase 2      00000003EC72D2E3

```

Figure 156. Start of a unit of recovery

The formatted record is displayed.

```

BROWSE      IPI000.QADATA.TCN000N.DB2P.ARCHLOG1.A Record 00000442 Line 00000000
Command ==> Scroll ==> CSR
Form ==> + Use Form in Filter Format ==> STD
***** Top of data *****
+0004 Code... 0020 DB2 Unit of Recovery Control - Begin UR
+001E STCK... BFAAB15B37240000 LSN.... 00000003EC72C7E3
      Date... 2014-03-17 Monday Time... 06.39.08.984950.186

+0000 LRHLL..... 0096      LRHPREV1... 00      LRHPREV.... 0090
+0004 LRHRTYPE... 0020      LRHSTYPE... 0001      LRHRMID.... 03
+0009 LRHFLAGS... 80      LRHURID   0003EC72C7E3
+0010 LRHLINK.... 000000000000      LRHREL..... 05
+0017 LRHLEN.... 26      LRHUNLSN... 000000000000
+001E LRHTIME.... BFAAB15B37240000
+001E LRHLRSN.... BFAAB15B3724      LRHMEMID... 0000

+0034 LRHUOWD.... Unit of work information
      LRHLUW..... 'FTS1 /DB2PLU /BFAAB15B369A/0001'
+0044 LRHAUTH.... 'MKR ' LRHCORID... '0001DSN8IC0 '
+0054 LRHRSRCE... 'DSN8IC0 ' LRHCONTP... 'MASS '
+0064 LRHCONID... 'IZDE '

***** End of data *****

```

Figure 157. Begin UR record showing unit of recovery ID

You can browse sequentially through the DB2 log records in this unit of recovery (0003EC72C7E3). When the end commit phase 1 (log code 0020, DB2 Unit of Recovery Control – End Commit Phase 1) record is encountered, the IMS recovery token can be seen (IZDE/0000000300000000).

```

BROWSE      IPI000.QADATA.TCN000N.DB2P.ARCHLOG1.A Record 00000448 Line 00000000
Command ==> _____ Scroll ==> CSR
Form ==>      +      Use Form in Filter      Format ==> STD
***** Top of data *****
+0004 Code... 0020 DB2 Unit of Recovery Control - End Commit Phase 1
+001E STCK... BFAAB15B39B70000 LSN.... 00000003EC72D253
      Date... 2014-03-17 Monday Time... 06.39.08.995494.186

+0000 LRHLL..... 0062      LRHPREV1... 00      LRHPREV.... 005C
+0004 LRHRTYPE... 0020      LRHSTYPE... 0004      LRHRMID.... 03
+0009 LRHFLAGS... 80      LRHURID.... 0003EC72C7E3
+0010 LRHLINK.... 0003EC72D216      LRHREL..... 05
+0017 LRHLEN..... 26      LRHUNLSN... 0003EC72D216
+001E LRHTIME.... BFAAB15B39B70000
+001E LRHLRSN.... BFAAB15B39B7      LRHMEMID... 0000

+0034 LRHUOWD.... Unit of work information
+0038 LRHCORID... '0001DSN8IC0 '
      LRHRECTK   'IZDE/0000000300000000'
***** End of data *****

```

Figure 158. End Commit Phase 1 record showing the IMS recovery token

The IMS recovery token can be used to track the updates to IMS databases within the same unit of work as these DB2 updates.

The DB2 unit of work is terminated by the end of commit phase 2 record (log code 0020, DB2 Unit of Recovery Control – End Commit Phase 2).

```

BROWSE      IPI000.QADATA.TCN000N.DB2P.ARCHLOG1.A Record 00000450 Line 00000000
Command ==> _____ Scroll ==> CSR
Form ==>      +      Use Form in Filter      Format ==> STD
***** Top of data *****
+0004 Code... 0020 DB2 Unit of Recovery Control - End Commit Phase 2
+001E STCK... BFAAB15B93220000 LSN.... 00000003EC72D2E3
      Date... 2014-03-17 Monday Time... 06.39.09.361750.186

+0000 LRHLL..... 003A      LRHPREV1... 00      LRHPREV.... 0034
+0004 LRHRTYPE... 0020      LRHSTYPE... 0010      LRHRMID.... 03
+0009 LRHFLAGS... 80      LRHURID.... 0003EC72C7E3
+0010 LRHLINK.... 0003EC72D2AF      LRHREL..... 05
+0017 LRHLEN..... 26      LRHUNLSN... 0003EC72D2AF
+001E LRHTIME.... BFAAB15B93220000
+001E LRHLRSN.... BFAAB15B9322      LRHMEMID... 0000
***** End of data *****

```

Figure 159. End Commit Phase 2 record terminating the DB2 unit of work

In the following example, the DBID (0001) and the PSID (00CF) give information about the actual DB2 database and pageset being updated. The row header and data fields provide the actual values that were inserted into the DB2 database. Other log records show different types of locks taken on behalf of the data update and also any index updates that were necessary.

```

BROWSE      IPI000.QADATA.TCN000N.DB2P.ARCHLOG1.A Record 00000530 Line 00000000
Command ==> Scroll ==> CSR
Form ==> + Use Form in Filter Format ==> STD
***** Top of data *****
+0004 Code... 0020 DB2 Insert into a Data Page
+001E STCK... BFAAB218BC1A0000 LSN.... 00000003EC7359D9
      Date... 2014-03-17 Monday Time... 06.42.27.710422.186

+0000 LRHLL..... 007A          LRHPREV1... 00          LRHPREV.... 0074
+0004 LRHRTYPE... 0600          LRHSTYPE... 0001          LRHRMID.... 0E
+0009 LRHFLAGS... 80           LRHURID.... 0003EC735949
+0010 LRHLINK.... 0003EC735949          LRHREL..... 05
+0017 LRHLEN..... 26           LRHUNLSN... 0003EC735949
+001E LRHTIME.... BFAAB218BC1A0000
+001E LRHLRSN.... BFAAB218BC1A          LRHMEMID... 0000

+0026 LRHDBHDR... Database identification
+0027 LRHDBID.... 0001          LRHPSID.... 00CF

+0038 LRHUPDTH... Update information
      LRHACTN.... 'Insert'
      LRHDESC... 'Full user row insert (REDO)'

+0040 LRHUPDTE... Update data
+0040 LRHRHDR.... Row Header
      +0000 00003400 D13D          *...J.          *
+0046 LRHRDATA... Row Data
      +0000 01030008 F1F1F0F7 F0F6F0F5 F3F4F1F2 *...110706053412*
      +0010 F9F70003 EC73589F 00000000 00008000 *97.....*
      +0020 0003EC73 589F0000 00000000 0000      *.....*
***** End of data *****

```

Figure 160. DB2 database update details - Insert

In the following example, the DBID (0103) and the PSID (0008) give information about the actual DB2 database and pageset being updated. The redo data field shows the actual new data that was put in the database and the undo data was the old (replaced) data. These fields are useful if you are investigating a data corruption problem and need to identify the actual data changes that were made at the time.

```

BROWSE      IPI000.QADATA.TCN000N.DB2P.ARCHLOG1.A Record 00000538 Line 00000000
Command ==> Scroll ==> CSR
Form ==> + Use Form in Filter Format ==> STD
***** Top of data *****
+0004 Code... 0020 DB2 Update In-Place in a Data Page
+001E STCK... BFAAB218BCA20000 LSN.... 00000003EC735CB8
      Date... 2014-03-17 Monday Time... 06.42.27.712598.186

+0000 LRHLL..... 0062      LRHPREV1... 00      LRHPREV.... 005C
+0004 LRHRTYPE... 0600      LRHSTYPE... 0001      LRHRMID.... 0E
+0009 LRHFLAGS... 80      LRHURID.... 0003EC735BF9
+0010 LRHLINK.... 0003EC735C89      LRHREL..... 05
+0017 LRHLEN..... 26      LRHUNLSN... 0003EC735C89
+001E LRHTIME.... BFAAB218BCA20000
+001E LRHLRSN.... BFAAB218BCA2      LRHMEMID... 0000

+0026 LRHDBHDR... Database identification
+0027 LRHDBID.... 0103      LRHPSID.... 0008      LRHDFLAG... 41

+0038 LRHUPDTH... Update information
      LRHACTN.... 'Update'
      LRHDESC... 'Partial user row update'
      LRHVARNO... +9      LRHUFLAG... C0

+0040 LRHUPDTE... Update data
+0040 LRHOSET.... +14
+0042 LRHREDOD... Redo Data
      +0000 00F00500 19820101 00198307 18      *.0...b....c.. *
+004F LRHUNDOD... Undo Data
      +0000 00F00400 19820101 00198306 17      *.0...b....c.. *
***** End of data *****

```

Figure 161. DB2 database update details - Replace

Example: IMS transaction with DB2 and IMS Connect activity

Tracking allows you to focus on activity related to a particular transaction and helps performance analysts isolate where problems occur and track them back to their source.

The following example shows an IMS transaction with DB2 activity. It also shows IMS Connect activity which was achieved by including IMS Connect Extensions journals in the list of merged files in addition to IMS and DB2 log files. IMS PI transaction tracking presents records of all three types that belong to a single transaction, filtering out potentially thousands of records not related to the transaction.

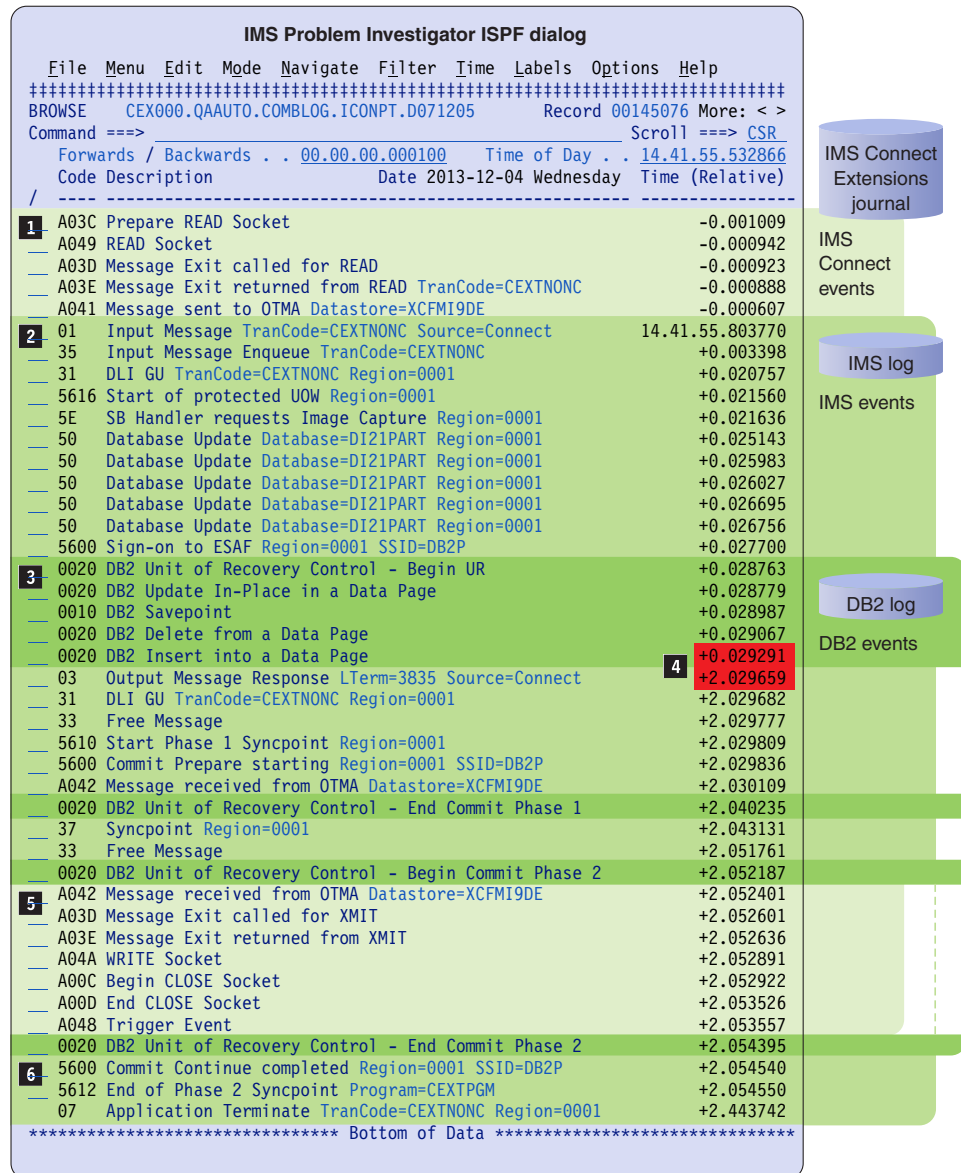


Figure 162. End-to-end analysis of an IMS transaction with DB2 and IMS Connect activity

Observe the sequence of events:

- 1 IMS Connect receives transaction request via TCP/IP.
- 2 IMS Transaction Manager receives request from IMS Connect, and starts processing the transaction.
- 3 Transaction starts DB2 activity.
- 4 Sudden jump in elapsed time indicates the DB2 Insert took over 2 seconds! Why? Select this event to view the details and begin analysis.
- 5 IMS Connect receives transaction response from IMS TM, and sends it to the client via TCP/IP.
- 6 IMS TM ends transaction.

Chapter 17. Analyzing WebSphere MQ activity in IMS transactions

IMS Problem Investigator can process the WebSphere MQ log to provide improved diagnostic capability for IMS transactions that use MQ. You can analyze and track IMS and MQ events for individual IMS transactions by merging their respective logs. This allows you to measure transaction event latencies and to investigate performance or application problems when IMS transactions use MQ.

IMS PI supports WebSphere MQ version 6 or later.

When merged with the IMS log file, WebSphere MQ and IMS events associated with an IMS transaction can be viewed together in a single diagnostic session. Merging MQ with IMS log data will allow you to perform the following functions:

- Track both IMS and MQ events that are associated with an IMS transaction, to help determine whether MQ is the cause of a problem in IMS
- Measure MQ and IMS event latencies that can be the cause of poor performance
- Investigate the type of MQ activity that was undertaken by IMS transactions
- Review messages put onto a queue, including their message descriptors and text
- For transactions that use both DB2 and MQ, the three IMS, DB2, and MQ logs can be merged to provide a complete picture of transaction activity

Restriction: The native MQ log is not directly supported by IMS PI which requires instead an extract created by the MQ log print utility CSQ1LOGP.

WebSphere MQ and IMS connectivity options

IMS PI supports two MQ connectivity options that can be used by IMS workloads – the IMS bridge and IMS adapter.

Two MQ connectivity options used by IMS workloads:

- IMS bridge – sends MQ-generated IMS transactions into IMS through OTMA.
- IMS adapter – issues IMS transaction-issued MQ requests (MQGET, MQPUT or MQSET) to an MQ external subsystem.

MQ log data

The MQ log provides a detailed audit trail of MQ activity for recovery and audit purposes.

The MQ unit of work represents all of the MQ activity for an IMS transaction. However, it is common to find more than one MQ unit of work for a single IMS transaction. Persistent MQ messages need to be committed when they are issued during transaction processing to enable them to be recovered after a system failure.

Each unit of work is identified by a URID (unit of recovery identifier). The URID is the RBA (relative byte address), or the log record sequence number (LSN) for queue-sharing, of the first log record written for that unit of work. The presence of these log records allows the MQ system to either commit or back out any in-doubt messages that are encountered during MQ system restart or after an application or transaction failure.

MQ log records are initially written to a VSAM linear data set and later offloaded, through an automatic archiving process, to the MQ archive log. Note that unlike DB2 archive log files, IMS PI cannot directly process MQ archive log files. You must use the EXTRACT function of the MQ log print utility CSQ1LOGP to create an extract file for input into IMS PI.

The extract records that are created by this process are reported by IMS PI according to their mapping, as supplied in the MQ C language header file CSQ4LOGD in library CSQ600.SCSQC370.

MQ log record codes

IMS PI has introduced new log record codes specifically for MQ.

Each code represents an MQ request type.

Related reference:

“MQ: WebSphere MQ log codes” on page 391
The MQ log type consists of log codes that identify WebSphere MQ log extract records.

MQ correlation tokens

WebSphere MQ uses three tokens to uniquely identify MQ transaction events. IMS PI uses these tokens for tracking purposes - connecting IMS and MQ event records to report the complete end-to-end picture for a transaction or message flow.

The MQ correlation tokens are:

- 1** Relative byte address (RBA)
- 2** Message or correlation identifier (LogToken)
- 3** Unit of recovery identifier (URID)

The following MQ Put record shows the three tokens:

Code	Description	Date	2014-03-17 Monday	LSN	1
0001	MQ Put				
	Userid=TWM				
	LogToken=C1FA1CFCCE74DC63				2
	SSID=CSQ6 QMgr=CSQ6				
	Delta=89 ConnType=BATCH RepQ=MQIADG_REPLY_Q QName=MQIADG_REQ_Q				
	URID=000000AA3F26				3

Figure 163. MQ tracking tokens

RBA - Relative byte address

IMS PI reports the RBA of the MQ record as the log sequence number (LSN), not the record sequence number that is normally associated with the IMS log. MQ uses the relative byte address offset RBA to directly locate the record in the archive log.

Message or correlation identifier (LogToken)

The MQ message or correlation ID STCK suffix is reported as the LogToken global field.

```

+00B1 Code... 0001 MQ Put
+0020 STCK... C1FA1CFDE3AFF741 LSN.... 0000000000AA5C0C
      Date... 2014-04-16 Wednesday Time... 14.59.18.171391.453
. . .

+00FD MQMD_MSGID..... C3E2D840C3E2D8F64040404040404040C1FA1CFDE3A68161
+0115 MQMD_CORRELID..... C3E2D840C3E2D8F64040404040404040C1FA1CFCCE74DC63

```

Figure 164. MQ message ID and correlation ID

When the correlation ID is available, it is reported as the LogToken allowing the outgoing message to be tied back to the original incoming request. Otherwise, the message ID is used. IMS PI reports this token in the LogToken global field.

URID - Unit of recovery identifier

The MQ application requests cut unit of recovery records, typically send/receive (MQPUT/MQGET) and object change (MQSET) calls. Each MQ unit of recovery is uniquely identified by its 6-byte unit of recovery identifier (URID). The URID is the RBA of the first record cut for the unit of recovery. Every MQ log record in the unit of recovery has the same URID. You can use IMS PI tracking (TX line action) to display all of the records that are associated with an MQ unit of recovery.

Note that in an IMS adapter environment, every persistent MQ message has its own URID because they are committed when the message is issued. Therefore, the URID cannot be used to track this request with other messages that are associated with the transaction. In this case, IMS PI uses the dependent region partition specification table (PST) ID to identify an MQ request with its IMS transaction.

MQ log record formatting

IMS PI formats MQ log extract records according to their mapping information as supplied in the MQ C language header file CSQ4LOGD in library CSQ600.SCSQC370.

The MQ Put record in Figure 165 on page 228 shows the following information:

- 1** CSLOGE – Extract record header
- 2** MQMD – MQ Message Descriptor
- 3** MQIIH – IMS Information Header
- 4** Message text

MQ log time stamps

Some MQ time stamps are estimates only, particularly for long-running transactions.

The accuracy is explained in the *WebSphere MQ for z/OS Version 6 System Administration Guide*:

“A time stamp can only be extracted from a Begin-UR record or from an MQPUT request. Thus if there is only a long-running transaction which is getting messages, the times when the gets occurred will all be the time the transaction started (the Begin-UR record). If there are many short units of work, or many messages being put, the time is reasonably accurate (within milliseconds), otherwise the times will become less and less accurate.”

Locating the MQ log files for analysis

The MQ-supplied print log map utility CSQJU004 identifies the data set name of the MQ archive log data sets and the time range that they span.

Run the MQ-supplied print log map utility CSQJU004 to locate the required MQ log files.

```
//CSQJU004 JOB,NOTIFY=&SYSUID
//*
//STEP1 EXEC PGM=CSQJU004
//STEPLIB DD DISP=SHR,DSN=CSQ600.SCSQANLE
// DD DISP=SHR,DSN=CSQ600.SCSQAUTH
//SYSPRINT DD SYSOUT=*
//SYSUT1 DD DISP=SHR,DSN=CSQ600.CSQ6.BSDS01
```

Figure 166. JCL to list the MQ log files and their time span

The CSQJU004 report output shows the DSN of the archive log data sets and the time range that they span.

ARCHIVE LOG COPY 1 DATA SETS

START RBA/TIME/LRSN	END RBA/TIME/LRSN	CREATED	DATA SET INFORMATION
0000001D3000 /	00000060AFFF /	2007-12-14	DSN=CSQARC1.CSQ6.A0000005
2013-12-05 14:32:42.4	2013-12-14 15:36:30.2	15:36	PASSWORD=*****
/ C1994770A288	/ C1A4A67C3330		VOL=DEV029 UNIT=DASD
			CATALOGUED

Figure 167. MQ log data set name and time span

Related reference:

“WebSphere MQ log data” on page 70

To analyze WebSphere MQ data, you must first determine the name of the archive log data sets and the time range that they span by running the MQ-supplied print log map utility CSQJU004. IMS PI does not support the native MQ log. So the second step is to create an extract file using the MQ log print utility CSQ1LOGP.

Extracting the MQ log records

IMS PI does not support the native MQ log, requiring instead the extract created by the MQ log print utility CSQ1LOGP.

Run the CSQ1LOGP utility with the EXTRACT(YES) option specified. The ARCHIVE DD statement identifies the native MQ log, while the CSQBOTH DD statement identifies the extract data set.

```
//CSQ1LOGP JOB,NOTIFY=&SYSUID
//*
//STEP1 EXEC PGM=CSQ1LOGP
//STEPLIB DD DISP=SHR,DSN=CSQ600.SCSQANLE
// DD DISP=SHR,DSN=CSQ600.SCSQLOAD
//SYSPRINT DD SYSOUT=*
//ARCHIVE DD DISP=SHR,DSN=CSQARC1.CSQ6.A0000005
//CSQBOTH DD DISP=(NEW,CATLG),DSN=MY.MQ.EXTRACT,
// SPACE=(CYL,(10,5)),UNIT=SYSDA
//SYSIN DD *
EXTRACT(YES)
/*
```

Figure 168. JCL to extract MQ log records

Related reference:

“WebSphere MQ log data” on page 70

To analyze WebSphere MQ data, you must first determine the name of the archive log data sets and the time range that they span by running the MQ-supplied print log map utility CSQJU004. IMS PI does not support the native MQ log. So the second step is to create an extract file using the MQ log print utility CSQ1LOGP.

Processing MQ log extract files

IMS PI allows you to browse merged IMS and MQ logs to see all of the IMS and associated MQ events that occurred during a particular IMS unit of work.

To analyze MQ activity in IMS transactions, you might do some or all of the following (and more):

1. Define the IMS log files and MQ log extract files to IMS PI.
2. Merge the IMS and MQ records in time sequence to get a comprehensive view of events over time and across systems.
3. Use tracking to investigate lifecycle events for a particular transaction.
4. Browse the formatted records. Drill-down from file, to record, to data field to determine the causes of problems.
5. Define filters and forms to refine your analysis.
6. Use navigation aids such as skipping to a particular record or point in time.
7. Extract a subset of records to use for more performance-efficient processing.

Merging IMS and MQ log files

To analyze MQ activity in IMS transactions, specify the data set names of the relevant IMS log files and MQ log extract files.

Select option **1 Process** from the Primary Option Menu.

To merge the IMS and DB2 log files, select them all using line action **S** or the block line action **SS** to select the files that you want to analyze.

Process Log Files			
Command ==>			Scroll ==> CSR
Select a Log File to browse.		IMS Release 121 +	Zone
/	Log File	Rel +	Filter + Zone
S	'MY.MQ.EXTRACT'		
S	'IADG.SLDSP.IADG.D08051.T1549119.V1F'		

Figure 169. Merge IMS and MQ log files

IMS PI merges the files, showing both the MQ and IMS events in time sequence.

Locating and tracking the problem transaction

IMS PI allows you to navigate interactively through the log files to locate the problem transaction.

You can navigate to the particular IMS unit of work that you are interested in by using either the navigation bar (to skip forwards or backwards in time, or to a particular time of day) or by scrolling using the Backward function key (F7) and the Forward function key (F8). To navigate more easily, you can use the Left function key (F10) and the Right function key (F11) keys to toggle from the compact record view to the expanded view that shows the global field values, and toggle the right hand column to show either time or LSN (log record sequence number).

You can begin tracking (line action **TX**) on any record for the problem transaction to isolate all IMS and MQ log records that are associated with the transaction. In the following example, tracking is started on the 0001 MQ Put record. Equally you could have started tracking on the IMS 01 record.

BROWSE	MY.MQ.EXTRACT	Record 00008962	More: < >
Command ==>			Scroll ==> PAGE
Forwards / Backwards . .		HH.MM.SS.THMIJU	Time of Day . . HH.MM.SS.THMIJU
Code Description		Date 2014-04-16 Wednesday	LSN
/	-----		
TX	0001 MQ Put	1-00000000AB59FD	
	Userid=TWM LogToken=C1FA3840716A7401 SSID=CSQ6 QMgr=CSQ6		
	Delta=55 ConnType=BATCH RepQ=MQIADG_REPLY_Q QName=MQIADG_REQ_Q		
	URID=000000AB596F		

Figure 170. Start tracking on a record in the problem transaction

IMS PI examines the TX-selected record for *tracking fields*, key data items such as LogToken and URID, then identifies other records with those same values. All of the records that are in the same transaction as the selected record are displayed. All other records are excluded (hidden).

The following example shows that the first three records are MQ and the next three are IMS. You know this by the prefix of the LSN field in the far right column: 1- for file 1 (the MQ log extract file) and 2- for file 2 (the IMS log).

BROWSE	MY.MQ.EXTRACT	Transaction Tracking active
Command ==>		Scroll ==> PAGE
Forwards / Backwards . .	HH.MM.SS.THMIJU	Time of Day . . HH.MM.SS.THMIJU
Code Description	Date 2014-04-16 Wednesday	LSN
/	-----	-----
0001	MQ Put	1-00000000AB59FD
	Userid=TWM LogToken=C1FA3840716A7401 SSID=CSQ6 QMgr=CSQ6	
	Delta=55 ConnType=BATCH RepQ=MQIADG_REPLY_Q QName=MQIADG_REQ_Q	
	URID=000000AB596F	
	-----	-----
0006	MQ Commit Phase 1	1-00000000AB5BF4
	SSID=CSQ6 Delta=55 ConnType=BATCH URID=000000AB596F	
	-----	-----
0007	MQ Commit Phase 2	1-00000000AB5BF4
	SSID=CSQ6 Delta=55 ConnType=BATCH URID=000000AB596F	
	-----	-----
01	Input Message	2-0000000000032B
	UTC=18.01.15.884867 TranCode=PART LTerm=CSQ00027 Terminal=CSQ00027	
	OrgUOWID=IADG/C1FA38409AD1F503 LogToken=C1FA3840716A7401 SSN=029	
	QMgr=CSQ6 Source=MQ RepQ=MQIADG_REPLY_Q	
	-----	-----
35	Input Message Enqueue	2-0000000000032C
	UTC=18.01.15.884867 TranCode=PART LTerm=CSQ00027 Terminal=CSQ00027	
	OrgUOWID=IADG/C1FA38409AD1F503 SSN=029 QMgr=CSQ6 RepQ=MQIADG_REPLY_Q	

Figure 171. Transaction tracking isolates records in this transaction

Browsing record details

To view specific MQ records, you can filter by the log record code.

In the following example, we have specified 0001 in the Filter column to display MQ Put records only.

Enter line action **S** to display the formatted records.

Process Log Files			
Command ==>		Scroll ==>	CSR
Select a Log File to browse.	IMS Release 121 +	Zone	
/	Log File	Rel + Filter + Zone	
S	'MY.MQ.EXTRACT'	0001	

Figure 172. Filter by log record code 0001

The filter displays only 0001 records (of any log type). Because this is an MQ extract file, only MQ 0001 records are reported.


```

BROWSE      MY.MQ.EXTRACT                      Record 00000010 More: < >
Command ====>                                Scroll ====> PAGE
Forwards / Backwards . . HH.MM.SS.THMIJU      Time of Day . . HH.MM.SS.THMIJU
Code Description                      Date 2014-01-30 Thursday Time (Local)
/ -----
-- 0001 MQ Put Region=0001                      10.35.31.238688
-- 0001 MQ Put Region=0001                      10.35.42.223178
-- 0001 MQ Put Region=0001                      15.56.57.376113
-- 0001 MQ Put Region=0001                      15.57.47.558789
-- 0001 MQ Put Region=0001                      15.58.00.446832
-- 0001 MQ Put Region=0001                      15.58.30.711135
-- 0001 MQ Put Region=0001                      15.58.35.506694

```

Figure 173. Filtered file: Only MQ 0001 records

Use the Left function key (F10) and the Right function key (F11) to view compact or expanded record details, by time or by LSN.

Enter line action **S** to format a particular record of interest.

```

BROWSE      MY.MQ.EXTRACT                      Record 00000010 More: < >
Command ====>                                Scroll ====> PAGE
Forwards / Backwards . . HH.MM.SS.THMIJU      Time of Day . . HH.MM.SS.THMIJU
Code Description                      Date 2014-01-30 Thursday LSN
/ -----
-- 0001 MQ Put                                00000000008FCBAA
   Program=MQATPGM Userid=FUNTRM82 Region=0001 IMSID=IADG
   RecToken=IADG/00000000800000000 LogToken=C1E0AF51B428CE40
   SSID=CSQ6 QMgr=CSQ6 Delta=86 ConnType=IMS QName=MQB_REQ_Q
-----
S 0001 MQ Put                                00000000008FD178
   Program=MQATPGM Userid=FUNTRM82 Region=0001 IMSID=IADG
   RecToken=IADG/00000000800000001 LogToken=C1E0AF5C2DEB0503
   SSID=CSQ6 QMgr=CSQ6 Delta=87 ConnType=IMS QName=MQB_REQ_Q
-----
-- 0001 MQ Put                                00000000008FD729
   Program=MQATPGM Userid=FUNTRM82 Region=0001 IMSID=IADG
   RecToken=IADG/00000000100000000 LogToken=C1E0F72A65CD1C40
   SSID=CSQ6 QMgr=CSQ6 Delta=96 ConnType=IMS QName=MQB_REQ_Q
-----
-- 0001 MQ Put                                00000000008FDCDA
   Program=MQATPGM Userid=FUNTRM82 Region=0001 IMSID=IADG
   RecToken=IADG/00000000100000001 LogToken=C1E0F75A416EAF61
   SSID=CSQ6 QMgr=CSQ6 Delta=92 ConnType=IMS QName=MQB_REQ_Q

```

Figure 174. Format a particular MQ record

IMS PI displays the formatted record details.

```

BROWSE      MY.MQ.EXTRACT                      Record 00000018 Line 00000000
Command ==>                                     Scroll ==> PAGE
Form ==> + Use Form in Filter                     Format ==> STD
***** Top of data *****
+00B1 Code... 0001 MQ Put
+0020 STCK... C1E0AF5C2DF4AD43      LSN.... 00000000008FD178
      Date... 2014-01-30 Thursday   Time... 10.35.42.223178.828

+0004 CSRECTIME..... '2014.031 1:35:42.223'   CSDELTA.... ' 87'
+0020 CSTIME..... C1E0AF5C2DF4AD43
+0028 CSURID..... 0000008FD0EA
+002E CSCORRID... '0001MQATPGM '
+003A CSAUTH..... ' ' CSSTIME.... C1E0AF5C2DEF3843
+004A CSRSRCE.... ' ' CSCONNT.... 'IMS '
+005A CSCONNID... 'IADG ' CSUSTAT.... 'BUR'   CSDATLEN... 00000172
+0069 CSQMGR..... 'CSQ6'
+006D CSQNAME.... 'MQB_REQ_Q '
+009D CSSQKEY.... 0000000400000C0700000000
+00A9 CSNSQKEY... 0000000400000C07
+00B1 CSACTION... 'MQPUT ' CSCSTAT.... C3      CSSHUNT.... D5
+00BB CSLOGRBA... 0000008FD178
+00C1 CSSRBA.... 000000000000      CSUSCOPE... 01
+00C8 CSSEGN0.... 00000001   CSBORA..... C1

+00CD MQMD..... Message Descriptor
+00CD MQMD_STRUCID..... 'MD '
+00D1 MQMD_VERSION..... 00000001
+00D5 MQMD_REPORT..... 00000000
+00D9 MQMD_MSGTYPE..... 00000008

```

Figure 175. Formatted MQ record details

You can use the SkipPrev function key (F10) and the SkipNext function key (F11) to explore the file sequentially, formatting the previous or next record in sequence.

You can drill down from record, to data field. Position the cursor on the point-and-shoot field name, for example CSSTIME, and press Enter to zoom for more details on that particular field.

```

BROWSE      MY.MQ.EXTRACT                      Line 00000000
Command ==>                                     Scroll ==> PAGE
***** Top of data *****
+0042 CSSTIME.... C1E0AF5C2DEF3843

      Time (LOCAL)... 2014-01-30 10.35.42.223091.516 Thursday

      Time (in STCK format) when task started
      that created the unit of recovery.

***** End of data *****

```

Figure 176. MQ field contents

Press the Exit function key (F3) to return to the formatted record display.

Press the Switch function key (F4) to switch to DUMP format.

```

BROWSE      MY.MQ.EXTRACT                      Record 00000018 Line 00000000
Command ==>                                     Scroll ==> PAGE
                                                Format ==> DUMP
***** Top of data *****
+0000 023E0000 F2F0F0F8 4BF0F3F1 4040F17A *...2008.031 1:*
+0010 F3F57AF4 F24BF2F2 F3404040 4040F8F7 *35:42.223 87*
+0020 C1E0AF5C 2DF4AD43 0000008F D0EAF0F0 *A\*.4.....00*
+0030 F0F1D4D8 C1E3D7C7 D4404040 40404040 *01MQATPGM *
+0040 4040C1E0 AF5C2DEF 38434040 40404040 * A\*. .... *
+0050 4040C9D4 E2404040 4040C9C1 C4C74040 * IMS IADG *
+0060 4040C2E4 D9000001 72C3E2D8 F6D4D8C2 * BUR....CSQ6MQB*
+0070 6DD9C5D8 6DD84040 40404040 40404040 * REQ_Q *
+0080 40404040 40404040 40404040 40404040 * *
+0090 40404040 40404040 40404040 40000000 * ...*
+00A0 0400000C 07000000 00000000 0400000C *.....*
+00B0 07D4D8D7 E4E34040 40C3D500 00008FD1 *.MQPUT CN...J*
+00C0 78000000 00000001 00000001 C1D4C440 *.....AMD *
+00D0 40000000 01000000 00000000 08FFFFFF * .....*
+00E0 FF000000 00000003 11000001 F4404040 *.....4 *
+00F0 40404040 40000000 00000000 01C3E2D8 * .....CSQ*
+0100 40C3E2D8 F6404040 40404040 40C1E0AF * CSQ6 A\.*
+0110 5C2DEB05 03000000 00000000 00000000 **.....*
+0120 00000000 00000000 00000000 00000000 *.....*
+0130 00404040 40404040 40404040 40404040 *. *
+0140 40404040 40404040 40404040 40404040 * *
+0150 40404040 40404040 40404040 40404040 * *
+0160 40C3E2D8 F6404040 40404040 40404040 * CSQ6 *
+0170 40404040 40404040 40404040 40404040 * *
+0180 40404040 40404040 40404040 40404040 * *

```

Figure 177. MQ record in dump format

Press the Switch function key (F4) to switch back to standard format.

Applying a filter

You can define a named filter to retrieve specific MQ 0001 records, for example only those with queue name MQIADG_REQ_Q.

From the Primary Option Menu, select option **2 Filter**. Then name the new filter, for example MQFILTR1, as shown in the following screen image.

```

                                Filters
Command ==> NEW MQFILTR1                      Scroll ==> HALF

Select to edit a Filter.                      IMS Release 121 +

/  Name                Description                Changed                ID
***** Bottom of data *****

```

Figure 178. Define a new filter

Specify the filter criteria. Initially, the filter specifies the special log code ALL to include all log records. Overtyping the defaults. Provide a meaningful description of the filter, and specify the filter criteria: log type MQ and log code 0001.

EDIT	Filter - MQFILTR1	Row 1 of 8 More: < >
Command ==>		Scroll ==> HALF
Description . . . Filter on Queue Name _ Activate Tracking		
/ Log Code + Exc Description		
S MQ 0001	MQ Put	
	Level 1	Conditions No Form + REXX

- - - - -	Level 1	Conditions No Form + REXX

Figure 179. Specify filter criteria: Log type and code MQ 0001

Use line action **S** to provide a filter condition: a specific queue name of MQIADG_REQ_Q.

Command ==>	Conditions	Row 1 to 1 of 1
		Scroll ==> HALF
Code: 0001 MQ Put		
/ Field Name +	Oper Value +	
- CSQNAME	EQ 'MQIADG_REQ_Q'	

Figure 180. Specify filter conditions: Queue name

So, this filter will select only those MQ 0001 records that have a CSQNAME of MQIADG_REQ_Q.

Press the Exit function key (F3) twice to save and exit from the filter specification.

On the Process Log Files panel, replace the 0001 in the Filter column with the name of the filter that you just created. Either type the name in or press the Prompt function key (F4) from the Filter field to display a prompt list of previously defined filters.

Command ==>	Filters	Row 1 to 2 of 2
		Scroll ==> CSR
Select a Filter then press Enter.		
Name	Description	
S MQFILTR1	Filter on Queue Name	
- TRFFILTR	OMEGAMON TRF filter	

Figure 181. Select MQ filter from prompt list

From the prompt list, enter line action **S** to select the desired filter.

Process Log Files		Row 1 of 21 More: < >
Command ==>		Scroll ==> CSR
Select a Log File to browse.	IMS Release 121 +	Zone
/	Log File	Rel + Filter + Zone
S	'MY.MQ.EXTRACT'	MQFILTR1

Figure 182. Filter by a pre-defined filter

Now when you select the log file with the specified filter, only MQ 0001 records with a queue name of MQIADG_REQ_Q are displayed as shown in the following screen image.

BROWSE MY.MQ.EXTRACT		Record 00007642 More: < >
Command ==>		Scroll ==> CSR
Forwards / Backwards . . HH.MM.SS.THMIJU		Time of Day . . HH.MM.SS.THMIJU
Code Description		Date 2014-04-16 Wednesday LSN
/	-----	
S	0001 MQ Put	0000000000A7CDF9
	Userid=TWM1 LogToken=C1F16591191FA340 SSID=CSQ6 QMgr=CSQ6	
	Delta=128 ConnType=BATCH QName=MQIADG_REQ_Q URID=000000A7CC60	

-	0001 MQ Put	0000000000A7D152
	Userid=TWM1 LogToken=C1F16F3876891D42 SSID=CSQ6 QMgr=CSQ6	
	Delta=111 ConnType=BATCH QName=MQIADG_REQ_Q URID=000000A7D0C4	

-	0001 MQ Put	0000000000A7D436
	Userid=TWM LogToken=C1F240AB4F00D663 SSID=CSQ6 QMgr=CSQ6	
	Delta=99 ConnType=BATCH QName=MQIADG_REQ_Q URID=000000A7D3A8	

Figure 183. Filtered file: Only MQ 0001 records with queue name MQIADG_REQ_Q

Select a particular record by entering line action S to drill down to record field contents. The following screen image shows the field contents of the selected record.

```

BROWSE      MY.MQ.EXTRACT                      Record 00007642 Line 00000000
Command ==>                                     Scroll ==> CSR
Form ==> + Use Form in Filter                    Format ==> STD
***** Top of data *****
+00B1 Code... 0001 MQ Put
+0020 STCK... C1F16591192C3640 LSN.... 000000000A7CDF9
      Date... 2014-04-16 Wednesday Time... 17.36.04.593347.390

+0004 CSRECTIME..... '2014.044 8:36:04.593' CSDelta.... ' 128'
+0020 CStIME..... C1F16591192C3640
+0028 CSURID..... 000000A7CC60
+002E CSCORRID... 000000000000000000000000000000
+003A CSAUTH..... 'TWM1 ' CSStIME.... C1F1659119243300
+004A CSRSRCE.... ' ' CSConNT.... 'BATCH '
+005A CSConnID... 'TWM#DRV ' CSuSTAT.... 'BUR' CSDATLEN... 00000145
+0069 CSQMGR..... 'CSQ6'
+006D CSQNAME.... 'MQIADG_REQ_Q
+009D CSSQKEY.... 00000001000007010000000000
+00A9 CSNSQKEY... 0000000100000701
+00B1 CSAction... 'MQPUT ' CSCSTAT.... C3 CSSHUNT.... D5
+00BB CSLOGRBA... 000000A7CDF9
+00C1 CSSRBA..... 000000000000 CSUSCOPE... 01
+00C8 CSSEGN0.... 00000001 CSBORA..... C1

+00CD MQMD..... Message Descriptor
+00CD MQMD_STRUCID..... 'MD '
+00D1 MQMD_VERSION..... 00000001
+00D5 MQMD_REPORT..... 00000000
+00D9 MQMD_MSGTYPE..... 00000008

```

Figure 184. Drill-down to field contents of a particular MQ 0001 record with queue name MQIADG_REQ_Q

Use the SkipNext function key (F11) and the SkipPrev function key (F10) to skip through the records in the merged file sequence.

Applying a form

Suppose you are interested in seeing only the Message Descriptor segment of the MQ 0001 record. You can exclude the rest of the MQ 0001 record by defining and using a form. You can either add the form to the filter and invoke it with the filter, or you can just add the form to the record view.

To create a new form, select option **3 Forms** from the primary menu, then name the new form. For example, MQFORM1, as shown in the following screen image.

```

Forms
Command ==> NEW MQFORM1                      Scroll ==> HALF
Select to edit a Form.                        IMS Release 121 +

/  Name      Code      Description      Changed      ID

```

Figure 185. Define a new form

Specify the log record type and code that this form is being designed for.

```

                                New Form
Command ==> _____

Specify the Form name, type and code, or model.

Name . . . . . MQFORM1_

Record Type . . . MQ +
Record Code . . . 0001 +

Default or MODEL
1 1. Default
2. Model . . . _____ +

```

Figure 186. Specify form type and code MQ 0001

By default, the form is populated with all the fields applicable to the specified log record type and code. Delete the fields that you want to exclude from the form. The following screen image shows the deletion of the CSRECTIME and CSBORA fields and all fields in-between.

```

EDIT                                Form - MQFORM1                                Row 1 of 89
Command ==> _____                                Scroll ==> HALF

Description . . . New Form for record type MQ 0001                                Log Code MQ 0001

/ ID Name      Description
__ 01 CSLOGE    MQ Log Extract Record
dd 01 CSRECTIME Log Record Time (Formatted)
__ 01 CSDELTA    Time Delta Between Records (in milliseconds)
__ 01 CSTIME     Log Record Time (STCK)
__ 01 CSURID     Unit of Recovery Id for Log Record
__ 01 CSCORRID   Correlation Id
__ 01 CSAUTH     Authorization Id
__ 01 CSSTIME     Unit of Recovery Start Time (STCK)
__ 01 CSRSRCE    Resource Id
__ 01 CSCONNT    Connection Type
__ 01 CSCONNID   Connection Id
__ 01 CSUSTAT    Unit of Recovery Status
__ 01 CSDATLEN   Length of Variable Data
__ 01 CSQMGR     Queue Manager Name (or Null)
__ 01 CSQNAME     Queue Name or "?" (undetermined)
__ 01 CSSQKEY     Shared Queue Key
__ 01 CSNSQKEY    Non-Shared Queue Key
__ 01 CSACTION    Request Generating Record
__ 01 CSCSTAT     UR Commit State
__ 01 CSSHUNT     UR Shunt State
__ 01 CSLOGRBA    RBA of Log Record
__ 01 CSSRBA     RBA of Shunted Log Record
__ 01 CSUSCOPE    Scope of Unit of Work
__ 01 CSSEGNO     Segment Number (Zero for Unsegmented Record)
dd 01 CSBORA     Before or After Image Indicator

```

Figure 187. Edit the form: Delete the clutter

Enter a meaningful description and the form now looks like the following screen image.

EDIT		Form - MQFORM1	Row 1 of 65
Command ==>			Scroll ==> PAGE
Description . . .		Form for MQ 0001 without CS fields	Log Code MQ 0001
/	ID	Name	Description
—	01	CSLOGE	MQ Log Extract Record

—	02	MQMD	Message Descriptor
—	02	MQMD_STRUCID	Structure identifier
—	02	MQMD_VERSION	Structure version number
—	02	MQMD_REPORT	Options for report messages
—	02	MQMD_MSGTYPE	Message type
—	02	MQMD_EXPIRY	Message lifetime
—	02	MQMD_FEEDBACK	Feedback or reason code
—	02	MQMD_ENCODING	Numeric encoding of message data
—	02	MQMD_CODEDCHARSETID	Character set identifier of message data
—	02	MQMD_FORMAT	Format name of message data
—	02	MQMD_PRIORITY	Message priority
—	02	MQMD_PERSISTENCE	Message persistence
—	02	MQMD_MSGID	Message identifier
—	02	MQMD_CORRELID	Correlation identifier
—	02	MQMD_BACKOUTCOUNT	Backout counter
—	02	MQMD_REPLYTOQ	Name of reply queue
—	02	MQMD_REPLYTOQMGR	Name of reply queue manager
—	02	MQMD_USERIDENTIFIER	User identifier
—	02	MQMD_ACCOUNTINGTOKEN	Accounting token
—	02	MQMD_APPLIDENTITYDATA	Application data relating to identity
—	02	MQMD_PUTAPPLTYPE	Type of application that put the message

Figure 188. Edited form showing relevant fields

Press the Exit function key (F3) to end and save the form.

Return to the filtered MQ log file that we worked with previously and display the list of records as shown in “Applying a filter” on page 235, that is, only MQ 0001 records with queue name MQIADG_REQ_Q.

Select the first record to display the record field contents.


```

BROWSE      MY.MQ.EXTRACT                      Record 00007642 Line 00000000
Command ==>                                     Scroll ==> PAGE
Form ==> + Use Form in Filter                     Format ==> STD
***** Top of data *****
+00B1 Code... 0001 MQ Put
+0020 STCK... C1F16591192C3640 LSN.... 000000000A7CDF9
      Date... 2014-04-16 Wednesday Time... 17.36.04.593347.390

+0004 CSRECTIME..... '2008.044 8:36:04.593' CSDELTA.... ' 128'
+0020 CTIME..... C1F16591192C3640
+0028 CSURID..... 000000A7CC60
+002E CSCORRID... 000000000000000000000000000000
+003A CSAUTH..... 'TWM1 ' CSSTIME.... C1F1659119243300
+004A CSRSRCE.... ' ' CSCONNT.... 'BATCH '
+005A CSCONNID... 'TWM#DRV ' CSUSTAT.... 'BUR' CSDATLEN... 00000145
+0069 CSQMGR..... 'CSQ6'
+006D CSQNAME.... 'MQIADG_REQ_Q
+009D CSSQKEY.... 000000010000070100000000
+00A9 CSNSQKEY... 0000000100000701
+00B1 CSACTION... 'MQPUT ' CSCSTAT.... C3 CSSHUNT.... D5
+00BB CSLOGRBA... 000000A7CDF9
+00C1 CSSRBA.... 000000000000 CSSUSCOPE... 01
+00C8 CSSEGN0.... 00000001 CSBORA..... C1

+00CD MQMD..... Message Descriptor
+00CD MQMD_STRUCID..... 'MD '
+00D1 MQMD_VERSION..... 00000001
+00D5 MQMD_REPORT..... 00000000
+00D9 MQMD_MSGTYPE..... 00000008

```

Figure 189. Formatted MQ record in standard format (no form applied)

Change the Format option from STD to FORM to enable you to specify the name of your form in the Form option input field above the **Top of data**. Type the name in or press the Prompt function key (F4) from the Form field to display the selection list of available forms as shown in the following screen image.

```

Command ==> Forms Row 1 to 2 of 2
Scroll ==> CSR

Select a Form then press Enter.

Name      Log Code  Description
. MQFORM1  MQ 0001 Form for MQ 0001 without CS fields
. MQFORM2  MQ 0001 Alternative form for MQ 0001

```

Figure 190. Select MQ form from prompt list

To select the desired form, tab to the point-and-shoot line action, and press Enter.

Observe from the following screen image that the fields from CSRECTIME to CSBORA are now excluded from the formatted display of the record details.

```

BROWSE      MY.MQ.EXTRACT                      Record 00007642 Line 00000000
Command ==>                                     Scroll ==> PAGE
Form ==> MQFORM1 + _ Use Form in Filter          Format ==> FORM
***** Top of data *****
+00B1 Code... 0001 MQ Put
+0020 STCK... C1F16591192C3640      LSN.... 0000000000A7CDF9
      Date... 2014-04-16 Wednesday Time... 17.36.04.593347.390

+00CD MQMD..... Message Descriptor
+00CD MQMD_STRUCID..... 'MD '
+00D1 MQMD_VERSION..... 00000001
+00D5 MQMD_REPORT..... 00000000
+00D9 MQMD_MSGTYPE..... 00000008
+00DD MQMD_EXPIRY..... FFFFFFFF
+00E1 MQMD_FEEDBACK..... 00000000
+00E5 MQMD_ENCODING..... 00000311
+00E9 MQMD_CODEDCHARSETID..... 000001F4
+00ED MQMD_FORMAT..... ' '
+00F5 MQMD_PRIORITY..... 00000000
+00F9 MQMD_PERSISTENCE... 00000001
+00FD MQMD_MSGID..... C3E2D840C3E2D8F6404040404040C1F16591191FA340
+0115 MQMD_CORRELID..... 00000000000000000000000000000000000000000000
+012D MQMD_BACKOUTCOUNT..... 00000000
+0131 MQMD_REPLYTOQ..... ' '
+0161 MQMD_REPLYTOQMGR... 'CSQ6 '
+0191 MQMD_USERIDENTIFIER..... 'TWM1 '
+019D MQMD_ACCOUNTINGTOKEN..... Accounting token
+0000 07C1C3C3 D6E4D5E3 00000000 00000000 *.ACCOUNT.....*

```

Figure 191. Formatted MQ record with form applied

Note: If you switch to dump format by using the Switch function key (F4), or by changing the Format option from **FORM** to either **DUMP**, **HEX1**, or **HEX0**, the form is ignored and all fields are included in the record dump.

To revert to standard format and ignore the form, change the Format option back to STD.

Navigating through the file

If you have not yet identified a specific record but know approximately when an event occurred, you can easily navigate to that point in time in your log file.

Consider an event that occurred at about 18.00.00. You can scroll forward until you reach that point, but that can be time-consuming. The FIND command is a useful feature in many situations, but to do a FIND on 18.00.00, many records might need to be searched and if 18.00.00.00 is not found exactly in any time stamps, then the search will return a message of 'not found' and the browse session will not reposition the file.

A better method is to enter 18.00.00 in the **Time of Day** field as shown in the following screen image. Then tab back to the point-and-shoot Time of Day field title and press Enter. The file view is repositioned at the first record after your requested time of 18.00.00.00.

```

BROWSE      MY.MQ.EXTRACT                      Record 00007477 More: < >
Command ==>                                     Scroll ==> PAGE
Forwards / Backwards . . .                      Time of Day . . 18.00.00.000000
Code Description                               Date 2014-01-30 Thursday Time (Local)
/ -----
- 0002 MQ Get                                  18.08.56.982059
    Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS
    QName=MQB_REQ_Q
-----
- 0006 MQ Commit Phase 1                      18.08.56.982059
    Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS
-----
- 0007 MQ Commit Phase 2                      18.08.56.982059
    Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS
-----
- 0002 MQ Get                                  18.08.56.984412
    Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS
    QName=MQB_REQ_Q

```

Figure 192. Navigate to a particular time of day

From this point you can navigate forward or backward in time by a specified amount, for example, 3 milliseconds. To specify 3 milliseconds, enter 00.00.00.003 in the **Forwards/Backwards** field then to navigate forward, tab back to the point-and-shoot **Forwards** field title and press Enter. Your file view is repositioned at the first record that is more than 3 milliseconds ahead of the record that you were previously positioned on.

```

BROWSE      MY.MQ.EXTRACT                      Record 00007483 More: < >
Command ==>                                     Scroll ==> PAGE
Forwards / Backwards . . . 00.00.00.003000    Time of Day . . 18.00.00.000000
Code Description                               Date 2014-01-30 Thursday Time (Local)
/ -----
- 0002 MQ Get                                  18.08.56.986413
    Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS
    QName=MQB_REQ_Q
-----
- 0006 MQ Commit Phase 1                      18.08.56.986413
    Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS
-----
- 0007 MQ Commit Phase 2                      18.08.56.986413
    Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS
-----
- 0001 MQ Put                                  18.08.57.239307
    Program=MQATPGM Userid=FUNTRM85 Region=0001 IMSID=IADG
    RecToken=IADG/0000000200000000 LogToken=C1E398664A279D23
    SSID=CSQ6 QMgr=CSQ6 Delta=85 ConnType=IMS QName=MQB_REQ_Q

```

Figure 193. Skip forward or backward by a specified time interval

Other useful line actions are **W**, **R**, **E**, and **N**. They control the time format in the Time column to help you clarify when events occurred. The default is wall-clock format *HH.MM.SS.THMIJU*.

The **Zone** input field on the Process Log Files panel allows you to request to view times in either local time or GMT, or, for log data created in another time zone, you can specify the time zone offset.

Figure 193 shows record time stamps in local time in wall-clock format.

Line action **R** displays the time difference (plus or minus) relative to the current record as shown in the following screen image.

BROWSE	MY.MQ.EXTRACT	Record 00007483	More: < >
Command ==>		Scroll ==>	PAGE
Forwards / Backwards . .	00.00.00.003000	Time of Day . .	18.00.00.000000
Code Description	Date 2014-01-30 Thursday	Time (Relative)	

R	0002 MQ Get	18.08.56.986413	
	Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS		
	QName=MQB_REQ_Q		

-	0006 MQ Commit Phase 1	+0.000000	
	Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS		

-	0007 MQ Commit Phase 2	+0.000000	
	Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS		

-	0001 MQ Put	+0.252893	
	Program=MQATPGM Userid=FUNTRM85 Region=0001 IMSID=IADG		
	RecToken=IADG/00000000200000000 LogToken=C1E398664A279D23		
	SSID=CSQ6 QMgr=CSQ6 Delta=85 ConnType=IMS QName=MQB_REQ_Q		

Figure 194. Relative time format

Line action **E** displays the times that have elapsed between each record.

BROWSE	MY.MQ.EXTRACT	Record 00007483	More: < >
Command ==>		Scroll ==>	PAGE
Forwards / Backwards . .	00.00.00.003000	Time of Day . .	18.00.00.000000
Code Description	Date 2014-01-30 Thursday	Time (Elapsed)	

E	0002 MQ Get	18.08.56.986413	
	Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS		
	QName=MQB_REQ_Q		

-	0006 MQ Commit Phase 1	0.000000	
	Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS		

-	0007 MQ Commit Phase 2	0.000000	
	Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS		

-	0001 MQ Put	0.252893	
	Program=MQATPGM Userid=FUNTRM85 Region=0001 IMSID=IADG		
	RecToken=IADG/00000000200000000 LogToken=C1E398664A279D23		
	SSID=CSQ6 QMgr=CSQ6 Delta=85 ConnType=IMS QName=MQB_REQ_Q		

Figure 195. Elapsed time format

Line action **N** increases the precision of relative and elapsed times from microseconds (the default) to nanoseconds. The following screen image shows elapsed times with nanosecond precision.

BROWSE	MY.MQ.EXTRACT	Record 00007483	More: < >
Command ==>		Scroll ==>	PAGE
Forwards / Backwards . .	00.00.00.003000	Time of Day . .	18.00.00.000000
Code Description	Date 2014-01-30 Thursday	Time (Elapsed)	
/	-----		
N	0002 MQ Get	18.08.56.986413	
	Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS		
	QName=MQB_REQ_Q		

-	0006 MQ Commit Phase 1	0.000000.000	
	Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS		

-	0007 MQ Commit Phase 2	0.000000.000	
	Program=MQATPGM Region=0001 IMSID=IADG SSID=CSQ6 ConnType=IMS		

-	0001 MQ Put	0.252893.805	
	Program=MQATPGM Userid=FUNTRM85 Region=0001 IMSID=IADG		
	RecToken=IADG/000000002000000000 LogToken=C1E398664A279D23		
	SSID=CSQ6 QMgr=CSQ6 Delta=85 ConnType=IMS QName=MQB_REQ_Q		

Figure 196. Nanosecond precision

Line action **W** restores times to wall-clock format.

Creating extract files

If you require only a section of a large log file for analysis, it can improve performance efficiency to extract only those records either by time range, by using a filter, or both. You can do this dynamically using Time Slicing or you can create a smaller, filtered extract data set.

To request a batch extract, return to the list of log files on the Log Process Files panel and enter line action **SUB** as shown in the following screen image.

Command ==>	Process Log Files	Row 1 of 21	More: < >
		Scroll ==>	CSR
Select a Log File to browse.	IMS Release 121 +	Zone	
/	Log File	Rel + Filter + Zone	
SUB	'MY.MQ.EXTRACT'	MQFILTR1	

Figure 197. Use **SUB** to request a report, extract or CSV

IMS PI prompts you for more information before generating the JCL. Select the option **Create Extract Data Set** and specify the name of the data set to be created. Specify the name of a filter, or a report interval, or both. You can also request to produce a report in the same run.

Figure 198. Specify batch submission options

If you selected the option **Edit JCL before submit**, an ISPF-style edit panel intervenes displaying the generated JCL. You can review or modify the JCL using the usual ISPF edit commands and actions, or you can use the CREATE command to save the JCL in an external data set for your automatic job scheduler. Then to submit the job, enter SUB on the edit command line.

Figure 199. Edit the JCL

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to the original file.

Process Log Files		Row 1 of 22 More: < >
Command ==>		Scroll ==> CSR
Select a Log File to browse.	IMS Release 121 +	Zone
/	Log File	Rel + Filter + Zone
	'MY.MQ.EXTRACT'	MQFILTR1
	'MY.MQFILTR1.EXTRACT'	

Figure 200. Extract data set name is added to the process list

Example: MQ-IMS bridge

IMS Problem Investigator supports MQ IMS bridge connectivity data – MQ-generated IMS transactions sent into IMS through OTMA.

In this example, an IMS transaction (TranCode=PART) is driven from an initial message, to OTMA, from an MQ system. The sequence of events is:

- 1 The message is PUT to the IMS bridge
- 2 The MQ message is committed
- 3 IMS initiates the PART transaction
- 4 IMS processes the transaction
- 5 The IMS reply is sent to OTMA
- 6 OTMA GETs the reply from the message queue and sends to MQ

Code	Description	Date 2014-04-16 Wednesday	Time (Local)	
0001	MQ Put		16.31.12.275748	1
	Userid=TWM LogToken=C1FA31888C8C6881 SSID=CSQ6 QMgr=CSQ6 Delta=52 ConnType=BATCH RepQ=MQIADG_REPLY_Q QName=MQIADG_REQ_Q URID=000000AAAB29			
0006	MQ Commit Phase 1		16.31.12.275748	2
	SSID=CSQ6 Delta=52 ConnType=BATCH URID=000000AAAB29			
0007	MQ Commit Phase 2		16.31.12.275748	
	SSID=CSQ6 Delta=52 ConnType=BATCH URID=000000AAAB29			
01	Input Message		16.31.12.477973	3
	UTC=17.31.12.477964 TranCode=PART LTerm=CSQ00027 Terminal=CSQ00027 OrgUOWID=IADG/C1FA3188BDEE0023 LogToken=C1FA31888C8C6881 SSN=017 QMgr=CSQ6 Source=MQ RepQ=MQIADG_REPLY_Q			

Figure 201. MQ-IMS bridge: MQ message initiates an IMS transaction (part 1)

Code	Description	Date 2014-04-16 Wednesday	Time (Local)	
35	Input Message Enqueue UTC=17.31.12.477964 TranCode=PART LTerm=CSQ00027 Terminal=CSQ00027 OrgUOWID=IADG/C1FA3188BDEE0023 LogToken=C1FA31888C8C6881 SSN=017 QMgr=CSQ6 RepQ=MQIADG_REPLY_Q		16.31.12.477997	
5607	Start of UOR Program=DFSSAM02 Region=0001 IMSID=IADG RecToken=IADG/0000000C00000000		16.31.12.552256	4
31	DLI GU UTC=17.31.12.552280 TranCode=PART Region=0001 OrgUOWID=IADG/C1FA3188BDEE0023 RecToken=IADG/0000000C00000000		16.31.12.552283	
5E	SB Handler requests Image Capture UTC=17.31.12.552133 Region=0001		16.31.12.567547	
5610	Start Phase 1 Syncpoint Region=0001 IMSID=IADG RecToken=IADG/0000000C00000000		16.31.12.569615	
03	Output Message Response UTC=17.31.12.477964 TranCode=PART LTerm=CSQ00027 Terminal=CSQ00027 OrgUOWID=IADG/C1FA3188BDEE0023 LogToken=C1FA31888C8C6881 SSN=017 QMgr=CSQ6 Source=MQ RepQ=MQIADG_REPLY_Q		16.31.12.569666	
35	Output Message Enqueue UTC=17.31.12.569680 TranCode=PART LTerm=CSQ00027 Terminal=CSQ00027 Region=0001 OrgUOWID=IADG/C1FA3188BDEE0023 RecToken=IADG/0000000C00000000 LogToken=C1FA31888C8C6881 SSN=017 QMgr=CSQ6 RepQ=MQIADG_REPLY_Q		16.31.12.569689	
37	Syncpoint Region=0001 RecToken=IADG/0000000C00000000		16.31.12.569715	
37	Syncpoint message transfer TranCode=PART LTerm=CSQ00027 Terminal=CSQ00027 Region=0001 OrgUOWID=IADG/C1FA3188BDEE0023 RecToken=IADG/0000000C00000000 LogToken=C1FA31888C8C6881 SSN=017 QMgr=CSQ6 RepQ=MQIADG_REPLY_Q		16.31.12.569750	5
33	Free Message OrgUOWID=IADG/C1FA3188BDEE0023		16.31.12.569780	
5612	End of Phase 2 Syncpoint Program=DFSSAM02 Region=0001 IMSID=IADG RecToken=IADG/0000000C00000000		16.31.12.569824	
31	Communications GU UTC=17.31.12.588956 TranCode=PART LTerm=CSQ00027 Terminal=CSQ00027 OrgUOWID=IADG/C1FA3188BDEE0023 LogToken=C1FA31888C8C6881 SSN=017 QMgr=CSQ6 RepQ=MQIADG_REPLY_Q		16.31.12.588964	6
0001	MQ Put Userid=TWM LogToken=C1FA31888C8C6881 SSID=CSQ6 QMgr=CSQ6 QName=MQIADG_REPLY_Q URID=000000AADC23		16.31.12.605969	

Figure 202. MQ-IMS bridge: MQ message initiates an IMS transaction (part 2)

Example: IMS adapter

IMS Problem Investigator supports MQ IMS adapter connectivity data – IMS transaction-issued MQ requests (MQGET, MQPUT or MQSET) to an MQ external subsystem.

The following example shows a single IMS transaction that performs:

- 1** Full Function IMS database updates
- 2** DB2 SQL calls
- 3** IMS adapter GET and PUT requests to MQ

The expanded record details of the IMS 07 record are shown here for convenience of illustration. They are normally viewed by scrolling using the Left function key (F10) and the Right function key (F11) from the compact list of records.

- 4** Observe the high number of MQ calls (in excess of 200). This might be the cause of a problem.

. . .	
01 Input Message TranCode=MQATREQ1	09.49.26.679852
35 Input Message Enqueue TranCode=MQATREQ1	+0.000023
31 DLI GU TranCode=MQATREQ1 Region=0001	+0.000137
5E SB Handler requests Image Capture Region=0001	+0.000262
50 Database Update Database=DI21PART Region=0001	+0.000643 1
50 Database Update Database=DI21PART Region=0001	+0.000720
50 Database Update Database=DI21PART Region=0001	+0.000771
5600 Sign-on to ESAF Region=0001 SSID=DB3A	+0.001604
0020 DB2 Unit of Recovery Control - Begin UR	+0.023043 2
0020 DB2 Update In-Place in a Data Page	+0.023059
0010 DB2 Savepoint	+0.023347
0020 DB2 Delete from a Data Page	+0.023459
0020 DB2 Insert into a Data Page	+0.023683
5600 Sign-on to ESAF Region=0001 SSID=CSQ6	+0.145085
0002 MQ Get Region=0001	+0.145870 3
0006 MQ Commit Phase 1 Region=0001	+0.145870
0007 MQ Commit Phase 2 Region=0001	+0.145870
0002 MQ Get Region=0001	+0.148405
0007 MQ Commit Phase 2 Region=0001	+0.154640
0002 MQ Get Region=0001	+0.156635
. . . [Multiple additional MQ calls]	

07 Application Terminate	+1.073791
UTC=10.37.00.753639 TranCode=MQATREQ1 Program=MQATPGM Region=0001	
RecToken=IADG/0000000700000005	
RegTyp=MPP MCNT=5 DBDLI=10 DCDLI=10 CPU=0.129896 ESAF=220 4	

Figure 203. IMS adapter: IMS transaction issues MQ requests

Chapter 18. Investigating IRLM Long Lock events

The information in SMF 79.15 (X'4F0F') records allows you to measure transaction event latencies and to investigate performance problems when IMS transactions experience IRLM Long Locks.

The IRLM Long Lock record provides information when a database lock occurs during an update. Merging IMS and SMF log files, IMS Problem Investigator enables end-to-end analysis of an IMS transaction to identify the event that is holding and the event that is waiting for the lock.

Related reference:

“SMF data for IRLM Long Locks” on page 71

No special preparation is required.

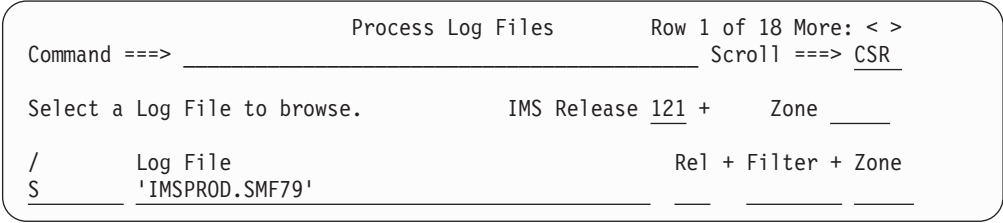
SMF record type

IMS PI provides SMF file support, formatting one type of SMF record, IRLM Long Locks which have record code 79.15 (X'4F0F').

Potentially there are 128 SMF record types in the range X'00' to X'7F' though they are not all in current use. IMS Problem Investigator recognizes all SMF record types, but formats only the IRLM Long Lock records. However, since every SMF record definition begins with a common header area, this area can be correctly interpreted and formatted for every SMF record. For the X'4F0F' record, data after the header is formatted, whilst all other SMF record types are dumped.

Browsing SMF records

From the IMS PI primary option menu, select option **1 Process**. Then specify the data set name of the SMF file containing the records to be analyzed.



The screenshot shows a terminal window with the following text:

```
Process Log Files          Row 1 of 18 More: < >
Command ==>              Scroll ==> CSR
Select a Log File to browse.      IMS Release 121 +      Zone ____
/      Log File                  Rel + Filter + Zone
S      'IMSPROD.SMF79'
```

Figure 204. Selecting a log file to browse

The list of records in the file are displayed.

BROWSE	IMSPROD.SMF79	Record 00000001	More: < >
Command ==>		Scroll ==>	PAGE
Forwards / Backwards . .	00.00.00.003000	Time of Day . .	18.00.00.000000
Code Description	Date 2014-03-17 Monday	Time (Local)	

/			
— 2A	DFSMS Statistics and Configuration	16.00.02.900000	
— 5C	File System Activity	16.00.02.980000	
— 5C	File System Activity	16.00.03.950000	
— 6E	CICS Transaction Server	16.00.03.950000	
— 6E	CICS Transaction Server	16.00.05.000000	
— 2A	DFSMS Statistics and Configuration	16.00.05.780000	
— 2A	DFSMS Statistics and Configuration	16.00.05.830000	
— 6E	CICS Transaction Server	16.00.09.660000	
— 2A	DFSMS Statistics and Configuration	16.00.11.300000	
— 1E	Common Address Space Work	16.00.12.490000	

Figure 205. Listing records in a file

Investigating database update locks

IRLM Long Lock records provide information on the locks that occur during database updates. Typically two records are created for each Long Lock – a Waiter and a Blocker, although there can be more than one of each.

Whilst SMF records are usually known by their decimal type and subtype codes, IMS PI has adopted hexadecimal codes for consistency with the other types of log record that it supports. Thus the record generally known as decimal 79.15 is known to IMS PI as hexadecimal 4F0F.

The global tracking field LongLock is sourced from field R79FDLKC in the 4F0F record.

Analyzing formatted records

To isolate the IRLM Long Lock records, you can specify a record code filter.

Procedure

1. On the Process panel, enter the data set name of the SMF file, specify log record code 4F0F as the filter, then select the file.

Process Log Files		Row 1 of 18	More: < >
Command ==>		Scroll ==>	CSR
Select a Log File to browse.	IMS Release 121 +	Zone	
/	Log File	Rel + Filter + Zone	
S	'IMSPROD.SMF79'	4F0F	

Figure 206. Filtering by record code

2. Only records with record code X'4F0F' (SMF 79.15) are displayed.

```

BROWSE      IMSPROD.SMF79                      Record 00001484 More: < >
Command ==>                                     Scroll ==> CSR
Forwards / Backwards . . 00.00.00.003000      Time of Day . . 18.00.00.000000
Code Description                               Date 2014-03-17 Monday      Time (Local)
/ -----
--- 4F0F IRLM Long Lock Waiter Region=0021 LongLock=02199456      16.34.24.950000
--- 4F0F IRLM Long Lock Waiter Region=0089 LongLock=02199566      16.36.41.660000
--- 4F0F IRLM Long Lock Blocker Region=015D LongLock=02199566      16.36.41.660000
--- 4F0F IRLM Long Lock Waiter Region=0095 LongLock=02199582      16.36.55.710000
--- 4F0F IRLM Long Lock Blocker Region=015D LongLock=02199582      16.36.55.710000
--- 4F0F IRLM Long Lock Waiter Region=0095 LongLock=02199584      16.36.56.710000
--- 4F0F IRLM Long Lock Blocker Region=015D LongLock=02199584      16.36.56.710000
--- 4F0F IRLM Long Lock Waiter Region=0095 LongLock=02199586      16.36.57.720000
--- 4F0F IRLM Long Lock Blocker Region=015D LongLock=02199586      16.36.57.720000

```

Figure 207. Displaying filtered results

3. Use the Left function key (F10) and the Right function key (F11) to change the view from compact to expanded and from time to LSN.

```

BROWSE      IMSPROD.SMF79                      Record 00001484 More: < >
Command ==>                                     Scroll ==> CSR
Forwards / Backwards . . 00.00.00.003000      Time of Day . . 18.00.00.000000
Code Description                               Date 2014-03-17 Monday      LSN
/ -----
S --- 4F0F IRLM Long Lock Waiter                                00000000000005CC
      TranCode=B00QCSUB Program=ADMBOS2A Database=HGNDX Region=0021
      IMSID=IPS1 RecToken=IPS1/369A87BD00000000 Time=2 RegTyp=MPP
      LongLock=02199456
      -----
--- 4F0F IRLM Long Lock Waiter                                00000000000005CD
      TranCode=DAP30PRO Program=DAPAADM0 Database=DAPRDVA Region=0089
      IMSID=IPS1 RecToken=IPS1/369AD28C00000000 Time=1 RegTyp=MPP
      LongLock=02199566
      -----
--- 4F0F IRLM Long Lock Blocker                                00000000000005CE
      TranCode=DAPBB00J Program=DAPAU00 Region=015D IMSID=IPS1
      RecToken=IPS1/364B27790000265F8 Time=5 RegTyp=BMP LongLock=02199566
      -----
--- 4F0F IRLM Long Lock Waiter                                00000000000005CF
      TranCode=DAPBA00J Program=DAPUA00 Database=DAPPICA Region=0095
      IMSID=IPS1 RecToken=IPS1/364A1378000006D92 Time=2 RegTyp=BMP
      LongLock=02199582

```

Figure 208. Expanding the view

4. Select a record to drill-down to field contents.

```

BROWSE      IMSPROD.SMF79                      Record 00001484 Line 00000000
Command ==> _____ Scroll ==> CSR
Form ==> _____ + _ Use Form in Filter      Format ==> STD
***** Top of data *****
+0005 Code... 4F0F  IRLM Long Lock Waiter
+000A STCK... C16AD03885EF0000      LSN.... 00000000000005CC
      Date... 2014-03-17 Monday      Time... 16.34.24.950000.000

+0000 SMF79LEN... 009B      SMF79SEG... 0000      SMF79FLG... DE
+0005 SMF79RTY... +79      SMF79TME... 005B0A9F      SMF79DTE... 0107302F
+000E SMF79SID... '1S02'      SMF79SSI... 'RMF '      SMF79STY... +15
+0018 SMF79TRN... +2      SMF79PRS... 00000000      SMF79PRL... 0000
+0022 SMF79PRN... +0      SMF79FP0... 0000002C      SMF79FPL... 006F
+002A SMF79FPN... +1

+002C R79FIRLM... IRLM Long Lock
+002C R79FISTN... 'PIS1DS_IMSIRLM '      R79FDLKC... 02199456
+0040 R79FETYP... E6      R79FAVL.... 000000
+0044 R79FIMSI... 'IPS1 '      R79FPSTN... 0021
+004E R79FPSBN... 'ADMBOS2A'      R79FRGTY... 08
+0057 R79FRCVT... C9D7E2F140404040369A87BD00000000
+0067 R79FCTID... ' '      R79FLHTI... 0000000200000000
+0077 R79FLHCN... 00000000      R79FLKNA... 0B928BB6D485EF01D700020000000000
+008B R79FTRNM... 'B00QCSUB'      R79FRSNA... 'HGNNDX '
***** End of data *****

```

Figure 209. IRLM Long Lock record: standard format

- Position the cursor on a point-and-shoot field label and press Enter to zoom on the field. This displays the field description and possibly other information such as the meaning of specific values. For example, for field R79FTRNM, the following is displayed.

```

----- Field Zoom -----
BROWSE      IMSPROD.SMF79                      Line 00000000
Command ==> _____ Scroll ==> CSR
***** Top of data *****
+008B R79FTRNM... 'B00QCSUB'

      Transaction Name / Job Name
***** End of data *****

```

Figure 210. Zooming on a field

Applying a filter

Defining a filter with filtering conditions can give even more control over record selection.

Procedure

- From the IMS Problem Investigator Primary Option Menu, select option 3 **Forms**, and then define a new filter to isolate SMF 4F0F records.

EDIT	Filter - SMFFILTR	Row 1 of 1 More: < >
Command ==>		Scroll ==> CSR
Description . . . New SMF 4F0F Filter _ Activate Tracking		
/ Log Code + Exc	Description	
S SMF 4F0F	IRLM Long Lock	
	Level 1	Conditions Yes Form + REXX

Figure 211. Defining a new filter

- Specify conditions to narrow the selection further. For example, “select only those SMF 4F0F records where the transaction name is BO0QCSUB”.

Command ==>	Conditions	Row 1 to 1 of 1
		Scroll ==> CSR
Code: CA01 Transaction		
/ Field Name +	Oper	Value +
R79FTRNM	EQ	BO0QCSUB
***** Bottom of data *****		

Figure 212. Specifying conditions

- From the IMS Problem Investigator Primary Option Menu, select option 1 **Process**, and then specify the name of the filter for the SMF file.

Command ==>	Process Log Files	Row 1 of 18 More: < >
		Scroll ==> CSR
Select a Log File to browse.	IMS Release 121 +	Zone
/ Log File	Rel + Filter + Zone	
S 'IMSPROD.SMF79'	SMFFILTR	

Figure 213. Specifying the name of the filter

- Analyze the filtered results. Only those records satisfying the condition are reported.

```

BROWSE      IMSPROD.SMF79                      Record 00000123 More: < >
Command ==>                                     Scroll ==> CSR
Forwards / Backwards . . 00.00.00.003000      Time of Day . . 18.00.00.000000
Code Description                               Date 2014-03-17 Monday      LSN
/ -----
-- 4F0F IRLM Long Lock Waiter                      000000000000007B
   TranCode=B00QCSUB Program=ADMBOS2A Database=HGNNDX Region=0021
   IMSID=IPS1 RecToken=IPS1/3643264200000000 Time=1 RegTyp=MPP
   LongLock=021802E5
   -----
-- 4F0F IRLM Long Lock Waiter                      000000000000007F
   TranCode=B00QCSUB Program=ADMBOS2A Database=HGNNDX Region=003D
   IMSID=IPS1 RecToken=IPS1/3649808A00000000 Time=2 RegTyp=MPP
   LongLock=02187BC0
   -----
-- 4F0F IRLM Long Lock Waiter                      0000000000000081
   TranCode=B00QCSUB Program=ADMBOS2A Database=HGNNDX Region=003D
   IMSID=IPS1 RecToken=IPS1/3649808A00000000 Time=3 RegTyp=MPP
   LongLock=02187BC2
   -----
-- 4F0F IRLM Long Lock Waiter                      0000000000000083
   TranCode=B00QCSUB Program=ADMBOS2A Database=HGNNDX Region=003D
   IMSID=IPS1 RecToken=IPS1/3649808A00000000 Time=4 RegTyp=MPP
   LongLock=02187BC4

```

Figure 214. Filtered results

Applying a form

Define a form to report only selected fields from the record.

Procedure

1. From the IMS Problem Investigator Primary Option Menu, select option 3 **Forms**.
2. Enter the NEW command to define a new form.

```

Forms                                           Row 1 to 1 of 1
Command ==> new smfform                       Scroll ==> CSR
Select to edit a Form.                        IMS Release 121 +
/  Name   Code   Description                     Changed      ID
-- MQFORM1 0001 New Form for record type MQ 0001 2014/03/12 12:28 JCP3
***** Bottom of data *****

```

Figure 215. Defining a new form

3. Specify record type SMF and record code 4F0F.

Figure 216. Defining a new form

New Form

Command ==> _____

Specify the Form name, type and code, or model.

Name SMFFORM

Record Type . . . SMF +

Record Code . . . 4F0F +

Default or MODEL

1 1. Default

2. Model . . . _____ +

4. Press Enter. All fields in the IRLM Long Lock record are listed.
5. Tailor the formatted report by deleting the fields that are of no interest to you. In this example, fields SMF79TRN through SMF79FPN will not be reported.

EDIT

Form - SMFFORM

Row 1 of 59

Command ==> _____ Scroll ==> SCR

Description . . . Form to demonstrate SMF record 4F0F_ Log Code **SMF 4F0F**

/	ID	Name	Description
—	01	SMF79HDR	IRLM Long Lock Record
—	01	SMF79LEN	Record length
—	01	SMF79SEG	Segment descriptor
—	01	SMF79FLG	Header flag byte
—	01	SMF79RTY	Record type
—	01	SMF79TME	TOD record written
—	01	SMF79DTE	Date record written
—	01	SMF79SID	System Id from installation
—	01	SMF79SSI	Subsystem Id (RMF)
—	01	SMF79STY	Subtype
dd	01	SMF79TRN	Number of triplets in this record
—	01	SMF79PRS	Offset to RMF product section
—	01	SMF79PRL	Length of RMF product section
—	01	SMF79PRN	Number of RMF product sections
—	01	SMF79FPO	Offset to IMS Long Lock Data Section
—	01	SMF79FPL	Length of IMS Long Lock Data Section
dd	01	SMF79FPN	Number of IMS Long Lock Data Section

—	02	SMF79PRO	Product section
—	02	SMF79MFV	RMF version number, with introduction of
—	02	SMF79PRD	Product name
—	02	SMF79IST	TOD monitor interval start: 0hhmmssf
—	02	SMF79DAT	Date monitor interval start: 00yydddf

Figure 217. IRLM Long Lock form

6. Press the Exit function key (F3) to save the form. You can now use the form to format Long Lock records.
7. The following figure shows the customized format with the form applied. Compare with the format of the record in standard format.

```

BROWSE      IMSPROD.SMF79                      Record 00000123 Line 00000000
Command ==>                                     Scroll ==> CSR
Form ==> SMFFORM + _ Use Form in Filter          Format ==> FORM
***** Top of data *****
+0005 Code... 4F0F  IRLM Long Lock Waiter
+000A STCK... C16A100BD7590000      LSN.... 000000000000007B
      Date... 2014-03-17 Monday      Time... 02.14.38.490000.000

+0000 SMF79LEN... 009B      SMF79SEG... 0000      SMF79FLG... DE
+0005 SMF79RTY... +79      SMF79TME... 000C53A9    SMF79DTE... 0107302F
+000E SMF79SID... '1S02'    SMF79SSI... 'RMF '      SMF79STY... +15

+002C R79FIRLM... IRLM Long Lock
+002C R79FISTN... 'PIS1DS_ IMSIRLM '      R79FDLKC... 021802E5
+0040 R79FETYP... E6      R79FAVL.... 000000
+0044 R79FIMSI... 'IPS1 '  R79FPSTN... 0021
+004E R79FPSBN... 'ADMBOS2A' R79FRGTY... 08
+0057 R79FRCVT... C9D7E2F1404040403643264200000000
+0067 R79FCTID... ' '      R79FLHTI... 0000000100000000
+0077 R79FLHCN... 00000000    R79FLKNA... 0B0E3D55B085EF01D70001000000000
+008B R79FTRNM... 'B00QCSUB' R79FRSNA... 'HGNDX '
***** End of data *****

```

Figure 218. IRLM Long Lock record: with form applied

Merging log files

IMS PI can process multiple log files of different types and origins.

Procedure

1. Specify the log files of interest, then select them all using multiple line actions **S** or the block line actions **SS**. In this example, an SMF file and an IMS Connect Extensions journal are selected.

```

                                Process Log Files      Row 1 of 18 More: < >
Command ==>                                     Scroll ==> CSR

Select a Log File to browse.      IMS Release 121 +      Zone ____

/      Log File      Rel + Filter + Zone
SS      'IMSPROD.SMF79'      ____
SS      'CEX999.MAINT.IMSPS1.LOGFILE6'      ____

```

Figure 219. Merge SMF file and IMS Connect Extensions journal

2. The formatted records from both files are merged in date-time sequence.

BROWSE	IMSPROD.SMF79	Record 00000001	More: < >
Command ==>		Scroll ==>	CSR
Forwards / Backwards . .	00.00.00.003000	Time of Day . .	18.44.33.705000
Code Description	Date 2007-10-29 Monday	Time (Local)	

/			
— 2A	DFSMS Statistics and Configuration	16.00.02.900000	
— 5C	File System Activity	16.00.02.980000	
— 5C	File System Activity	16.00.03.950000	
— 6E	CICS Transaction Server	16.00.03.950000	
— 6E	CICS Transaction Server	16.00.05.000000	
— 2A	DFSMS Statistics and Configuration	16.00.05.780000	
— 2A	DFSMS Statistics and Configuration	16.00.05.830000	
— 6E	CICS Transaction Server	16.00.09.660000	
— 2A	DFSMS Statistics and Configuration	16.00.11.300000	
— 1E	Common Address Space Work	16.00.12.490000	

Figure 220. Merged records

What to do next

Especially if they are large files, try Time Slicing using line actions **W** or **WW**.

Locating and tracking problem transactions

IMS PI can associate related records from the merged log files. It does this by means of tracking fields.

About this task

Scenario: You have an IMS log and an SMF file that were cut at about the same time. A problem occurs with an IMS database update. Find an IMS log record associated with this update then invoke tracking to find all the records in that transaction - including any SMF Long Lock records.

Procedure

1. The first step might be to locate the approximate time of interest by using the **Time of Day** field. Specify a time of day, and then position the cursor on the point-and-shoot field title and press Enter.

```

BROWSE      IMSPROD.SMF79                      Record 00133277 More: < >
Command ====>                                Scroll ====> CSR
Forwards / Backwards . . 00.00.00.003000      Time of Day . . 18.44.33.700000
Code Description                               Date 2014-03-17 Monday      Time (Local)
/ -----
5600 Commit Prepare starting Region=0077 SSID=QPS2      18.44.33.700953
5950 FP Database Update Database=DAPPISDE Region=0077  18.44.33.703819
5950 FP Database Update Database=DAPPISDE Region=0077  18.44.33.703820
5950 FP Database Update Database=DAPPISDE Region=0077  18.44.33.703820
5950 FP Database Update Database=DAPPISDE Region=0077  18.44.33.703821
5950 FP Database Update Database=DAPPISDE Region=0077  18.44.33.703821
5950 FP Database Update Database=DAPUISDE Region=0077  18.44.33.703822
5950 FP Database Update Database=DAPUICDE Region=0077  18.44.33.703823
37 BMP extended restart Region=0077                    18.44.33.705507
5937 FP Syncpoint Program=DAPAU000 Region=0077         18.44.33.705507
41 Batch Checkpoint Region=0077                        18.44.33.705520
5600 Commit Continue completed Region=0077 SSID=QPS2   18.44.33.707175
TX 5607 Start of UOR Program=DAPAU000 Region=0077     18.44.33.707178
5612 End of Phase 2 Syncpoint Program=DAPAU000         18.44.33.707513
50 Database Update Database=HOGNDET0X Region=0021     18.44.33.708886
50 Database Update Database=HOGNDET0X Region=0021     18.44.33.708895
50 Database Update Database=HOGNDET0X Region=0021     18.44.33.708899
50 Database Update Database=CIF07 Region=0021         18.44.33.708955
5600 Commit Prepare starting Region=00AD SSID=QPS2     18.44.33.708985
5600 Commit Prepare starting Region=0021 SSID=QPS2     18.44.33.710196
03 Input Message TranCode=B00QACCN                    18.44.33.710363
35 Input Message Enqueue TranCode=B00QACCN Region=00AD 18.44.33.710382
37 Syncpoint Region=00AD                               18.44.33.710389

```

Figure 221. Locating a record using time of day

- Assuming the 5607 is the record of interest, use the **TX** line action to show only those records in the same transaction as the 5607. IMS PI does this by connecting records through a set of tracking fields that include RecToken, Region, and LongLock.

```

BROWSE      IMSPROD.SMF79                      Transaction Tracking active
Command ====>                                Scroll ====> SCR
Forwards / Backwards . . 00.00.00.003000      Time of Day . . 18.44.33.700000
Code Description                               Date 2014-03-17 Monday      Time (Local)
/ -----
5607 Start of UOR Program=DAPAU000 Region=0077         18.44.33.707178
5600 Sign-on to ESAF Region=0077 SSID=QPS2             18.44.33.764138
5600 Commit Prepare starting Region=0077 SSID=QPS2     18.44.40.783354
5950 FP Database Update Database=DAPPISDE Region=0077 18.44.40.786223
5950 FP Database Update Database=DAPPISDE Region=0077 18.44.40.786224
5950 FP Database Update Database=DAPPISDE Region=0077 18.44.40.786224
5950 FP Database Update Database=DAPPICDE Region=0077 18.44.40.786225
5950 FP Database Update Database=DAPUISDE Region=0077 18.44.40.786225
5950 FP Database Update Database=DAPUICDE Region=0077 18.44.40.786226
5950 FP Database Update Database=DAPPISDE Region=0077 18.44.40.786227
5950 FP Database Update Database=DAPPISDE Region=0077 18.44.40.786227
5950 FP Database Update Database=DAPPISDE Region=0077 18.44.40.786228
5950 FP Database Update Database=DAPPICDE Region=0077 18.44.40.786229
5950 FP Database Update Database=DAPUISDE Region=0077 18.44.40.786230
5950 FP Database Update Database=DAPUICDE Region=0077 18.44.40.786230
5950 FP Database Update Database=DAPPISDE Region=0077 18.44.40.786231
5950 FP Database Update Database=DAPPISDE Region=0077 18.44.40.786232

```

Figure 222. Tracking on a record of interest

3. Scrolling to the top shows the IRLM Long Lock records involved in the transaction.

BROWSE	IMSPROD.SMF79	Record 00000099	More: < >
Command ==>		Scroll ==>	SCR
Forwards / Backwards . .	00.00.00.003000	Time of Day . .	18.44.33.700000
Code Description	Date 2014-03-17 Monday	Time (Local)	
/	-----		
— 4F0F IRLM Long Lock Blocker Region=0077	LongLock=0217F4DD	18.44.36.360000	
— 4F0F IRLM Long Lock Waiter Region=009B	LongLock=0217F4DD	18.44.36.360000	
— 4F0F IRLM Long Lock Waiter Region=009B	LongLock=0217F4DF	18.44.37.360000	
— 4F0F IRLM Long Lock Blocker Region=0077	LongLock=0217F4DF	18.44.37.360000	
— 4F0F IRLM Long Lock Blocker Region=0077	LongLock=0217F4E1	18.44.38.370000	
— 4F0F IRLM Long Lock Waiter Region=009B	LongLock=0217F4E1	18.44.38.370000	
— 4F0F IRLM Long Lock Waiter Region=009B	LongLock=0217F4E3	18.44.39.370000	
— 4F0F IRLM Long Lock Blocker Region=0077	LongLock=0217F4E3	18.44.39.370000	
— 4F0F IRLM Long Lock Waiter Region=009B	LongLock=0217F4E5	18.44.40.370000	
— 4F0F IRLM Long Lock Blocker Region=0077	LongLock=0217F4E5	18.44.40.370000	
— 5607 Start of UOR Program=DAPAU00	Region=0077	18.44.33.707178	
— 5600 Sign-on to ESAF Region=0077	SSID=QPS2	18.44.33.764138	
— 5607 Start of UOR Program=DAPAU00	Region=009B	18.44.34.733518	
— 5600 Commit Prepare starting Region=0077	SSID=QPS2	18.44.40.783354	
— 5950 FP Database Update Database=DAPPISDE	Region=0077	18.44.40.786223	
— 5950 FP Database Update Database=DAPPISDE	Region=0077	18.44.40.786224	
— 5950 FP Database Update Database=DAPPISDE	Region=0077	18.44.40.786224	
— 5950 FP Database Update Database=DAPPICDE	Region=0077	18.44.40.786225	
— 5950 FP Database Update Database=DAPUISDE	Region=0077	18.44.40.786225	
— 5950 FP Database Update Database=DAPUICDE	Region=0077	18.44.40.786226	
— 5950 FP Database Update Database=DAPPISDE	Region=0077	18.44.40.786227	
— 5950 FP Database Update Database=DAPPISDE	Region=0077	18.44.40.786227	
— 5950 FP Database Update Database=DAPPISDE	Region=0077	18.44.40.786228	
— 5950 FP Database Update Database=DAPPICDE	Region=0077	18.44.40.786229	

Figure 223. IRLM Long Lock records

4. Using the Left function key (F10) and the Right function key (F11) exposes the identification fields (including tracking fields).

```

BROWSE      IMSPROD.SMF79                      Record 00000099 More: < >
Command ==>                                     Scroll ==> CSR
Forwards / Backwards . . 00.00.00.003000      Time of Day . . 18.44.33.700000
Code Description                               Date 2014-03-17 Monday      LSN
/ -----
— 4F0F IRLM Long Lock Blocker                      1-000000000000063
   TranCode=DAPBA00J Program=DAPAU00 Region=0077 IMSID=IPS1
   RecToken=IPS1/362776420000A437 Time=3 RegTyp=BMP LongLock=0217F4DD
-----
— 4F0F IRLM Long Lock Waiter                      1-000000000000064
   TranCode=DAPBB00J Program=DAPAU00 Database=DAPPICA Region=009B
   IMSID=IPS1 RecToken=IPS1/3627D0BE00033C3F Time=2 RegTyp=BMP
   LongLock=0217F4DD
-----
— 4F0F IRLM Long Lock Waiter                      1-000000000000065
   TranCode=DAPBB00J Program=DAPAU00 Database=DAPPICA Region=009B
   IMSID=IPS1 RecToken=IPS1/3627D0BE00033C3F Time=3 RegTyp=BMP
   LongLock=0217F4DF
-----
— 4F0F IRLM Long Lock Blocker                      1-000000000000066
   TranCode=DAPBA00J Program=DAPAU00 Region=0077 IMSID=IPS1
   RecToken=IPS1/362776420000A437 Time=4 RegTyp=BMP LongLock=0217F4DF
-----
— 4F0F IRLM Long Lock Blocker                      1-000000000000067
   TranCode=DAPBA00J Program=DAPAU00 Region=0077 IMSID=IPS1
   RecToken=IPS1/362776420000A437 Time=5 RegTyp=BMP LongLock=0217F4E1

```

5. You can interrupt your analysis at any time and save the tracking result set by entering the EXTRACT command as shown in the previous step. The data set name can then be entered as a file on the Process Log Files panel from where you can select it in the usual way and resume your investigation.

Chapter 19. Analyzing IMS trace table entries

IMS trace table records (67FA and 67FF) are written to the IMS log and can be analyzed by IMS Problem Investigator.

Here is an example.

```
BROWSE      ALZ000.QADATA.IMS101.ITR.TESTDATA(TALLA)  Record 00000113 More: < >
Command ==> _____ Scroll ==> CSR
  Forwards / Backwards . . HH.MM.SS.THMIJU  Time of Day . . HH.MM.SS.THMIJU
__ C902 Lock: LOCK exit Region=00A3                      02.41.56.568517
__ CC  Lock request handler (DFSLRH00) Region=00A3       02.41.56.568517
__ E2  Byte locate (buffer handler) Region=00A3          02.41.56.568517
__ E2  Byte locate (buffer handler) Region=00A3          02.41.56.568517
__ E2  Byte locate (buffer handler) Region=00A3          02.41.56.568517
s C802 Lock: LOCK Region=00A3                            02.41.56.568517
__ C902 Lock: LOCK exit Region=00A3                      02.41.56.568517
__ CC  Lock request handler (DFSLRH00) Region=00A3       02.41.56.568517
__ E6  Mark record altered (buffer handler) Region=00A3  02.41.56.568517
__ E2  Byte locate (buffer handler) Region=00A3          02.41.56.568517
__ CC  Lock request handler (DFSLRH00) Region=00A3       02.41.56.568517
__ CA00 Standard PI trace Region=00A3                   02.41.56.702596
__ C802 Lock: LOCK Region=00A3                          02.41.56.702596
__ C902 Lock: LOCK exit Region=00A3                      02.41.56.702596
__ CC  Lock request handler (DFSLRH00) Region=00A3       02.41.56.702596
__ E1  Block locate (buffer handler) Region=00A3         02.41.56.702596
__ E6  Mark record altered (buffer handler) Region=00A3  02.41.56.702596
```

Figure 224. IMS trace table records

Select a record to format the fields.

```
BROWSE      ALZ000.QADATA.IMS101.ITR.TESTDATA(TAL Record 00000118 Line 00000000
Command ==> _____ Scroll ==> CSR
Form      ==> _____ + _ Use Form in Filter  Format ==> STD
***** Top of data *****
+0018 Code... C802 Lock: LOCK
+0038 STCK... BF92A827691C5984      LSN.... 0000000000E9E87
      Date... 2014-01-30 Thursday   Time... 02.41.56.568517.594

+0004 Type..... 67      Subtype.... FA      TRHDID..... 'DL'
+0018 Entry..... Trace Table entry
      +0000 C8A334F1 0204001E 1CD4E060 00000000 *Ht.1....M\-.***
      +0010 096C5F80 07E4547B 03D9C000 807801D7 *.%...U.#.R....P*
***** End of data *****
```

Figure 225. IMS trace table formatted record contents

Chapter 20. Analyzing IMS Repository Audit log streams and extracts

IMS V12 maintains a repository for resource definitions and keeps an audit log in a log stream. IMS Problem Investigator batch processing can format the log stream or create an extract for interactive analysis using the dialog.

Here is an example.

BROWSE	DVP.FRP.LOGSTRM1.EXTRACT	Record 00000044	More: < >
Command ==>		Scroll ==>	CSR
Code	Description	Date 2011-09-13 Tuesday	Time (Local)
/	-----		
07	FRP StartUOW		12.52.24.761699
	Userid=STC@IMS OrgUOWID=FPQ/C85DBB19DB000960		
	RecToken=FPQ/C85DBB193F00BE40 Server=ICDEREPS XCFGGroup=REPXCFCGN		

06	FRP Session		12.52.24.762748
	Userid=STC@IMS OrgUOWID=FPQ/C85DBB19DB000960		
	RecToken=FPQ/C85DBB193F00BE40 Server=ICDEREPS XCFGGroup=REPXCFCGN		

07	FRP EndUOW		12.52.24.763773
	Userid=STC@IMS OrgUOWID=FPQ/C85DBB19DB000960		
	RecToken=FPQ/C85DBB193F00BE40 Server=ICDEREPS XCFGGroup=REPXCFCGN		

07	FRP EndUOW		12.52.24.764175
	Userid=STC@IMS OrgUOWID=FPQ/C85DBB19D90A5720		
	RecToken=FPQ/C85DBB193F00BE40 Server=ICDEREPS XCFGGroup=REPXCFCGN		

05	FRP Connect		12.52.24.810259
	Userid=STC@IMS RecToken=FPQ/C85DBB19E6EA9360		
	Server=ICDEREPS XCFGGroup=REPXCFCGN		

04	FRP Register		12.52.24.818295
	Userid=STC@IMS Server=ICDEREPS XCFGGroup=REPXCFCGN		

05	FRP Connect		12.52.24.819710
	Userid=STC@IMS RecToken=FPQ/C85DBB19E93DB040		
	Server=ICDEREPS XCFGGroup=REPXCFCGN		

S 02	FRP Repository open		12.52.25.702384
	Server=ICDEREPS XCFGGroup=REPXCFCGN		

Figure 226. IMS Repository Audit log extract

Select a record to format the fields.

```

BROWSE      DVP.FRP.LOGSTRM1.EXTRACT      Record 00000051 Line 00000000
Command ==> _____ Scroll ==> CSR
Form ==> _____ + _ Use Form in Filter      Format ==> STD
***** Top of data *****
+0005 Code... 02      FRP Repository open
+017E STCK... C85DBB1AC0BF0641      LSN.... 000000000000000F
      Date... 2011-09-13 Tuesday      Time... 12.52.25.702384.390

+0000 LGR02_LGPTLL..... 018E
+0002 LGR02_LGPTZZ..... 0000
+0004 LGR02_LGPTID..... A9 LGR02_LGPRTYPE..... 02
+0006 LGR02_LGPSTYPE..... 01 LGR02_LGPTCONT..... 00
+0008 LGR02_LGPTEYEC..... 'FPQ '
+000C LGR02_LGPTSTMP..... 00C85DBB1AC0B772000000001010001
+001C LGR02_LGPFPQNM..... 'ICDEREPS'
+0024 LGR02_LGPXCFGRP.... 'REPXCFCGN'
+002C LGR02_LGPOFSET..... 00000038
+0030 LGR02_LGVOFSET..... 00000000
+0034 LGR02_LGPTVERS..... 00000001
+0038 LGR02_LOG_DATA..... TYPE=02 log data...
+0038 LGR02_REC_LL..... 0146
+003A LGR02_REC_VERSION..... 00000001
+003E LGR02_REC_NAME..... 'ICDEREPN
+006A LGR02_RDS1_I..... 'ICDE.VC10.REPO.IMSPRI.RID
+0096 LGR02_RDS1_M..... 'ICDE.VC10.REPO.IMSPRI.RMD
+00C2 LGR02_RDS2_I..... 'ICDE.VC10.REPO.IMSSEC.RID
+00EE LGR02_RDS2_M..... 'ICDE.VC10.REPO.IMSSEC.RMD
+011A LGR02_RDS3_I..... 'ICDE.VC10.REPO.IMSSPR.RID
+0146 LGR02_RDS3_M..... 'ICDE.VC10.REPO.IMSSPR.RMD
+0172 LGR02_RDS1_STATUS..... '1'
+0173 LGR02_RDS2_STATUS..... '2'
+0174 LGR02_RDS3_STATUS..... 'S'
+0175 LGR02_OPEN_TYPE.... 'S'
+0176 LGR02_U_STCK..... C85CE20914A56A21
***** End of data *****

```

Figure 227. IMS Repository Audit log record contents

For further information on any field, you can use the Tab key to position on the point-and-shoot field name, then press Enter to zoom.

Part 4. Definitions

This part describes how to define the systems and logs to be analyzed, and the filters and forms to facilitate analysis.

Control Data Set (CDS)

Required for storing forms, filters, and user log record definitions.

Profile

Configure general settings for IMS Problem Investigator.

Filters

Create rules for selecting and presenting log records.

Object Lists

Create commonly used lists of fields and values for ease of use in specifying filter conditions.

Forms

Create custom views for a given record type, allowing you to select which fields from that record type to display.

Systems

Defining your IMS and IMS Connect systems allows you to perform DBRC log selection.

Groups

Grouping systems allows you to get data from multiple IMS and IMS Connect systems in a single extract or report with DBRC.

User Log records

Allows you to format and analyze your user log records.

Topics:

- Chapter 21, "Defining a Control Data Set (CDS)," on page 269
- Chapter 22, "Defining a profile," on page 273
- Chapter 23, "Defining filters," on page 281
- Chapter 24, "Defining Object Lists," on page 307
- Chapter 25, "Defining forms," on page 313
- Chapter 26, "Defining systems," on page 321
- Chapter 27, "Defining groups," on page 331
- Chapter 28, "Defining User Log records," on page 335

Chapter 21. Defining a Control Data Set (CDS)

The Control Data Set (CDS) is a VSAM KSDS that is the repository for Filters, Object Lists, Forms, and User Log records. You can define your own personalized CDS or you can use a common CDS that allows you to share definitions with others.

Specify the name of the Control Data Set on the IMS Problem Investigator Primary Option Menu. You can either type the name or press the Prompt function key (F4) to select from a list that you previously defined.

The default name is `xxxx.IMSPI.CDS` where `xxxx` is determined by your TSO prefix and userid. If the CDS is not cataloged, you will be prompted to allocate it when you attempt to reference Filters, Forms, or Object Lists.

IMS PI creates the CDS by building and issuing an IDCAMS DEFINE CLUSTER command based upon your specification. The options are:

Edit IDCAMS command

Select this option to edit and issue the IDCAMS command that will be generated by IMS PI to define the CDS. This option allows you to edit the command in an ISPF edit session, then enter the EXECute command to issue the request.

If this option is not selected, the command will be issued immediately to define the CDS.

Browse errors only

Select this option to browse the output from IDCAMS only when a non-zero return code is returned by IDCAMS.

If this option is not selected, the output from IDCAMS will always be displayed.

CDS Data Set Name

The name of the CDS to be defined. Normal ISPF data set conventions apply. Fully qualified data set names must be enclosed in quotes, except if PROFILE NOPREFIX is set.

Cluster Level Information

Space Units

Select the unit of measurement for the Quantity field.

Quantity

Specify the allocation quantity in the unit indicated in the **Space Units** field:

- Primary Quantity. The primary allocation quantity must be greater than 0.
- Secondary Quantity. The secondary allocation quantity. This can be 0 or greater.

Volume

Specify the volume serial number of the direct access device that is to contain the data set.

Data Class

Specify the name of the data class for the data set. The data class provides the allocation attributes for the data set.

The storage administrator at your installation defines the data class. However, you can override the parameters defined for a data class by explicitly specifying other attributes.

Management Class

If this is an *SMS-managed data set*, specify the name of the management class for the data set. The storage administrator at your installation defines the names of the management classes you can specify

If management class is not specified, but storage class is specified or defaulted, management class will be derived from automatic class selection (ACS).

If management class is specified and storage class is not specified or derived, the DEFINE will fail.

Note: If SMS is inactive and management class is specified, the DEFINE will fail.

Storage Class

If this is an *SMS-managed data set*, specify the name of the storage class for the data set. An SMS-managed data set is defined as a data set that has a storage class assigned.

The storage class replaces the storage attributes that are specified on the UNIT and VOLUME operand for a non-SMS-managed data set. Use the storage class to specify the storage service level to be used by SMS for storage of the data set.

The storage administrator at your installation defines the names of the storage classes you can specify. A storage class is assigned when either you specify a storage class, or an ACS routine selects a storage class for the new data set.

Note: If SMS is inactive and storage class is specified, the DEFINE will fail.

Press Enter to proceed. IMS PI generates the IDCAMS command to define the CDS.

- If you did not select Edit IDCAMS command, the IDCAMS command is executed immediately.
- If you selected Edit IDCAMS command, you can edit the command before issuing by overtyping or using the normal ISPF Edit commands. Then to issue the request to define the CDS, enter EXECute on the command line.

```

File Menu Help
Columns 00001 00072
Scroll ==> PAGE
Command ==>
Instructions:
Enter EXECute command to issue request.
Enter CANcel, END, or RETURN command to cancel request.
***** ***** Top of Data *****
000001 DEFINE CLUSTER( -
000002     NAME(userid.IMSPI.CDS) -
000003     INDEXED -
000004     CYLINDERS(1 1) -
000005     SHR(3,3) -
000006     FREESPACE(10 10) -
000007     REUSE -
000008     ) -
000009     DATA(NAME(userid.IMSPI.CDS.DATA) -
000010     KEYS(64 0)-
000011     RECORDSIZE(1024 32756)) -
000012     INDEX(NAME(userid.IMSPI.CDS.INDEX))
***** ***** Bottom of Data *****

```

Figure 228. Define Control Data Set: Edit IDCAMS command

To display a list of Control Data Sets that you have previously defined, press the Prompt function key (F4) from the **Control Data Set** field on the Primary Option Menu.

You can specify a new CDS here or select one from the list to be your current IMS PI Control Data Set.

To remove a CDS from the list, clear the name, use line action **D**, or overwrite with a new name. This does not delete the data set. You can use normal ISPF facilities such as option 3.4 **Data Set List Utility** to delete CDS data sets that you no longer require.

Related reference:

“Listing filters” on page 281

Filters are used to control the selection of log records for online viewing or batch report and extract processing.

“Listing object lists” on page 308

Object Lists are a convenient way to specify character values (typically names) for use in Filter Condition statements. This facility is usually invoked when specifying Filter Conditions by selecting **Object List** from the action bar. However, from anywhere in the IMS PI dialog, you can link directly here by selecting **Object Lists** from **Menu** in the action bar or by entering the OBJLISTs command in the command line.

“Listing forms” on page 313

Forms are used to control the presentation format of log records.

“Listing User Log codes” on page 335

User Log codes are saved (registered) into the IMS PI Control Data Set (CDS). If you share the control data set with other users then you can also share User Log Code definitions.

“ALZEXPIM: Export/Import” on page 419

Generic JCL to copy filters and forms from one complex to another.

Chapter 22. Defining a profile

Invoke the IMS PI Profile Options Menu with option **0 Profile**. Alternatively, enter the command PROFILE.

This panel provides the following options:

IMS PI Settings

Customize some aspects of the IMS PI dialog and the job statement it uses when generating report and extract JCL.

Extract Allocation Settings

Specify the default allocation attributes for new log file extracts and CSV data sets. The IMS PI dialog uses these when generating JCL.

IMS Connect Extensions Settings

To process IMS Connect Extensions data, provide the log record code prefix of the IMS Connect event records and the data set name of the IMS Connect Extensions definitions repository.

OMEGAMON for IMS TRF Settings

To process OMEGAMON Transaction Reporting Facility (TRF) Collector data from the IMS log, specify the TRF log record code prefix.

IMS PI Settings

You can adjust the settings to customize the IMS PI dialog and batch JCL for running reports and extracts. All required options have initial settings so you can start using IMS PI immediately.

To review IMS PI Settings, select **0.1 IMS PI Settings** from the IMS Problem Investigator Primary Option Menu.

IMS PI Settings

Command ==> _____

Specify settings:

IMS PI Load Library 'ALZ.V2R4M0.SALZLINK' _____

User Load Library 'USR.IMSPI.USERLOAD' _____

SYSEXEC Library _____

Personal Profile Library . . IMSPI.ALZPROF _____

IMS PA Profile Library . . . _____

Session Exit Confirmation YES (Yes or No)

Delete Confirmation YES (Yes or No)

Cancel Confirmation NO (Yes or No)

Automatic Save on Exit . . . YES (Yes, No, or Prompt)

Reports in Upper Case . . . NO (Yes or No)

DASD Work File Unit Name . . _____ (Blank for System Default)

Job Statement Information:

==> //USR JOB (ACCOUNT),'NAME' _____

==> _____

==> _____

==> _____

JES2 Control Statements (DBRC Log Selection only):

==> /*XEQ _____

==> /*JOBPARM SYSAFF= _____

==> /*ROUTE PRINT _____

Figure 229. IMS PI Settings

IMS PI Load Library

Specify the name of the library that contains the IMS PI executable load modules. These include:

- The Knowledge Modules that IMS PI uses to format the log records online and in batch.
- The batch report and extract programs.

You do not need to specify the name of this library if the modules reside in the system LNKLIST.

The initial setting is 'xxxx.SALZLINK' where xxxx is the DSN prefix specified at dialog setup. For example, ALZ.V2R4M0.SALZLINK.

User Load Library

Specify the name of the library that contains the Knowledge Modules, which IMS PI requires to format IMS user log records. This is the Knowledge Module load library used when specifying User Log codes (see option 7 **User Log** from the Primary Option Menu).

You do not need to specify the name of this library if the modules reside in the system LNKLIST.

The initial setting is 'xxxx.IMSPI.USERLOAD' where xxxx is determined by your TSO prefix and userid.

SYSEXEC Library

The library for storing REXX execs. When you use IMS Problem Investigator, the library is treated as though it is at the top of the SYSEXEC concatenation.

Personal Profile Library

The IMS PI dialog uses ISPF tables for storing some user data such as your log file and IMS subsystem definitions. These are saved in your Personal Profile Library. Specify the name of the data set to be used for this purpose.

It is recommended that each user has their own data set as the data is generally user-specific and can only be accessed by one user at a time.

If the specified data set does not exist, IMS PI allocates it for you when it is required.

The initial setting is `IMSPI.ALZPROF` which IMS PI translates to `'xxxx.IMSPI.ALZPROF'` where `xxxx` is determined by your TSO prefix and userid. You can change this by overtyping.

IMS PA Profile Library

The **IMS PA Profile Library** is the data set that contains your IMS Performance Analyzer for z/OS System Definitions and Groups. In IMS PA, this data set is called the **Permanent ISPF Table Library**.

Specify the **IMS PA Profile Library** if you want to share your IMS PA System Definitions and Groups with IMS PI.

IMS PI will automatically set your **IMS PA Profile Library** if it detects that you have IMS PA installed.

If you do not specify an **IMS PA Profile Library**, IMS PI saves your Systems and Groups in your personal profile library.

Session Exit Confirmation

This option applies to requests to exit process log file browse sessions. This is to help guard against accidental requests to exit which would lose useful information such as the location in the file and active filtering criteria.

Specify YES to request IMS PI to prompt you for confirmation of an Exit request. This is the initial setting.

Specify NO to have IMS PI perform Exit requests immediately without prompting for confirmation.

Delete Confirmation

This option applies only to requests to delete IMS PI Filters, Forms and Object Lists. It does *not* apply to log file and IMS subsystem definitions for which Delete actions can be immediately reversed by entering CANCEL.

Specify YES to request IMS PI to prompt you for confirmation of a Delete request. This is the initial setting.

Specify NO to have IMS PI perform Delete requests immediately without prompting for confirmation.

Cancel Confirmation

This option applies only to Cancel requests from Edit/View sessions where SAVE and SAVEAS apply (Filter, Form, Object List). It does *not* apply to log file and IMS subsystem definitions.

Specify YES to display a confirmation prompt if you attempt to Cancel when there have been changes. This is to alert you that your changes will be discarded if you proceed with the Cancel request.

Specify NO to have IMS PI action Cancel requests immediately without prompting for confirmation. This is the initial setting.

Automatic Save on Exit

Specify YES to automatically save changes on Exit. This is the initial setting.

Specify NO to automatically discard changes on Exit. To save any changes before Exit, you must remember to use the SAVE command.

Specify PROMPT to display a message on an attempt to Exit when changes have been made. The message prompts you to either:

- Enter SAVE to save your changes, then enter EXIT or END to exit.
- Enter CANCEL to discard changes and exit.

Reports in Upper Case

Specify NO to receive reports in upper and lower case characters. This is the initial setting.

Specify YES to translate all reports to upper case characters only.

DASD Work File Unit Name

Specify the device type or group name to be used by the IMS PI batch interface to allocate temporary data sets as required by facilities such as DBRC Log Selection.

The name must represent a device that is defined as DASD in the Eligible Device Table of the current processor. For example, SYSDA, SYSALLDA, 3390. The initial setting is blank.

If not specified, the system default is used.

Job Statement Information

Specify the JCL JOB statement which can be continued to a maximum of four lines. These will be used by IMS PI to supply the job statement for batch report and extract jobs. All the rules of JCL must be followed in specifying the job statement. IMS PI does not validate this information. Blank lines are ignored.

The default is `//userid JOB (ACCOUNT), 'NAME'` from the ISPF Log and List JCL job statement information. To review this, use the SETTINGS command to display the ISPF Settings panel, select **Log/List** from the action bar then select **JCL**.

JES2 Control Statements

Specify one or more JES2 Control Statements for your DBRC Log Selection requests.

IMS PI accepts any control statement, but performs special processing for `/*XEQ`, `/*JOBPARM`, and `/*ROUTE`.

- The initial skeleton specification is:

```
/*XEQ
/*JOBPARM SYSAFF=
/*ROUTE PRINT
```

In this case, IMS PI inserts these statements into the JCL if the System or Group has **Node** or **SYSAFF** specified (see Chapter 27, "Defining groups," on page 331). The resultant JCL card will have the Node name and System Affinity resolved.

- Alternatively, you can enter your own statement specifying a default Node name and System Affinity:

```
/*XEQ node
/*JOBPARM SYSAFF=cccc
/*ROUTE PRINT node
```

In this case, IMS PI always inserts the statement into the JCL. If the System or Group specifies **Node**, **SYSAFF**, or both, then it will be substituted, overriding your default.

Related reference:

“Upgrading to IMS PI V2R4” on page 52

Upgrading to the next release of IMS PI should be simple and straightforward, but check this list of considerations.

“JCL using Journal File Selection” on page 177

Using options specified from the dialog, IMS Problem Investigator builds the JCL to execute the Automated File Selection utility ALZDBRC.

“ALZRXCOPY: Copy sample REXX to SYSEXEC library” on page 425

Sample JCL to copy (and rename) the sample REXX execs to your specified SYSEXEC library.

“Defining a group” on page 332

You can assign both IMS subsystems and Connect systems to a group by editing an existing group or defining a new group.

“Setting up an IMS subsystem for DBRC Log Selection” on page 324

Specifying your DBRC Settings allows you to use DBRC Log Selection for Log reporting. DBRC Log Selection is a facility that you can use when running your report requests. It automatically selects the required Log files from DBRC for the required reporting time period, saving you the effort of manually identifying relevant log data sets.

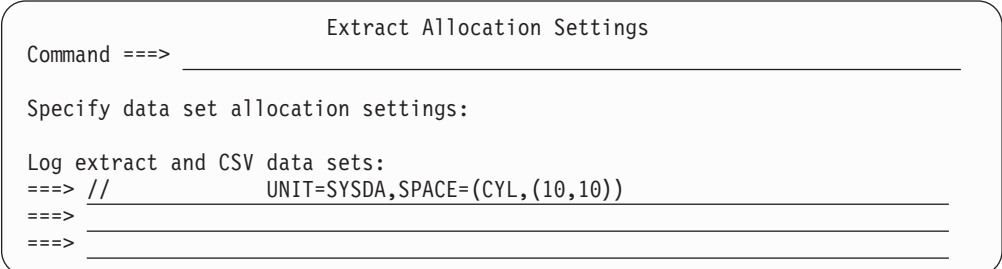
“Editing a User Log record definition” on page 336

After you define a new IMS User Log Code, or select an existing code from the list, you are presented with the Knowledge Module maintenance panel.

Extract Allocation Settings

Extract Allocation Settings specify the default allocation settings appended to the EXTRACT DD statement when you submit an extract request to a new data set. They also are used for the CSV DD statement when creating new CSV files.

To review Extract Allocation Settings, select **0.2 Extract Allocation Settings** from the IMS Problem Investigator Primary Option Menu.



Extract Allocation Settings

Command ==> _____

Specify data set allocation settings:

Log extract and CSV data sets:

==> // UNIT=SYSDA,SPACE=(CYL,(10,10)) _____

==> _____

==> _____

Figure 230. Extract Allocation Settings

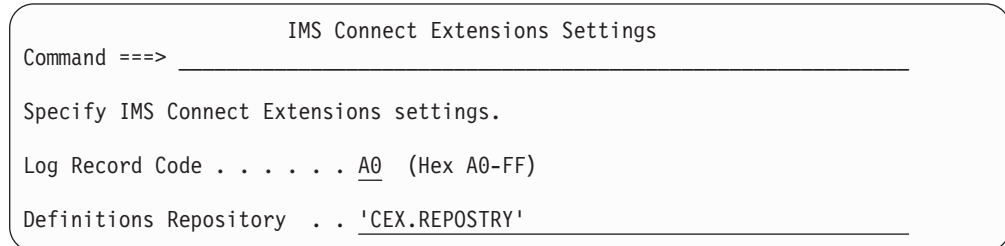
Suppose you submitted an extract job to YOUR.NEW.EXTRACT, then the DD statement will look similar to this:

```
//EXTRACT DD DSN=YOUR.NEW.EXTRACT,  
//          DISP=(NEW,CATLG),  
//          UNIT=SYSDA,SPACE=(CYL,(10,10))
```

IMS Connect Extensions Settings

To process IMS Connect Extensions data, provide the log record code prefix of the IMS Connect event records and the data set name of the default IMS Connect Extensions definitions repository

To review IMS Connect Extensions Settings, select **0.3 IMS Connect Extensions Settings** from the IMS Problem Investigator Primary Option Menu.



```
IMS Connect Extensions Settings
Command ===>
Specify IMS Connect Extensions settings.
Log Record Code . . . . . A0 (Hex A0-FF)
Definitions Repository . . 'CEX.REPOSTRY'
```

Figure 231. IMS Connect Extensions Settings

Log Record Code

Specify the log record code prefix that IMS Connect Extensions assigns to the event records. IMS PI uses this code to identify IMS Connect event records. The default is A0.

When browsing log files, the code can be changed dynamically by entering the ICC primary command. This is useful when analyzing files from different systems.

Definitions Repository

Specify the name of the data set that contains the IMS Connect Extensions definitions. The data set defines IMS Connect systems and journal data sets maintained by IMS Connect Extensions but available for analysis by IMS PI.

This is the default repository. If IMS Connect Extensions definitions are contained in a different repository, you can specify that repository in the IMS Connect system definition where it will take precedence.

IMS PI can process standalone IMS Connect Extensions journal data sets specified on the Process Log Files panel. However, to process IMS Connect event records using predefined systems and journal data sets maintained in the IMS Connect Extensions definitions repository, proceed as follows:

1. Select option **6 Connect** from the Primary Option Menu to view the list of IMS Connect systems and archive data sets. Use line action **SUB** to select (submit) a system for batch reporting. The batch processor automatically selects the relevant journal data sets, both archive and active, that are relevant to the selected system and specified report period.
2. From the list of archive data sets, use line action **S** to select a file for immediate formatted browse processing, or use line action **P** to add the file name to the Process Log Files list for subsequent dialog or batch processing. Use line action **SUB** to select (submit) an archive data set for batch reporting.

Related tasks:

“Setting the repository and record code to process IMS Connect event data” on page 170

To enable IMS Problem Investigator to analyze IMS Connect event data in IMS Connect Extensions journal data sets, you must first specify the data set name of

the IMS Connect Extensions definitions repository and the record code.

Related reference:

“JCL using Journal File Selection” on page 177

Using options specified from the dialog, IMS Problem Investigator builds the JCL to execute the Automated File Selection utility ALZDBRC.

“IMS Connect event data” on page 69

IMS PI can process IMS Connect event data collected by IMS Connect Extensions in journal data sets.

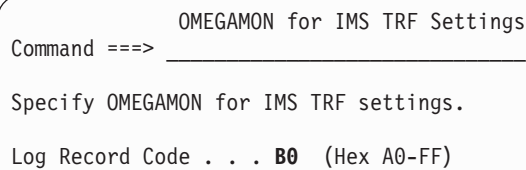
“Defining IMS Connect systems” on page 329

You can explicitly define standalone IMS Connect systems or you can use the systems defined in a specified IMS Connect Extensions definitions repository. Only when IMS Connect systems are defined in a repository, are they available for automated journal file selection.

OMEGAMON for IMS TRF Settings

Specify the TRF log record code prefix to identify the OMEGAMON Transaction Reporting Facility (TRF) records in the IMS log.

To review OMEGAMON for IMS TRF Settings, select **0.4 OMEGAMON for IMS TRF Settings** from the IMS Problem Investigator Primary Option Menu.



```
OMEGAMON for IMS TRF Settings
Command ==> _____
Specify OMEGAMON for IMS TRF settings.
Log Record Code . . . B0 (Hex A0-FF)
```

Figure 232. OMEGAMON for IMS TRF Settings

Log Record Code

Specify the log record code prefix of the OMEGAMON TRF records in the IMS log. IMS PI uses this code to identify the TRF records.

When browsing log files, the code can be changed dynamically by entering the OMC primary command. This is useful when analyzing files from different systems.

Chapter 23. Defining filters

Filters enable you to select the log records that you are interested in. For example, select only those records associated with a particular Transaction Code or User ID.

Filters consist of:

1. A list of log codes
2. An optional set of conditions for each log code. For example, select only type 01 records when the Transaction Code is 'MENU'.

IMS Problem Investigator selects records if their log code is in the filter and if they match the optional conditions for that log code.

Related concepts:

Chapter 33, "Sample library SALZSAMP," on page 409

The SALZSAMP library supplied with IMS PI contains JCL samples that you can tailor to suit your requirements.

Related reference:

"FILTER command" on page 85

The FILTER command allows you to dynamically change the active filtering options for the current log file.

"FILTER option" on page 401

FILTER is an optional operand of the REPORT, EXTRACT or CSV command to control which log records are selected for report, extract or CSV processing.

"Sample REXX execs" on page 121

REXX execs supplied in the sample library SALZSAMP.

Listing filters

Filters are used to control the selection of log records for online viewing or batch report and extract processing.

Select **2 Filter** from the Primary Option Menu to display the list of Filters that you previously defined. Also, from anywhere in the IMS PI dialog, you can link directly here by selecting **Filter** from **Menu** in the action bar or by entering the FILTERS command in the command line.

Filters are saved in the Control Data Set (CDS).

Line actions

- | | |
|----------|--|
| / | Display the selection list of valid line actions. |
| C | Copy this filter to another CDS. |
| E | Edit this Filter. |
| S | Select this Filter (same as Edit). |
| V | View this Filter (no Save, but SaveAs is available). |
| D | Delete this Filter. |

Important: This action can not be undone. Deleted Filters cannot be reinstated.

Primary commands

NEW *name* **MODEL** *modelName*

Create a new Filter. The name must be a unique Filter name.

If a valid command is specified, the Edit panel is displayed for you to complete the definition.

If you specify **MODEL** with the name of an existing Filter, IMS PI uses that to populate the new one, otherwise the default specification is used (Log Code ALL with no Conditions which selects all records unconditionally).

You can also select **New** from **File** in the action bar.

SORT Name | Description | Changed | Id

Sort the list in ascending sequence by the field name specified as a parameter. With one exception; the **Changed** column is sorted in descending sequence so the most recent is first.

The parameter field names are the column headings. The default sort field is Name. The list is sorted by Name on initial entry and when the **SORT** command is entered without a parameter.

The parameter can be abbreviated to any string from the start of the field name. For example: **SORT D** is the same as **SORT DESCRIPTION**.

You can also sort by selecting a point-and-shoot column heading.

RESet Clear outstanding line actions.

FIND '*search string*'

Find the next occurrence of a character string. If the string has embedded spaces, enclose the string in quotes. Press F5 to repeat find.

Related concepts:

Chapter 21, "Defining a Control Data Set (CDS)," on page 269

The Control Data Set (CDS) is a VSAM KSDS that is the repository for Filters, Object Lists, Forms, and User Log records. You can define your own personalized CDS or you can use a common CDS that allows you to share definitions with others.

Creating a new filter

To define a new Filter, enter the **NEW** command in the command line of the list of Filters or select **New** from **File** in the action bar.

The format of the **NEW** command is:

NEW [*name* [**MODEL** *modelName*]]

If a valid command is specified, the Edit panel is displayed for you to complete the definition.

3. Generally, log codes are logically ORed. That is, a log record is selected if its log code matches any of the listed log codes and the conditions for those codes. However, to logically AND codes (for example, to specify global conditions that apply to all codes), specify a different Level for those conditions. See "Specifying levels for log codes" on page 294 for examples.
4. Optionally, activate tracking in the filter to show records in the same transactions as records matching the filtering conditions. Where the log code does not have conditions, log records with that code will be displayed, but not necessarily other records in the same transactions.
5. You can specify a **Form** to control the format of selected log records. For more information, see "Specifying a form in a filter" on page 306.
6. You can specify a REXX exec to automatically run the exec when a user selects a record matching the log code and conditions.

When a new Filter is edited for the first time, an ALL rule is inserted automatically into the Filter. ALL is a special log code that allows you to specify global selection criteria that applies to all log record types. For example, select all log records with a transaction code field value of MENU.

When the Filter is being validated against a log record, each log code in the Filter (and its associated Conditions) is checked in turn:

- The log record is selected for reporting when the log record matches a Filter log code and, if the Conditions indicator is Yes, its associated conditions.
- The log record is not selected for reporting if the log record does not match any Filter log codes.

Log Code ALL (without conditions specified) will select every log record. Therefore in cases where you want to select individual log codes, you must either:

- Delete the ALL log code, or overtype it, or
- Specify global conditions that select only required log records

Line actions

- | | |
|----------|--|
| / | Display the selection list of valid line actions. |
| S | Select (edit) conditions for this log code. |
| I | Insert a blank row after this row to add a log code. |
| R | Repeat this row. |
| C | Copy this row. |
| M | Move this row. |
| A | After this row (Move/Copy). |
| B | Before this row (Move/Copy). |
| D | Delete this row. |
| X | Toggle the exclude status of the log code. The Exc column shows the exclude status of the log code: <ul style="list-style-type: none"> • If blank, the log code is included and eligible for reporting. • If * (asterisk), the log code is excluded and not reported. |

Primary commands

SAVE Available from Edit but not View mode.

Saves the current definition to the Control Data Set. If the Filter already exists, it is overwritten. If it does not exist, it is created. Editing of the data can continue after the save is complete.

Save can be selected from **File** in the action bar.

SAVEAS *name*
Available from Edit and View mode.

Saves the current definition under the specified name. If you do not specify a name, IMS PI will prompt you. If a Filter of that name already exists in the Control Data Set, it will be overwritten. If it does not exist, it will be created. Editing of the data can continue after the SaveAs is complete.

SaveAs can be selected from **File** in the action bar.

RESet Clear outstanding line actions and remove blank rows.

Related reference:
“TRACK command” on page 407

To request tracking using batch commands, specify the TRACK command. To generate this command from the dialog, specify a Filter with **Activate Tracking** selected.

Examples of filters

Examples that illustrate how to specify filtering criteria.

Example 1: Log code ALL and one condition

Select all log record types with Transaction Code MENU.

EDITFilter – EXAMPLE1

/ Log Code + Exc Description

S ALLGlobal Criteria for all Log Record Codes

Level 1Conditions YesForm + REXX

Figure 234. Filter example 1: Select log code ALL

Conditions

Code: ALL Global Criteria for all Log Record Codes

/ Field Name + Oper Value +

TRANCODEEQ'MENU'

Figure 235. Filter example 1: Specify the condition

TRANCODE is one of several global field names that can be used for Global Criteria (ALL). See “Specifying global field values” on page 293 for a list of global fields or press the Prompt function key (F4) from Field Name in the Conditions statement for ALL shown in Figure 235. IMS PI will check every IMS log record that it knows has a transaction code field (for example, DLRTRNCD in the type 07 record) and validates against that field.

This Filter can also be specified using the following batch commands:

```
REPORT
CODE(ALL)
COND TRANCODE EQ 'MENU'
```

Example 2: Log code ALL for a specified record type

Select all DB2 records.

```
EDIT                Filter - EXAMPLE2

/ Log Code + Exc Description
S DB2 ALL           Global Criteria for all Log Record Codes
                    Level 1 Conditions No Form _____ + REXX _____
```

Figure 236. Filter example 2: Select all DB2 records

This Filter can also be specified using the following batch commands:

```
REPORT
CODE(DB2,ALL)
```

Example 3: Particular log code and one condition

Select type 07 Application Terminate Accounting log records with Transaction Code MENU.

```
EDIT                Filter - EXAMPLE3

/ Log Code + Exc Description
S IMS 07            Application Terminate Accounting
                    Level 1 Conditions Yes Form _____ + REXX _____
```

Figure 237. Filter example 3: Select IMS log code 07

```
Conditions

Code: 07   Application Terminate Accounting

/ Field Name +      Oper Value +
_ DLRTRNCD          EQ  'MENU'
```

Figure 238. Filter example 3: Specify the condition

DLRTRNCD is the Transaction Code field for the type 07 Application Terminate Accounting record. IMS PI knows the position of the DLRTRNCD field in the type 07 log record and validates against it.

This Filter can also be specified using the following batch commands:

```
REPORT
CODE(07)
COND DLRTRNCD EQ 'MENU'
```

Example 4: Particular log code and more than one condition

Select type 01 Transaction Input log records with Transaction Code MENU and User ID JAMES.

EDIT		Filter – EXAMPLE4	
/	Log Code + Exc Description		
S	IMS 01	IMS Message	
	Level 1	Conditions Yes	Form _____ + REXX _____

Figure 239. Filter example 4: Select IMS log code 01

Conditions			
Code: 01 IMS Message			
/	Field Name +	Oper Value +	
	QDF2SMB	ON	
-	MSGODSTN	EQ	'MENU'
-	MSGRACUS	EQ	'JAMES'

Figure 240. Filter example 4: Specify multiple conditions

QDF2SMB is a bit setting for flag MSGDFLG2. It indicates that the IMS message is an input message with a SMB (transaction) destination rather than an output message to a terminal. It does not require a value because IMS PI checks to see if Flag bit(s) are ON.

This Filter can also be specified using the following batch commands:

```
REPORT
CODE(01)
COND QDF2SMB ON
COND MSGODSTN EQ 'MENU'
COND MSGRACUS EQ 'JAMES'
```

Example 5: CQS log code

Select CQS log records with record code 0301.

EDIT		Filter – EXAMPLE5	
/	Log Code + Exc Description		
S	CQS 0301	CQSCONN Client Connect to Structure completed	
	Level 1	Conditions No	Form _____ + REXX _____

Figure 241. Filter example 5: Select CQS log code 0301

Example 6: IMS Connect code

Select IMS Connect event record with record code.

EDIT		Filter – EXAMPLE6	
/	Log Code + Exc Description		
S	CON A04E	Local Message SEND-then-RECEIVE	
	Level 1	Conditions No	Form _____ + REXX _____

Figure 242. Filter example 6: Select IMS Connect record code A04E

Related reference:

“REPORT command” on page 403

The REPORT command requests that a formatted report of log records is to be produced.

“CODE command” on page 396

An alternative way to specify filtering criteria without defining a Filter.

“COND command” on page 397

Condition statements allow you to filter log records based on certain field values in the log record. The statements contain conditional logic (like IF statements) to either include or exclude records from processing.

Specifying log codes in a filter

A log record code is specified by a log type to identify the source, for example IMS, CQS, DB2, and a hexadecimal code to identify record type and sometimes subtype. There are also special cases such as specifying ALL.

Log record codes are identified by both of the following:

Log type

This identifies the source. IMS PI supports many types of log data:

IMS	IMS system and user log records
MON	IMS monitor records
CQS	CQS Shared Queues log, directly from a CQS log stream (batch only) or from an extract (dialog or batch)
CON	IMS Connect event data, generated by IMS Connect Extensions for z/OS Event Collection
TRF	OMEGAMON for IMS Transaction Reporting Facility data, both TRF Collector records on the IMS Log and TRF Extractor output records
ATF	OMEGAMON for IMS Application Trace Facility journal records
DB2	DB2 log records
MQ	WebSphere MQ log extract records
SMF	IRLM Long Lock events
ITR	IMS trace table entries in the IMS log
FRP	IMS Repository Audit log, directly from a log stream (batch only) or from an extract (dialog or batch)

Record code

Determines the available fields. Record codes are two or four hexadecimal digits, such as 07 or 400F.

IMS PI interprets the log codes and displays their description. For example:

IMS 01

IMS Message

IMS 07

Application Terminate Accounting

IMS 5612

External Subsystem - End of Phase 2 Syncpoint

IMS 5937

Fast Path Sync Point

CQS 0702

CQSPUT COMMIT request completed

CON A03C

Prepare READ Socket

You can enter the log type and code explicitly, or press the Prompt function key (F4) to select from a list of known log codes.

Log Codes

Command ==> _____ Scroll ==> CSR

Select a Log Code then press Enter.

Log Code	Description
IMS 69	3275 Switched unauthorized ID
IMS 6C	MSC Link Connection/Disconnection
IMS 6D	Hot Standby /START/STOP/CHANGE surveillance
IMS 6E	HARP Session Miscellaneous
IMS 7000	Online Change
IMS 7001	SMB Update for OLC
IMS 7201	User Create
IMS 7202	User Delete
IMS 7203	User Modify
IMS 7204	LTERM Add
IMS 7205	SMB Create
IMS 7206	LNB Create
IMS 7207	SMB Changed (Shared Queues)
IMS 9904	Data Capture - Changed data
IMS 9928	Data Capture - End of job
IMS 9930	Data Capture - SETS call
IMS 9934	Data Capture - ROLS call
IMS FFFF	User Log record type FFFF
CQS 0301	CQSCONN Client Connect to Structure completed
CQS 0401	CQSDISC Client Disconnect from Structure completed
CQS 0701	CQSPUT OBJECT request completed
CQS 0702	CQSPUT COMMIT request completed
CQS 0703	CQSPUT START request completed

Figure 243. Select a log code

Special cases

There are four special cases that you can specify:

1. Log code ALL with no log type encompasses all log record types and subtypes. This allows you to specify global criteria for all log record codes.
2. Log code ALL with a specified log type operates on all records of that type only. For example, DB2 ALL for DB2 records only.
3. Unknown log codes. You can still specify Conditions (using record offsets). If this is an IMS user log code, IMS PI can only “know” about it if it has a corresponding Knowledge Module. For information on how to specify and prepare User Log Knowledge Modules, see Chapter 28, “Defining User Log records,” on page 335.
4. Log code prefix for records that have subtypes. For example, specify 40 to represent all checkpoint records, subtypes 4001 to 4099. Although an unknown log code, you can still specify Conditions (using record offsets) and a Form.

Related concepts:

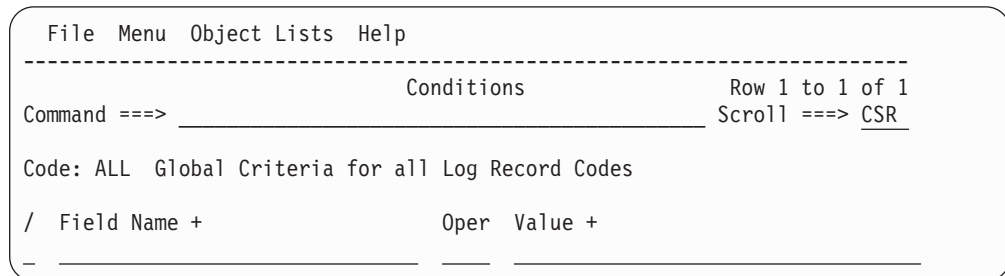
Chapter 31, “Log record types and codes,” on page 387

IMS Problem Investigator can analyze log records from a variety of sources.

Specifying conditions for log codes

Condition statements allow you to filter log records based on certain field values in the log record. The statements contain conditional logic to either include or exclude records from processing.

If Conditions are not specified for a log code in the Filter, IMS PI will unconditionally select records with that log code. To specify filter conditions, enter line action **S** to select the log code and display the Conditions panel.



File Menu Object Lists Help

Conditions Row 1 to 1 of 1

Command ===> Scroll ===> CSR

Code: ALL Global Criteria for all Log Record Codes

/	Field Name +	Oper	Value +

Figure 244. Specify Conditions

As shown in Figure 244, the format of a Filter Condition in the dialog is:

Fieldname|Offset Operator Value

The corresponding batch command is:

COND Fieldname|Offset Operator Value

Condition statements are evaluated from top to bottom. All conditions are matched (logical AND relationship) except in the following situation:

When two adjacent conditions specify the same field name and operator (except NE), a logical OR relationship is applied.

For example, the following conditions will select the record if the Transaction Code is MENU OR LOGO:

```
COND TRANCOD EQ 'MENU'
COND TRANCOD EQ 'LOGO'
```

The following conditions will select the record if the Transaction Code is not MENU AND not LOGO:

```
COND TRANCOD NE 'MENU'
COND TRANCOD NE 'LOGO'
```

Line actions

- /** Display the selection list of valid line actions.
- S** Select from a list of fields applicable to this log code and IMS release.
- I** Insert a blank row after this row to add a new condition.
- R** Repeat this row.
- C** Copy this row.
- M** Move this row.
- A** After this row (Move/Copy).
- B** Before this row (Move/Copy).
- D** Delete this row.

Primary commands

OBJLISTs

Link to where you can define and maintain Object Lists.

Object Lists are a convenient way to specify character values in Filter Conditions. For more information, see “Using object lists in filter conditions” on page 307.

Object Lists can also be selected from the action bar.

RESet Clear outstanding line actions and remove blank rows.

Related reference:

“COND command” on page 397

Condition statements allow you to filter log records based on certain field values in the log record. The statements contain conditional logic (like IF statements) to either include or exclude records from processing.

Field name or offset

Specify a field name or offset to identify the location in the record.

You can specify any of the following:

1. A field name. Type the name of the field or press the Prompt function key (F4) to select from a list of valid fields for this log record code and IMS release (see “Specifying filtering criteria for a particular log code” on page 296). For example: `TRANCODE EQ 'MYTRAN'`.
2. A field name and offset. The offset is relative to 1. The compare will start at that location in the field. For example: `TRANCODE(4) EQ 'BANK'`.
3. A field name and * (floating offset). This indicates that the compare value can appear anywhere in the field. For example: `MSGXSTXT(*) EQ 'UNAUTHORIZED'`.
4. An offset in the record.
 - If the offset is specified as an integer, it is relative to 1. For example: `5 EQ X'03'` will select records with log code 03 since the 5th byte of the log record is always the log record code.
 - If the offset is specified in hexadecimal, it is relative to 0. For example: `X'04' EQ X'03'` will also select records with log code 03 since X'04' indicates the 5th byte of the log record.
5. * (floating offset). This indicates that the compare value can appear anywhere in the record. For example: `* EQ 'IMSTRANS'`.

Note: If the log code is an “Unknown Code”, you can only specify a record offset or * (floating offset). IMS PI only supports field names for known log codes.

Condition operator

The mnemonic operator for comparing field against value.

The valid comparison operators are:

EQ	Equal to
NE	Not equal to
GT	Greater than
LT	Less than
GE	Greater than or equal to

LE Less than or equal to

Flag bits

Additional comparison operators for checking Flag bits are:

ON Bits are on

OFF Bits are off

Operator for Flag bit checking

To test the value of Flag bits, specify the operator **ON** or **OFF**.

- **ON** selects records if all Field bits are on.
- **OFF** selects records if all Field bits are off.

For the Field Name, specify either the name of the data field or its predefined bit setting:

- When **ON** or **OFF** is specified for a data field or a Flag byte, a Value (bit pattern) must be specified. For example:
`MSGDFLG2 ON X'80'`
- When **ON** or **OFF** is specified for a predefined bit setting, a Value is not required because the value is implicit in the bit setting and IMS PI applies the test to the associated Flag byte. For example:

`QDF2SMB ON`

Related reference:

“Value”

Comparison values are determined by the type of field, either a character string, hexadecimal string, or integer. For a list of values, you can specify the name or an object list.

Value

Comparison values are determined by the type of field, either a character string, hexadecimal string, or integer. For a list of values, you can specify the name or an object list.

The allowed field values are:

'string' or "string"

Character string in quotes (although IMS PI will accept it without quotes). The maximum length of the character string and enclosing quotes is 36 bytes. The supported masking characters are:

% (percent sign)

Mask a single character.

*** (asterisk)**

Mask zero or more characters.

x'hex-digits'

Hexadecimal string.

0 to 99999999

Integer.

&Object List name

& (ampersand) identifies the name of an Object List that specifies a list of values. Press the Prompt function key (F4) to select from a list of Object Lists that you previously defined.

For Flag bit checking using a predefined bit setting, it is not mandatory to specify a value because it is implicit in the bit setting.

Related reference:

“Selecting an Object List” on page 298

In a filter condition, you can specify more than one value for a field by specifying the name of an Object List prefixed by an & (ampersand).

“Operator for Flag bit checking” on page 292

To test the value of Flag bits, specify the operator ON or OFF.

Specifying global field values

For log code ALL, specified with or without a log type, conditions can be set for any or all global fields.

The following table lists the global fields with descriptions to help you specify valid values. When specifying values for global fields, quotes are optional for character strings and hexadecimal strings.

ABEND Abend code of pseudo abend or system abend.

CLIENTID

8-byte character IMS Connect client ID.

CODE 2-byte hex code. For example, specify 5937 as an alternative to X'5937'.

DATABASE

8-byte Database name.

IMSID 8-byte IMS Subsystem name (usually 4 bytes, left justified and padded with blanks).

ITASK 4-byte hexadecimal Monitor ITASK number.

LOGTOKEN

8-byte hexadecimal date/time (STCK) IMS Connect logon token.

LONGLOCK

4-byte hexadecimal Deadlock cycle number for IRLM long lock.

LSN 8-byte log record sequence number. For example, specify 0000000000000001 as an alternative to X'0000000000000001'.

LTERM 8-byte LTERM.

LUWID Logical unit of work ID in the format: *Network ID/LU name/Unique value/Commit count*. The LUWID consists of an LU network name, an LUW instance number, and a commit sequence number. The LU network name consists of a 1-character through 8-character network ID, a separator, and a 1-character through 8-character network LU name. Then an LUW instance number of 12 hexadecimal characters, and a commit sequence number of 4 hexadecimal characters, each preceded by a separator. For example, NET1/DB2LUA/B7ADFE54E81F/0001.

ORGUOWID

16-byte Originating Tracking Unit of Work ID in the format: *Originating IMS ID/time stamp token* (8 bytes character / 8 bytes hexadecimal). For

example, IMSA/B765FE4519BE5A40. In a sysplex where originating IMS ID is not known, specify **/Timestamp token*.

PORT 8-byte character IMS Connect TCP/IP port.

PROGRAM
8-byte Program (PSB) name.

RBA 4-byte VSAM RBA or OSAM RBN. For example, specify 00001000 as an alternative to X'00001000'.

RECTOKEN
16-byte Recovery Token in the format *IMS ID/OASN+Commit Number* (8 bytes character / 8 bytes hexadecimal). For example, IMSA/0000002300000001.

REGION 2-byte Region PST ID. For example, specify 003F as an alternative to X'003F'.

RESUMETP
8-byte hexadecimal date/time (STCK) IMS Connect logon token for Resume Tpipe.

SSN 4-byte hexadecimal IMS Connect send sequence number.

TERMINAL
8-byte VTAM Node name, Line/Pterm, APPC Net ID or OTMA Tpipe.

TRANCODE
8-byte Transaction Code.

URID 6-byte hexadecimal Unit of recovery ID (DB2, MQ).

USERID 8-byte character User ID.

UTC (Coordinated Universal Time) and IMSREL (IMS Release) cannot be specified in COND statements.

Related concepts:

“Global fields” on page 18

Global fields are information fields that mean the same thing in different types of records. They help identify the resources used in transaction processing.

Specifying levels for log codes

Each log code statement in a filter has a level (1-255) to define logical AND/OR processing at the log code level. The default is 1.

Levels are processed in ascending order. Each level is ANDed with the next level. Statements within the same level are ORed.

If a log code is matched at more than one level and has forms or REXX specified, the form or REXX exec at the highest level (where 255 is higher than 1) applies.

In batch processing, if Level is not specified, then 1 is assumed.

The following examples show how filters process levels and conditions.

Example 1

Code	Level	Conditions

ALL	1	LSN GE 0000000000001023 LSN LE 0000000000007829

```

IMS 01      2      TRANCODE EQ T1
                TRANCODE EQ T2
                USERID   EQ JOHN

IMS 07      2      TRANCODE EQ T3
                TRANCODE EQ T4
                USERID   EQ BOB

```

The example is equivalent to the following Boolean expression:

```

(LSN GE 0000000000001023 AND LSN LE 0000000000007829)
AND ((CODE EQ 01
      (TRANCODE EQ T1 OR TRANCODE EQ T2) AND
      USERID EQ JOHN)
OR (CODE EQ 07
    (TRANCODE EQ T3 OR TRANCODE EQ T4) AND
    USERID EQ BOB))

```

Example 2

The following screen image is contrived for the purpose of illustration. Conditions are normally on a subpanel.

```

Filter . . . . . AUDIT
Description . . . Auditor looking for unusual activity

-----
Log Code... ALL      Global Criteria
                  Level=1  Conditions=Yes

      Conditions... Field Name +   Oper  Value +
                  LSN             GE    0000000000001000
                  LSN             LE    0000000000008000
-----
Log Code... IMS 01   IMS Message
                  Level=2  Conditions=Yes

      Conditions... Field Name +   Oper  Value +
                  MSGXSTXT(*)      EQ    'UNAUTHORIZED'
-----
Log Code... IMS 03   IMS Message
                  Level=2  Conditions=Yes

      Conditions... Field Name +   Oper  Value +
                  MSGXSTXT(*)      EQ    'UNAUTHORIZED'
-----
Log Code... IMS 50   Database Update
                  Level=2  Conditions=Yes

      Conditions... Field Name +   Oper  Value +
                  DATABASE         EQ    'ACCOUNTS'
-----

```

Figure 245. Filter example: Specifying Levels

The corresponding logic for this filter is:

```

FOR ALL Log Codes
IF (LSN >= 0000000000001000) AND (LSN <= 0000000000008000) THEN
  Continue to level 2
ELSE
  Bypass record

FOR CODE=01
IF MESSAGE TEXT contains the string 'UNAUTHORIZED' THEN
  Process record

```

```
FOR CODE=03
IF MESSAGE TEXT contains the string 'UNAUTHORIZED' THEN
    Process record
```

```
FOR CODE=50
IF DATABASE NAME is 'ACCOUNTS' THEN
    Process record
```

```
OTHERWISE
    Bypass record
```

Related reference:

“CODE command” on page 396

An alternative way to specify filtering criteria without defining a Filter.

Specifying global fields for the ALL log code

You can specify log code ALL without a log type to specify global criteria for all log records. If you specify log code ALL with a log type, the global criteria applies to all log records of that type only. For example, DB2 ALL for all DB2 records.

Enter line action **S** against log code ALL to specify global criteria that apply to all log record codes.

When you specify conditions for log code ALL, the allowed field names are the global fields.

For some of the global fields you can specify special values for expediency as an alternative to character and hexadecimal strings. For more information, see “Specifying global field values” on page 293.

The following example is an unrealistic set of conditions but illustrates how to specify the different types of values.

Command ===> _____
Conditions
Row 1 to 13 of 13
Scroll ===> CSR

Code: ALL Global Criteria for all Log Record Codes

/ Field Name +	Oper	Value +
CODE	EQ	5937
LSN	EQ	00000000005DEF91
TRANCODE	EQ	'TRAN1'
PROGRAM	EQ	'PROGRAM1'
USERID	EQ	'USERID1'
LTERM	EQ	'LTERM1'
TERMINAL	EQ	'VTAM01'
DATABASE	EQ	'DATABAS1'
RBA	EQ	00000001
REGION	EQ	0001
ORGUOWID	EQ	*/B96A33D8DD9C2300
RECTOKEN	EQ	IMSA1234/0000002300000001
IMSID	EQ	'IMSA'

Figure 246. Specify conditions for log code ALL

Specifying filtering criteria for a particular log code

To select only log records with a particular log code, specify the log code in the filter statement and add filtering conditions.

Enter line action **S** against the particular log code to specify conditions that apply to all log records with that record code.

When you specify conditions for a known log code, you can enter any field name that is valid for the particular log code and IMS release. You can use the Prompt function key (F4) to select the name from a list.

The following example is an unrealistic set of conditions but illustrates how to specify the different types of values.

Command ==> _____ Conditions Row 1 to 12 of 12
Scroll ==> CSR

Code: 01 IMS Message

/	Field Name +	Oper	Value +
-	MSGIDSTN	EQ	'LTERM*'
-	MSGODSTN	EQ	&BANKTRAN
-	USERID	NE	'JOHN'
-	QDF2SMB	EQ	1
-	MSGTEXT(7)	EQ	'BANK IT'
-	MSGTEXT(*)	EQ	'DO IT NOW'
-	USERID	EQ	'JAN% '
-	MSGDFLG2	EQ	X'C2'
-	MSGTEXT(1)	EQ	'LOTS OF MONEY'
-	27	EQ	'WITHDRAW'
-	*	EQ	'CHECK'

***** Bottom of data *****

Figure 247. Specify conditions for IMS log code 01

Note: If the log code is an “unknown code”, you can only specify a record offset or * (floating offset). IMS PI only supports field names for known log codes.

Selecting a field for a particular log code

When you specify conditions for a known log code, you can press the Prompt function key (F4) from Field Name to display the list of field names that are valid for the particular log code and IMS release.

Select a field name from the list to insert in the Condition statement. You can use the FIND command to help locate fields of interest.

```
----- 4505 - Variable Pool Statistics -----
                          Fields                      Row 1 to 14 of 37
Command ==> _____ Scroll ==> CSR

Select a Field Name then press Enter.

  Field Name
- STLOGREC      Statistics Log Record - Variable Pool
- STATLEN       Length of log record
- STATCODE      Log record code
- STATTYPE      Statistics Type
- S STATID       Statistics ID
- STSSTATS      Variable Pool statistics
- STSDSTAT      DMB Pool statistics
- STSDNAME      DMB Pool name
- STSDSIZE      Size of DMB Pool in bytes
- STSDRES       Number of bytes in use
- STSDHIGH      Highest number of bytes in use
- STSPSTAT      PSB Pool statistics
- STSPNAME      PSB Pool name
- STSPSIZE      Size of PSB Pool in bytes
- F1=Help      F3=Exit      F6=Resize      F7=Backward      F8=Forward
- F12=Cancel
```

Figure 248. Select a field for a particular log code

Selecting an Object List

In a filter condition, you can specify more than one value for a field by specifying the name of an Object List prefixed by an & (ampersand).

To display the selection list of available Object Lists, press the Prompt function key (F4) from the Value field.

```
Object Lists          Row 1 to 3 of 3
Command ==> _____ Scroll ==> CSR

Select an Object List then press Enter.

  Name      Description
- LTERMS     Logical Terminals
- TRANCODE   Transaction Codes
- USERIDS   User IDs
```

Figure 249. Select an Object List

Related reference:

- “Using object lists in filter conditions” on page 307
- An Object List name is prefixed by an ampersand (&) when specified in a Filter Condition statement. This is to identify it as an Object List and not a single character value.
- “Value” on page 292
- Comparison values are determined by the type of field, either a character string, hexadecimal string, or integer. For a list of values, you can specify the name or an object list.

How IMS PI selects records

Understand the rules for record selection to specify filtering criteria that are efficient and effective.

When IMS PI performs record selection, the procedure is:

1. Compare each record in the log file to each log code listed in the Filter from top to bottom. If no match is found, the record is bypassed. See “Rules for matching log codes.”
2. When there is a match on log code and the Conditions indicator is No, the record is selected and no further testing is performed on that record.
Be careful when specifying log code ALL as all log records will match unless Conditions are specified.
3. When there is a match on log code and the Conditions indicator is Yes, the conditions are checked:
 - If the record matches the conditions, the record is selected. See “Rules for matching one condition” on page 300.
 - If the record does not match the conditions, the record is compared to the next log code in the Filter until:
 - A match on log code and conditions is found and the record is selected.
 - All log codes (and conditions) are checked, no match is found, and the record is bypassed.
4. When there is a match on log code and conditions, the corresponding Form, if specified, is applied to the record.

Note: The order of your Filtering Criteria statements is important since the record matching occurs top to bottom and stops when a match is found. The order can affect performance and the Form that is applied to the record.

- You want to specify the most likely matches first to minimize the number of comparisons.
- A record can potentially match more than one set of criteria. IMS PI will select the record on the first match. For example, if you specify Log Code ALL first with no Conditions, all log records will be selected at this point and any other criteria you may have specified will be ignored. Therefore in cases where you want to select particular log codes, you must either:
 - Delete the ALL log code
 - Specify conditions for log code ALL (“global criteria”) so that only required records are selected

Related reference:

“COND command” on page 397

Condition statements allow you to filter log records based on certain field values in the log record. The statements contain conditional logic (like IF statements) to either include or exclude records from processing.

Rules for matching log codes

When IMS PI performs record selection, the log record is compared in turn to each log code in the Filter. The record is selected if it matches one of the log codes and its associated conditions. Conditions are only tested if the Condition indicator is Yes.

Specify log codes as two hexadecimal digits in the range 00 to FF or four hexadecimal digits in the range 0000 to FFFF. IMS PI compares the specified digits

directly with the two or four byte hexadecimal log code in the record. For example, specify log code 20 to select type X'20' records (Database Open) or specify log code 450F to select subtype X'450F' records (Fixed Pool Statistics). The equivalent batch commands are CODE(20) or CODE(450F) .

There are three special cases:

1. You can specify log code ALL to select all log records. To control which records are selected, you can specify global criteria conditions using the global fields. For example, to select only the records for transaction code KAZTRANZ, specify the condition: COND TRANCODE EQ 'KAZTRANZ' . For more information on specifying global criteria, see "Specifying global field values" on page 293.
2. You can specify log codes for user-defined log records. These report a description of "Unknown Code" and you can specify Conditions using record offsets only.
3. Log code prefix for records that have subtypes. For example, specify 40 to represent all checkpoint records, subtypes 4001 to 4099. Although an "Unknown Code", you can still specify Conditions (using record offsets) and a Form.

IMS PI does not know the field names for "unknown" log codes, so cannot filter or format them using field names.

Rules for matching one condition

Conditions are only tested if the log code matches and the Conditions indicator value is Yes.

The format of a Condition statement is:

Fieldname | Offset Operator Value

The rules for comparing depend on how the Field Name (or Offset) and Value are specified. This determines the length of the data to be compared.

Field Name or Offset can be any of the following:

1. A valid field name for the log record code. For log code ALL, the valid fields are the global fields.

IMS PI compares the value from the start of the field. The compare length is the longer of the field and value lengths:

- If the value is shorter than the field:
 - Character values are left justified and padded with blanks (X'40')
 - Hex values are left justified and padded with low values (X'00')
 - Numeric values are converted to binary, right justified and padded with low values (X'00')

For example:

TRANCODE EQ 'MYTRAN'

'MYTRAN ' will *match* but 'MYTRANX ' will *not match*.

- If the value is longer than the field, the comparison will continue past the end of the field.
2. A field name and offset. The compare length is determined by the length of the value. IMS PI compares the value to this location in the field (relative to 1). The offset can take the comparison beyond the end of the field. For example: TRANCODE(4) EQ 'BANK' OURBANKS will *match* but MYBANK and YOURBANK will *not match*.

3. A field name and * (floating offset). The compare length is determined by the length of the value. IMS PI looks for the value anywhere in the field. For example, `TRANCODE(*) EQ 'BANK'` MYBANK, YOURBANK and OURBANKS will all *match*.
4. An offset only. The compare length is determined by the length of the value. IMS PI compares the value to this location in the record.
 - If the offset is specified as a decimal integer, it is relative to 1. For example: `5 EQ X'03'` will select records with log code 03 since the 5th byte of the log record is always the log record code.
 - If the offset is specified in hexadecimal, it is relative to 0. For example: `X'04' EQ X'03'` will also select records with log code 03 since X'04' indicates the 5th byte of the log record. X'00' identifies the 1st byte in the record and X'18' is the 25th.
5. * (floating offset). The compare length is determined by the length of the value. IMS PI looks for the value anywhere in the record.

Additional rules for matching:

1. If the comparison operator is ON or OFF, only the first byte of the field in the record is tested.
2. When Conditions are specified for “unknown” log codes, field names cannot be specified. However, you can specify a record offset or * (asterisk).
3. If the field name is not present in the record, it will *not match*. Some fields do not exist in older releases of IMS and care needs to be taken when specifying the IMS release used to browse the log file. Specifying the wrong release can result in the fields not being found in the record when you expected them to be present.
4. Fields can be present more than once in a record if they are in a repeatable segment. Only one of the field values need match for the condition to be satisfied.
5. Comparisons that continue past the end of the log record result in *no match*.

Rules for matching more than one condition

When IMS PI performs record selection, the Condition statements are evaluated from top to bottom, in order of the levels. All filter conditions are matched (logical 'AND' relationship), except when two adjacent conditions specify the same field and operator. When two adjacent conditions specify the same field name and operator, then there is a logical OR relationship between them.

For example, the following conditions will select the record if the Transaction Code is MENU OR LOGO:

```
COND TRANCODE EQ 'MENU'
COND TRANCODE EQ 'LOGO'
```

The exception is when both operators are the NE, 'not equals' operators. In such cases an AND relationship applies. For example, the following conditions will select the record if the Transaction Code is not MENU AND not LOGO:

```
COND TRANCODE NE 'MENU'
COND TRANCODE NE 'LOGO'
```

Examples of conditions in a filter

The following examples illustrate how IMS PI interprets your Filter specifications.

Example 1: Is string anywhere in the field? Compare field(*) to string.

To select all IMS Message log records that have message text that contains the string 'IMSPROD', define a Filter for log code IMS 01 and the following condition:

Command ==>		Conditions	Row 1 to 1 of 1
			Scroll ==> CSR
Code: 01 IMS Message			
/	Field Name +	Oper	Value +
-	MSGXSTXT(*)	EQ	'IMSPROD'

Figure 250. Filter example 1: Specifying fieldname(*) "Is string anywhere in the field?"

Example 2: Is string anywhere in the record? Compare * to string.

Use * (floating offset) to search the entire record for particular data. In this example, we want to select all IMS Message log records (log code 01) that contain the string 'IMSPROD' anywhere in the record.

Command ==>		Conditions	Row 1 to 1 of 1
			Scroll ==> CSR
Code: 01 IMS Message			
/	Field Name +	Oper	Value +
-	*	EQ	'IMSPROD'

Figure 251. Filter example 2: Specifying * as field name "Is string anywhere in the record?"

Example 3: Compare field(offset) to hex value. Start at offset for length of value.

When a field and an offset are specified, IMS PI compares the value starting from the position indicated by the offset past the start of the field. The compare length is determined by the length of the value.

SPQBAQUE is a hexadecimal type field of 8 bytes. In this example, an offset (1) is specified and the compare will start at the first byte of field SPQBAQUE for the length of 2 bytes, being the length of the value.

If the data in field SPQBAQUE is X'9A8CE1141A6CE114' then it is equal to the specified value and will *match*.

Command ==>		Conditions	Row 1 to 1 of 1
			Scroll ==> CSR
Code: 4014 Checkpoint - SPQB - Subpool Queue Block			
/	Field Name +	Oper	Value +
-	SPQBAQUE(1)	EQ	X'9A8C'

Figure 252. Filter example 3: fieldname(offset) uses length of value from offset

This generates the following commands:

```
CODE(4014)
COND SPQBAQUE(1) EQ X'9A8C'
```

Example 4: Compare field to longer value. Uses length of value.

When a field name is specified, IMS PI compares the value to the field. The compare length is the longer of the field and value lengths.

TRANCODE is a character field of 8 bytes. If TRANCODE is 'FINANY01' and the specified value is 'FINANY0199' (10 bytes), the compare length will be 10 bytes. Therefore the next 2 bytes of the record beyond the end of the TRANCODE field will also be examined. If the data from the start of the TRANCODE field is 'FINANY01XX', then it is not equal to the specified value and will *not match*. However, if the next two bytes after the TRANCODE field are '99', then 'FINANY0199' will *match*.

In this example, the specified value is the same length as the field and is a *match*.

Command ==>		Conditions	Row 1 to 1 of 1
			Scroll ==> CSR
Code: 01 IMS Message			
/	Field Name +	Oper	Value +
-	TRANCODE	EQ	'FINANY01'

Figure 253. Filter example 4: Value length same as field length

Example 5: Compare field to shorter value. Uses length of field, pads value.

In this example, the TRANCODE field is 8 bytes and the specified value is 4 bytes. The compare length will be 8 bytes and the specified value will be left justified and padded with blanks. (For a character field, the value is padded with blanks. For a hexadecimal field, the value is padded with low-values.) Therefore TRANCODE will be compared with 'FINA '.

If the data in field TRANCODE is 'FINANY01' then it is *not* equal to the specified value and will *not match*.

Command ==>		Conditions	Row 1 to 1 of 1
			Scroll ==> CSR
Code: 01 IMS Message			
/	Field Name +	Oper	Value +
-	TRANCODE	EQ	'FINA '

Figure 254. Filter example 5: Field length greater than value length, pads value

Example 6: Compare field(offset) to string. Start at offset for length of string.

If the location of the data within the field is known, you can specify the offset of the start of the value. In this example the compare begins from the 5th byte in TRANCODE for a length of 2 bytes, being the length of the specified string.

If TRANCODE is 'FINANY01', then bytes 5 to 6 are 'NY' and the specified value will *match*.

Command ==>		Conditions	Row 1 to 1 of 1
			Scroll ==> CSR
Code: 01 IMS Message			
/	Field Name +	Oper	Value +
_	TRANCODE(5)	EQ	'NY'

Figure 255. Filter example 6: *fieldname(offset)* uses length of string from offset

Example 7: Compare character field to masking pattern.

Character values can specify a pattern. The standard ISPF masking characters % (percent) and * (asterisk) can be used.

In this example, IMS PI will select all Checkpoint DMB Directory Entry records with field CHKDSYM (DMB Symbolic Name) containing the character string MAST anywhere in the field.

CHKDSYM is a character field of length 8 bytes. Thus MAST1234, 12MAST34, and 1234MAST will *match* but M12AST34 will *not match*.

Command ==>		Conditions	Row 1 to 1 of 1
			Scroll ==> CSR
Code: 4006 Checkpoint - DDIR - DMB Directory Entry			
/	Field Name +	Oper	Value +
_	CHKDSYM	EQ	'*MAST*'

Figure 256. Filter example 7: Using masks for character fields

This equates to the following commands:

```
CODE(4006)
COND CHKDSYM EQ '*MAST*'
```

If the trailing * was omitted, this would generate the following commands:

```
CODE(4006)
COND CHKDSYM EQ '*MAST'
```

This time, 1234MAST would *match* but MAST1234 and 12MAST34 would *not match*.

Example 8: Is high order bit on in hex field? Compare hex value.

In this example, the 8 byte hexadecimal field SPQBAQUE is tested to determine if the high order bit is on.

The use of the ON or OFF operator indicates that bit testing is required. Only the first byte of a field is tested, the rest of the field is ignored. In the condition statement, you can specify the name of the data field or a predefined bit setting. Data fields require a value to be specified, predefined bit settings do not. See "Operator for Flag bit checking" on page 292.

If the data in field SPQBAQUE in the record is X'9A8CE1141A8CE114' then it will *match*. However, if it is X'1A8CE1141A8CE114' then it will *not match*.

Command ==>		Conditions	Row 1 to 1 of 1
			Scroll ==> <u>CSR</u>
Code: 4014 Checkpoint - SPQB - Subpool Queue Block			
/	Field Name +	Oper	Value +
_	SPQBAQUE	EQ	X'80'

Figure 257. Filter example 8: Flag bit checking using a data field name

This equates to the following commands:

```
CODE(4014)
COND SPQBAQUE ON X'80'
```

Example 9: Is flag bit on? Compare hex value.

In this example, the one byte flag field SPQBFLG1 is tested to determine if bit X'04' is on.

X'86' will *match*. However, X'82' will *not match*.

Command ==>		Conditions	Row 1 to 1 of 1
			Scroll ==> <u>CSR</u>
Code: 4014 Checkpoint - SPQB - Subpool Queue Block			
/	Field Name +	Oper	Value +
_	SPQBFLG1	EQ	X'04'

Figure 258. Filter example 9: Flag bit checking using a hex value

This equates to the following commands:

```
CODE(4014)
COND SPQBFLG1 ON X'04'
```

Example 10: Is flag bit on? Use predefined bit setting.

For flag field SPQBFLG1, the symbol SPQB1DYN is equated with bit setting X'04'. In the Condition statement, a value cannot be specified because SPQB1DYN is a predefined bit setting and the value is implicit in its definition.

Command ==>		Conditions	Row 1 to 1 of 1
			Scroll ==> <u>CSR</u>
Code: 4014 Checkpoint - SPQB - Subpool Queue Block			
/	Field Name +	Oper	Value +
_	SPQB1DYN	EQ	

Figure 259. Filter example 10: Flag bit checking using a predefined bit setting

This equates to the following commands:

```
CODE(4014)
COND SPQB1DYN ON
```

It achieves the same result as:

```
CODE(4014)
COND SPQBFLG1 ON X'04'
```

Related reference:

“CODE command” on page 396

An alternative way to specify filtering criteria without defining a Filter.

“COND command” on page 397

Condition statements allow you to filter log records based on certain field values in the log record. The statements contain conditional logic (like IF statements) to either include or exclude records from processing.

Specifying a form in a filter

For each log code in your Filter, you can specify the name of a Form. The Form controls the presentation of filtered log records. Only the fields and segments specified in the Form are reported.

In the Form field of the Edit/View Filter panel, type the 1 - 8 character name or press the Prompt function key (F4) to select from a list of previously defined Forms.

Command ==> _____ Forms Row 1 to 3 of 3 Scroll ==> CSR

Select a Form then press Enter.

	Name	Description
	DBCALLS	Transaction DB Call counts
S	MESSAGES	IMS Messages
-	OSAMSTAT	OSAM DB Buffer Pool statistics

Figure 260. Select a Form

Related concepts:

Chapter 25, “Defining forms,” on page 313

Forms enable you to tailor the formatting of log records by removing fields that are not relevant to you.

Specifying a REXX exec in a filter

For each log code in your Filter, you can specify the name of a REXX exec.

If you use the REXX exec in a filter, it will execute when a user selects a record matching the filtering criteria and when a user zooms on a field in that record. The REXX exec will not execute if the filter is applied through a batch command.

Related concepts:

“Running a REXX exec” on page 121

You can run a REXX exec through the IMS Problem Investigator dialog or in batch.

Related reference:

“Sample REXX execs” on page 121

REXX execs supplied in the sample library SALZSAMP.

Chapter 24. Defining Object Lists

Object Lists are useful for specifying lists of fields and values for repeated use in specifying filter conditions.

They provide a convenient mechanism for grouping sets of values to filter the input data for more efficient processing and analysis.

What is an object list?

Object lists are used when filtering log files for online viewing or batch reports and extracts. An object list defines a list of field values, typically names, that can be specified in Condition statements for character fields. A typical use might be to define all the transaction codes that belong to a particular application system.

Object Lists enable you to define a group of related values once, then use them in Condition statements and Filters by specifying the name of the Object List in the Value field of the Condition.

An Object List name is prefixed by an ampersand (&) when specified in a Condition statement. This is to identify it as an Object List and not a single character value.

For example, the following batch commands will select all log records for Transaction Code MENU or that have a Transaction Code equal to any of the values in the Object List OURTRANS.

```
REPORT  
CODE(ALL)  
COND TRANCOD EQ &OURTRANS  
COND TRANCOD EQ 'MENU'
```

Related reference:

“COND command” on page 397

Condition statements allow you to filter log records based on certain field values in the log record. The statements contain conditional logic (like IF statements) to either include or exclude records from processing.

Using object lists in filter conditions

An Object List name is prefixed by an ampersand (&) when specified in a Filter Condition statement. This is to identify it as an Object List and not a single character value.

The following example shows how to specify an Object List in a Filter Condition statement.

File Menu Object Lists Help			
Command ==>		Conditions	Row 1 to 2 of 2 Scroll ==> CSR
Code: ALL Global Criteria for all Log Record Codes			
/	Field Name +	Oper	Value +
-	TRANCODE	EQ	&MYTRANS
-	TRANCODE	EQ	'MENU'

Figure 261. Specify an Object List in Filter Conditions

The first condition indicates that Trancode must match one of the values in Object List MYTRANS.

The second condition indicates that Trancode must match the value 'MENU'.

Note that both conditions have the same field name and same operator (EQ). In this case, only one of these conditions is required to match the log record. Trancode can match either one of the values in Object List MYTRANS or 'MENU'.

The Conditions, including the Object List, can also be specified using the following batch commands:

```
REPORT
CODE(ALL)
COND TRANCODE EQ &MYTRANS
COND TRANCODE EQ 'MENU'
```

Related reference:

“Selecting an Object List” on page 298

In a filter condition, you can specify more than one value for a field by specifying the name of an Object List prefixed by an & (ampersand).

“COND command” on page 397

Condition statements allow you to filter log records based on certain field values in the log record. The statements contain conditional logic (like IF statements) to either include or exclude records from processing.

Listing object lists

Object Lists are a convenient way to specify character values (typically names) for use in Filter Condition statements. This facility is usually invoked when specifying Filter Conditions by selecting **Object List** from the action bar. However, from anywhere in the IMS PI dialog, you can link directly here by selecting **Object Lists** from **Menu** in the action bar or by entering the OBJLISTs command in the command line.

Object Lists are held in the Control Data Set (CDS).

```

File  Menu  Help
-----
                                Object Lists                                Row 1 to 3 of 3
Command ==> _____ Scroll ==> CSR

Select an Object List to edit.

/   Name                Description                Changed                ID
S   LTERMS  Logical Terminals                2014/05/26 12:40 TAMSYN
-   TRANCOD Transaction Codes                2014/05/26 12:40 GABE
-   USERIDS User IDs                2014/05/26 12:39 RUTH
***** Bottom of data *****

F1=Help  F3=Exit  F7=Backward  F8=Forward  F10=Actions  F12=Cancel

```

Figure 262. List of Object Lists

Enter line action **S** to edit an Object List or **V** to view.

You can define new Object Lists using the **NEW** command or use line action **D** to delete ones no longer required.

Line actions

- /** Display the selection list of valid line actions.
- E** Edit this Object List.
- S** Select this Object List (same as Edit).
- V** View this Object List (no Save, but SaveAs is available).
- D** Delete this Object List (cannot be undone - deleted Object Lists cannot be reinstated).

Primary commands

NEW name **MODEL** modelname

Create a new Object List. The name must be a unique Object List name.

If a valid command is specified, the Edit panel is displayed for you to complete the definition (see “Editing an object list” on page 311).

If you specify **MODEL** with the name of an existing Object List, IMS PI uses that to populate the new one, otherwise the default specification is used (Log Code ALL with no Conditions which selects all records unconditionally).

You can also select New from File in the action bar.

SORT Name | Description | Changed | Id

Sort the list in ascending sequence by the field name specified as a parameter. With one exception; the **Changed** column is sorted in descending sequence so the most recent is first.

The parameter field names are the column headings. The default sort field is Name. The list is sorted by Name on initial entry and when the **SORT** command is entered without a parameter.

The parameter can be abbreviated to any string from the start of the field name. For example, **SORT D** is the same as **SORT DESCRIPTION**

You can also sort by selecting a point-and-shoot column heading.

RESet Clear outstanding line actions.

Related concepts:

Chapter 21, “Defining a Control Data Set (CDS),” on page 269

The Control Data Set (CDS) is a VSAM KSDS that is the repository for Filters, Object Lists, Forms, and User Log records. You can define your own personalized CDS or you can use a common CDS that allows you to share definitions with others.

Creating a new object list

To define a new Object List, enter the NEW command in the command line of the list of Object Lists, or select **New** from **File** in the action bar.

The format of the NEW command is:

NEW *name*

or

NEW *name* MODEL *modelName*

If a valid command is specified, the Edit panel is displayed for you to complete the definition.

New Object List

Command ==> _____

Specify the name of the new Object List and optional model.

Name TCEXAMP

Default or MODEL 1 1. Default
2. Model (specified below)

Model _____ +

F1=Help F3=Exit F4=Prompt F6=Resize
F7=Backward F8=Forward F12=Cancel

Figure 263. New Object List

To define a new Object List specify the following:

- **Name.** The name of the new Object List. A unique 1-8 character name in ISPF member name format.
- **Default or Model.** Select either of the following:

Default

Initialize the new Object List with the IMS PI default specification (Description IMS PI Object List and no values specified).

Model

Create the new Object List based on one that already exists. In the **Model** field, type the name of the Object List to use as the model or press the Prompt function key (F4) to select from a list of previously defined Object Lists.

```

Object Lists      Row 1 to 3 of 3
Command ==> _____ Scroll ==> CSR

Select an Object List then press Enter.

      Name      Description
      LTERMS    Logical Terminals
S  TRANCODE   Transaction Codes
-   USERIDS   User IDs
-

```

Figure 264. Select a model Object List

Editing an object list

To define an object list, give it a name, a description, and a list of values.

The Edit Object List panel is displayed when a new Object List is requested, or when selecting a predefined Object List from the list of Object Lists using line action **S**. You can display the Object List panel in View mode by instead entering line action **V**.

```

File Menu Help
-----
EDIT      Object List - TCEXAMP      Row 1 to 3 of 3
Command ==> _____ Scroll ==> CSR

Description . . . Transaction Code Example

Specify the Object List values:

/
-   AB      CD      T1234      Y8888
-   Z9999
-

```

Figure 265. Edit Object List

Specify a description for your Object List, then specify any number of character strings to be used as compare values in Filter Condition statements. The character strings are free-format, typically names such as Transaction Codes, User IDs and IMS Subsystem IDs. Character values are assumed, so do not enclose the character strings in quotes. Masking patterns are not allowed.

It is usual to define Object Lists that are homogenous. That is, an Object List should specify values for testing the contents of one particular field. Define one Object List for Transaction Codes, another for User IDs, and so on.

Each input field is a separate value. Embedded spaces are preserved. Blank values are ignored.

Line actions

- /** Display the selection list of valid line actions.
- I** Insert a blank row after this row to add more values.
- R** Repeat this row.
- C** Copy this row.
- M** Move this row.
- A** After this row (Move/Copy).
- B** Before this row (Move/Copy).

D Delete this row.

Primary commands

SAVE Available from Edit but not View mode.

Saves the current definition to the Control Data Set. If the Object List already exists, it is overwritten. If it does not exist, it is created. Editing of the data can continue after the save is complete.

Save can be selected from File in the action bar.

SAVEAS *name*

Available from Edit and View mode.

Saves the current definition under the specified name. If you do not specify a name, IMS PI will prompt you. If an Object List of that name already exists in the Control Data Set, it will be overwritten. If it does not exist, it will be created. Editing of the data can continue after the SaveAs is complete.

SaveAs can be selected from File in the action bar.

RESet Clear outstanding line actions and remove blank rows.

Chapter 25. Defining forms

Forms enable you to tailor the formatting of log records by removing fields that are not relevant to you.

There are two main benefits of using Forms:

- Only information relevant to you is presented, making it easier and quicker to interpret the report.
- The volume of report output is reduced because unnecessary information is not reported.

There are three ways to apply a Form:

1. Use the dialog to apply a Form for a Filter.

The equivalent batch command is:

```
REPORT FILTER(MYTRANS)
```

MYTRANS is the name of the Filter. The name of the Form is not obvious in the batch command, but IMS PI expands the Filter in SYSPRINT to show the CODE, COND and FORM commands.

2. Use batch commands to apply a Form for a log code.

In the following example, the resulting report will include only log records with log code 07 and show only the fields specified in the Form STAT07.

```
REPORT  
CODE(07) FORM(STAT07)
```

3. Use a Form to specify the record format of a CSV file.

If a Filter is used, it must specify as a minimum the same log code as the Form, otherwise the output will contain no data.

```
CSV FORM(STAT07)
```

Notes:

- Forms do not affect the formatting of log records in extract data sets.
- Forms do not allow you to change the predetermined sequence of fields in the record.

Related reference:

“Specifying a form in a filter” on page 306

For each log code in your Filter, you can specify the name of a Form. The Form controls the presentation of filtered log records. Only the fields and segments specified in the Form are reported.

“FORM option” on page 401

Forms control the presentation of log records. Only the fields specified in the form are reported.

Listing forms

Forms are used to control the presentation format of log records.

Select option **3 Forms** from the Primary Option Menu to display the list of Forms that you previously defined. Also, from anywhere in the IMS PI dialog, you can link directly here by selecting **Forms** from **Menu** in the action bar or by entering the FORMS command in the command line.

Forms are saved in the Control Data Set (CDS). If the CDS is not cataloged, you need to specify the name of the CDS on the Primary Option Menu. Then select option **3 Forms**, which will display a prompt for you to define the CDS.

FileMenuHelp

Forms

Row 1 to 3 of 3

Command ==> _____ Scroll ==> CSR

Select a Form to edit.

IMS Release . . . 121 +

/	Name	Code	Description	Changed	ID
-	DBCALLS	07	Transaction DB Call counts	2014/05/26 14:21	TOMMO
-	MESSAGES	01	IMS Messages	2014/05/26 14:22	MAGNAM
-	OSAMSTAT	4504	OSAM DB Buffer Pool statistics	2014/05/26 14:22	RECOG
***** Bottom of data *****					

F1=Help

F3=Exit

F4=Prompt

F7=Backward

F8=Forward

F10=Actions

F12=Cancel

Figure 266. List of Forms

Enter line action **S** to edit a Form or **V** to view.

You can define new Forms using the NEW command or use line action **D** to delete ones no longer required.

Line actions

- / Display the selection list of valid line actions.
- C Copy this form to another CDS.
- E Edit this Form.
- S Select this Form (same as Edit).
- V View this Form (no Save, but SaveAs is available).
- D Delete this Form (cannot be undone - deleted Forms cannot be reinstated).

Primary commands

NEW name MODEL modelname

Create a new Form. The name must be a unique Form name.

If a valid command is specified, the Edit panel is displayed for you to complete the definition (see Figure 270 on page 317).

If you specify MODEL with the name of an existing Form, IMS PI uses that to populate the new one, otherwise the default specification is used (all the segments and field names applicable to the specified log code and IMS release).

You can also select New from File in the action bar.

SORT Name | Description | Changed | Id

Sort the list in ascending sequence by the field name specified as a parameter. With one exception; the Changed column is sorted in descending sequence so the most recent is first.

The parameter field names are the column headings. The default sort field is **Name**. The list is sorted by **Name** on initial entry and when the SORT command is entered without a parameter.

The parameter can be abbreviated to any string from the start of the field name. For example, SORT D is the same as SORT DESCRIPTION.

You can also sort by selecting a point-and-shoot column heading.

RESet Clear outstanding line actions.

FIND '*search string*'

Find the next occurrence of a character string. If the string has embedded spaces, enclose the string in quotes. Press F5 to repeat find.

Related concepts:

Chapter 21, "Defining a Control Data Set (CDS)," on page 269

The Control Data Set (CDS) is a VSAM KSDS that is the repository for Filters, Object Lists, Forms, and User Log records. You can define your own personalized CDS or you can use a common CDS that allows you to share definitions with others.

Creating a new form

To define a new Form, enter the NEW command in the command line of the list of Forms or select New from File in the action bar.

The format of the NEW command is:

`NEW name logcode`

or

`NEW name MODEL modelname`

If a valid command is specified, the Edit panel is displayed for you to complete the definition. If the name or additional parameters are omitted or invalid, you are prompted to specify a valid name and log code or optional model.

The screenshot shows a command panel titled "New Form". It contains the following text and input fields:

- Command ==> _____
- Specify the Form name, type and code, or model.
- Name _____
- Record Type . . . ____ +
- Record Code . . . ____ +
- Default or MODEL
- 1 1. Default
- 2. Model . . . _____ +

Figure 267. Creating a new form

Name The name of the new Form. A unique 1 - 8 character name in ISPF member name format.

Record Type and Record Code

The type of log record that this Form is designed for. It determines the available fields. Log record codes are two or four hexadecimal digits, such

as 07 or 400F. Type the code or press the Prompt function key (F4) to select from a list of log codes applicable to the specified IMS release and record type.

You can use the FIND command to locate relevant record codes.

```

Command ==> _____ Log Codes Row 1 to 16 of 372
                               Scroll ==> CSR

Select a Log Code then press Enter.

Log Code Description
IMS 01  IMS Message
- IMS 02  Condensed Command
- IMS 03  IMS Message
- IMS 0401 Tracking Site Information - Started Planned Takeover
- IMS 0402 Tracking Site Information - Sharing started
- IMS 0403 Tracking Site Information - SUBSYS Recovery complete
- IMS 0404 Tracking Site Information - SUBSYS stopped Sharing
- IMS 0405 Tracking Site Information - Invalidate all Buffers
- IMS 0406 Tracking Site Information - Sharing needs re-evaluate
- IMS 0407 Tracking Site Information - Merge other Logs
- IMS 0408 Tracking Site Information - Batch Backout Update UOR
- IMS 0409 Tracking Site Information - Log Buffers Purged
- IMS 04FF Tracking Site Information - Idling record
- IMS 06  IMS Accounting
S IMS 07  Application Terminate Accounting
- IMS 08  Application Start Accounting

```

Figure 268. Select a log code

Default or MODEL

Select one of the following options:

Default

Initialize the new Form with the IMS PI default specification (Description "IMS PI Log Record Form" and all segments and fields for the specified log code and IMS release).

Model Create the new Form based on one that already exists. In the **Model** field, type the name of the Form to use as the model or press the Prompt function key (F4) to select from a list of previously defined Forms.

```

Command ==> _____ Forms Row 1 to 3 of 3
                               Scroll ==> CSR

Select a Form then press Enter.

Name      Description
S DBSTATS  Transaction DB Terminate statistics
- MESSAGES  IMS Messages
- OSAMSTAT  OSAM DB Buffer Pool statistics
***** Bottom of data *****

```

Figure 269. Select a model Form

Editing a form

The same panel is used for editing or viewing a form. In view mode, changes cannot be saved, however SaveAs is available.

The Edit Form panel is displayed when a new Form is requested, or when you enter line action **S** to select a predefined Form from the list of Forms. You can display the Form panel in View mode by instead entering line action **V**.

```

File  Menu  Help
-----
EDIT                               Form - STAT07                               Row 1 of 84
Command ==> _____ Scroll ==> CSR
Description . . . Transaction DB Call counts          Log Code IMS 07

  ID  Name      Description
dd 01 DLREC    Application Terminate Accounting
dd 01 DLRLL    Length of log record
  01 DLRZZ    ZZ field reserved for QSAM
  01 DLRLTYP   Log record code
dd 01 DLRNPSB   PSB name
  01 DLRTNRCD  Transaction Code
dd 01 DLRPTY   Transaction Priority
  01 DLRTYPE   Program Type
  01 DLRTIME   Execution time in Timer Units
  01 DLRCMP    ABEND Flag Byte
  01 DLRCOMP   Completion code in System format
  01 DLRNJOB   Job name
dd 01 DLRNSTP   Step name
  01 DLRMCNT   Messages processed by this Schedule
-----
  02 DLRACCT   Accounting data from DFSDACCT
  02 DLRGUI    Database GU calls issued
  02 DLRGN     Database GN calls issued
  02 DLRGNP    Database GNP calls issued
  02 DLRGHU    Database GHU calls issued
  02 DLRGHN    Database GHN calls issued
  02 DLRGHNP   Database GHNP calls issued
  02 DLRISRT   Database ISRT calls issued
  02 DLRDLET   Database DLET calls issued
  02 DLRREPL   Database REPL calls issued
  02 DLRCLCNT  Total number of DL/I Database calls
dd 02 DLRGUMES Message Queue GU calls
  02 DLRGNMES  Message Queue GN calls
  02 DLRISMES  Message Queue ISRT calls
  02 DLRPUMES  Message Queue purge calls
  02 DLRTSTNQ  Test Enqueues
  . . .
dd 02 DLRNWID  Network Identifier
***** End of data *****

```

Figure 270. Edit Form

IMS PI reports only the segments and field names that are specified in the Form. Segments are record sections that contain a logical grouping of fields. If the log record contains segments, these are delineated by a change of ID and a horizontal dashed line (-----).

A new Form displays the full list of segments and field names that are available for the specified log code and IMS release.

You can use line actions **D** or **DD** to delete the field names and segments that are of no interest to you.

Deleted field names and segments can be recovered immediately or in a later edit session using the UNDO command.

Line actions

- / Display the selection list of valid line actions.
- D Delete a field name or segment separator.
- DD Delete a block of field names and segment separators.

Primary commands

FIND *'search string'*

Find the next occurrence of a character string. Press F5 to repeat.

SAVE Available from Edit but not View mode.

Saves the current definition to the Control Data Set. If the Form already exists, it is overwritten. If it does not exist, it is created. Editing of the data can continue after the save is complete.

Save can be selected from **File** in the action bar.

SAVEAS *name*

Available from Edit and View mode.

Saves the current definition under the specified name. If you do not specify a name, IMS PI will prompt you. If a Form of that name already exists in the Control Data Set, it will be overwritten. If it does not exist, it will be created. Editing of the data can continue after the SaveAs is complete.

SaveAs can be selected from **File** in the action bar.

UNDO Undo the last delete action. In this way deleted field names and segment separators can be reinstated.

Enter the command “n” times to undo the last “n” delete actions in turn. The last delete action is the first undone, the first delete action is the last undone.

The command is effective across edit sessions; all deleted field names and segments can eventually be recovered.

Undo can be selected from **Edit** in the action bar.

RESet Clear outstanding line actions.

Reset can be selected from **Edit** in the action bar.

Example forms

Example that illustrates how to specify a form.

Format the type 07 Application Terminate Accounting record to only display:

- Transaction Code
- Messages processed (transaction count for this schedule)
- DL/I Database call counts

File Menu Help		
EDIT		Form - REC07
Command ==>		Row 1 of 84 Scroll ==> CSR
Description . . . IMS PI Log Record Form		Log Code IMS 07
/	ID Name	Description
—	01 DLREC	Application Terminate Accounting
DD	01 DLRLL	Length of log record
—	01 DLRZZ	ZZ field reserved for QSAM
—	01 DLRLTYP	Log record code
DD	01 DLRNPSB	PSB name
—	01 DLRTNRCD	Transaction Code
DD	01 DLRPTY	Transaction Priority
—	01 DLRTYPE	Program Type
—	01 DLRTIME	Execution time in Timer Units
—	01 DLRCMP	ABEND Flag Byte
—	01 DLRCOMP	Completion Code in System format
—	01 DLRNJOB	Job name
DD	01 DLRNSTP	Step name
—	01 DLRCNT	Messages processed by this Schedule

—	02 DLRACT	Accounting data from DFSDACCT
—	02 DLRGU1	Database GU calls issued
—	02 DLRGN	Database GN calls issued
—	02 DLRGNP	Database GNP calls issued
—	02 DLRGHU	Database GHU calls issued
—	02 DLRGHN	Database GHN calls issued
—	02 DLRGHNP	Database GHNP calls issued
—	02 DLRISRT	Database ISRT calls issued
—	02 DLRDLET	Database DLET calls issued
—	02 DLRREPL	Database REPL calls issued
—	02 DLRCLCNT	Total number of DL/I Database calls
DD	02 DLRGUMES	Message Queue GU calls
—	02 DLRGNMES	Message Queue GN calls
. . .		
DD	01 DLRNWID	Network Identifier
***** End of data *****		

Figure 271. Defining a Form for IMS log code 07

```

File  Menu  Help
-----
EDIT                                     Form - REC07                               Row 1 of 15
Command ==> _____ Scroll ==> CSR

Description . . . IMS PI Log Record Form _____ Log Code IMS 07

/  ID  Name      Description
--  --  --
01  DLREC      Application Terminate Accounting
01  DLRTNCD    Transaction Code
01  DLRMCNT    Messages processed by this Schedule
-----
02  DLRACCT    Accounting data from DFSDACCT
02  DLRGU1     Database GU calls issued
02  DLRGN      Database GN calls issued
02  DLRGNP     Database GNP calls issued
02  DLRGHU     Database GHU calls issued
02  DLRGHN     Database GHN calls issued
02  DLRGHNP    Database GHNP calls issued
02  DLRISRT    Database ISRT calls issued
02  DLRDLET    Database DLET calls issued
02  DLRREPL    Database REPL calls issued
02  DLRCLCNT   Total number of DL/I Database calls
***** End of data *****

```

Figure 272. Edited Form for IMS log code 07

The batch report will include only log records with log code 07 and show only the fields specified in the Form REC07.

Chapter 26. Defining systems

To identify the input data for reporting and analysis, you can define your IMS subsystems, IMS Connect systems and associated files and groups. If you have IMS Performance Analyzer for z/OS, you can share its definitions of systems and groups.

To display the System Definitions panel, select option **4 Systems** from the Primary Option Menu.

This panel lists the systems that are available for analysis.

```
File Menu Edit Help
-----
                        System Definitions      Row 1 of 1 More: < >
Command ===> _____ Scroll ===> PAGE

Specify IMS and Connect systems.

/ System   Type   VRM +   Description
S IZDE     IMS    131    TRF extractor detail & logs
***** Bottom of data *****
```

Figure 273. Listing systems available for analysis

Use the Left function key (F10) and the Right function key (F11) to view all the system attributes.

System

The IMS or Connect system identifier. For IMS subsystems, the identifier is a 1-4 alphanumeric character name and must be unique. For Connect systems, the identifier is a unique 1 – 8 alphanumeric character name.

The order in which the systems are specified on the panel is not relevant to IMS Problem Investigator. You may list them in the order that is convenient for you.

Type Specifies whether the system is an IMS subsystem (IMS) or a Connect system.

VRM The release of the IMS subsystem. The supported releases are 121, 131, and 141.

IMS Problem Investigator uses the value in **VRM** to perform release-dependent log record processing.

VRM is not applicable to Connect systems.

Description

A description of the system. The description can be 0 - 36 characters.

Files IMS Problem Investigator sets the Files indicator to Yes or No as follows:

Log Yes indicates that the IMS Subsystem has Log files explicitly specified.

Mon Yes indicates that the IMS Subsystem has Monitor files explicitly specified.

- CEX** Yes indicates that the Connect system has Journal data sets (archive or active) explicitly specified.
- TRF** Yes indicates that the IMS Subsystem has OMEGAMON TRF files specified.
- ATF** Yes indicates that the IMS Subsystem has OMEGAMON ATF journals specified.

Auto_File Selection

IMS Problem Investigator sets the indicator for Automated File Selection to Yes or No as follows:

- DBRC** Yes indicates that RECON or MDA data sets have been specified for the IMS Subsystem making it eligible for DBRC Log Selection.
- CEX** Yes indicates that the Connect system is in the IMS Connect Extensions definitions repository and eligible for Journal File Selection.

Line actions

- /** Select line action from a list.
- J** Submit report, extract or CSV request using DBRC log selection.
- S** Select (Edit) an IMS subsystem.
- I** Insert a blank row to define a new IMS subsystem.
- R** Repeat this row.
- C** Copy this row.
- M** Move this row.
- A** Move or Copy after this row.
- B** Move or Copy before this row.
- D** Delete the system from IMS PI.

Note: A row command on this panel applies to the IMS Subsystem and its associated information on the subordinate panels. That is, repeating a subsystem also repeats the DBRC settings, files, and groups for that subsystem.

Primary commands

NEW *name type*

This command defines a new IMS subsystem. You can also select this from **File** in the action bar.

The *type* is the type of system and can be one of the following:

IMS (Default) IMS subsystem.

CONNECT

IMS Connect system.

RESet This command (or RES) removes all pending line actions and deletes any blank rows. Reset is also available from **Edit** in the action bar.

SORT **System** | **VRM** | **Description** | **Type**

This command sorts the list of systems on the specified column. The default is System. The order is retained on Exit.

You can also sort by selecting a point-and-shoot column heading.

SAVE Save all changes to system definitions.

Note: The Save command is available from the System Definitions panel, being the top in the hierarchy of panels. the Exit function key (F3) from a subordinate panel

only temporarily retains changes. No changes are permanently saved until Save or Exit from the top panel. the Cancel function key (F12) discards all unsaved changes on this and subordinate panels.

Defining an IMS subsystem

This panel is used to specify the attributes of an IMS subsystem, its DBRC settings, log and monitor files, OMEGAMON TRF and ATF files, and groups that it belongs to. IMS Problem Investigator uses this information to generate JCL.

To display the IMS Subsystem panel, type NEW on the command line of the System Definitions panel.

The panel has six views (affecting the bottom half of the display only):

1. **DBRC Settings**
2. **Log Files**
3. **Monitor Files**
4. **Groups**
5. **OMEGAMON TRF Files**
6. **OMEGAMON ATF Journals**

You can switch between the views by entering the number of your choice, using the Right function key (F11) or using the Left function key (F10).

The IMS Subsystem details are:

IMS Subsystem ID

Specify the IMS subsystem identifier. An IMS ID is a 1 - 4 alphanumeric character name and must be unique.

IMS Version (VRM)

VRM is the release of the IMS subsystem. The supported releases are 121, 131, and 141.

IMS Problem Investigator uses the VRM to perform release-dependent batch report processing. IMS Version is a required field and must be kept up to date because IMS log record formats can change from version to version. IMS Problem Investigator needs to ensure that it selects the correct version-dependent reporting routines for this system's log data.

Description

Description is free format text up to 36 characters to describe the IMS subsystem. This is only for your reference. IMS Problem Investigator does not use it to identify the system.

RESLIB Data Set

Specify the name of the RESLIB data set. For DBRC Log Selection, the RESLIB data set must contain the DBRC API routine (DSPAPI00). The RESLIB data set can also be used to determine the IMS version. If you do not specify the VRM explicitly, IMS Problem Investigator will set the IMS version from the information in module DFSVC000. You do not need to specify the RESLIB data set name if the modules reside in the system LNKST concatenation.

Setting up an IMS subsystem for DBRC Log Selection

Specifying your DBRC Settings allows you to use DBRC Log Selection for Log reporting. DBRC Log Selection is a facility that you can use when running your report requests. It automatically selects the required Log files from DBRC for the required reporting time period, saving you the effort of manually identifying relevant log data sets.

The DBRC Settings details are:

DBRC Subsystem ID

The DBRC Subsystem ID defines the DBRC Subsystem (SSID) that owns the SLDS entries. Specify DBRC Subsystem ID when the DBRC Subsystem ID is longer than 4 characters, or different to the IMS Subsystem ID.

- For IMS and DBCTL subsystems, the DBRC Subsystem ID is the IMSID value from IMSCTRL SYSGEN macro (four characters). In this case, DBRC Subsystem ID need not be specified. DBRC Log Selection uses the IMS Subsystem ID as the DBRC Subsystem ID.
- For Batch and Utility subsystems, specify the Jobname.
- For XRF, specify the RSENAME (Recovery Service Element) of the IMS systems (active and alternate).

DBRC IMSplex name

Specify which IMSplex the DBRC should join.

DBRC Log Selection JCL is generated with the IMSPLEX parameter:

```
//ALZDBRC EXEC PGM=ALZDBRC,PARM='IMSPLEX=name'
```

The Group IMSplex specification is used for reporting on a group of systems.

The System IMSplex specification is used for reporting on a system, and is ignored when reporting on a group.

DBRC Sharing Group ID

Specify the DBRC group ID defined in the RECON data set used by the DBRC group.

DBRC Log Selection JCL is generated with the DBRCGRP parameter:

```
//ALZDBRC EXEC PGM=ALZDBRC,PARM='IMSPLEX=name,DBRCGRP=grp'
```

Specify IMSPLEX and DBRCGRP as you would when using the Database Recovery Control utility (DSPURX00):

```
EXEC PGM=DSPURX00,PARM='IMSPLEX=plexname,DBRCGRP=xxx,READONLY'
```

The Group DBRCGRP specification is used for reporting on a group of systems.

The System DBRCGRP specification is used when reporting on a system, and is ignored when reporting on a group.

RECON Data Set

Specify the names of the two or three RECON data sets used by this IMS subsystem. The RECON data sets are used by DBRC Log Selection to select the log files to use for batch processing.

The RECON data sets can be omitted if the MDA data set is specified. However, if both are specified, IMS Problem Investigator will use the RECON specification after validating it against the information in the MDA.

MDA Data Set

Specify the name of the MDA (MVS Dynamic Allocation) data set for this IMS subsystem.

DBRC Log Selection uses the MDA data set to determine the RECON data set names if they are not specified, and in turn uses DBRC to select the log files for input to reporting. If the RECON data set names are specified, the MDA data set is not required. However, if both are specified, IMS Problem Investigator validates that the RECON data sets match the MDA information.

Log Data Sets are Cataloged

Enter / (slash) if the SLDS data sets are cataloged. IMS Problem Investigator then omits UNIT, VOLSER and LABEL parameters from the generated JCL. This prevents JCL failures when the log files are SMS-managed cataloged data sets.

Default: Not selected; log data sets are not cataloged and UNIT, VOLSER and LABEL parameters will be generated in the JCL.

Use OLDS that are not Archived

Enter / (slash) to use OLDS data sets in the event that SLDS files are not available for the requested reporting time period. OLDS data sets will only be considered for selection if they are eligible for archive, but are yet to be archived.

Care should be taken when using this option. OLDS data sets are reused by IMS and their contents may change prior to the batch job execution.

Default: Not selected; OLDS data sets will not be used.

Use Secondary Log Data Sets

Enter / (slash) to use secondary SLDS data sets if they are available, instead of primary SLDS data sets.

Default: Not selected; primary SLDS data sets will be used.

JES2 options

Specify JES2 Control Statement options to run DBRC Log Selection jobs on the system where the RECONS and SLDS Log files are available.

DBRC Node and SYSAFF

Specify JES2 Control Statement options to run DBRC Log Selection jobs on the system where the RECONS Log files are available.

Node is the network node where the job must execute, generating: /*XEQ Node and /*ROUTE PRINT Node.

SYSAFF is the system name to process the job, generating: /*JOBPARM SYSAFF=name.

SLDS Node and SYSAFF

Specify JES2 Control Statement options to run report jobs on the system where the SLDS Log files are available.

Node is the network node where the job must execute, generating: /*XEQ Node and /*ROUTE PRINT Node.

SYSAFF is the system name to process the job, generating:
/*JOBPARM SYSAFF=name.

Note: The JES2 Control Statements will only be generated if they are specified using Primary Option Menu **0.1 IMS PI Settings**.

Related reference:

“ALZUAUTH: Request Authorization exit” on page 435

ALZUAUTH is the Request Authorization exit. Apply USERMOD ALZU002 (supplied in the SALZSAMP library) to install and activate the exit.

“IMS PI Settings” on page 273

You can adjust the settings to customize the IMS PI dialog and batch JCL for running reports and extracts. All required options have initial settings so you can start using IMS PI immediately.

Specifying log files for an IMS subsystem

Use this panel to specify IMS log data sets associated with a given IMS subsystem.

The specified log files are used by IMS Performance Analyzer in the generation of JCL to run log Report Sets. In IMS Problem Investigator, you can use this panel as a way of sorting the log files you want to process (but otherwise it is no different than selecting the logs from option **1 Process**). When you request DBRC Log Selection, the files specified on this panel are ignored because IMS Problem Investigator will use DBRC to locate files based on a specified time period.

Log data set definitions

Each listed data set has the following attributes:

Exc This field does not affect IMS Problem Investigator and is only in use by IMS Performance Analyzer.

Data Set Name (DSN)

Specify the name of the data set in TSO format.

If the data set is not cataloged or you wish to establish overriding data set characteristics, then specify:

UNIT The device type or group name associated with the data set, such as 3390, SYSALLDA, or CART. This must represent a device that is defined in the Eligible Device Table of the current processor as either TAPE or DASD. To select one from a list of possible Units, position the cursor on the **UNIT** field and press the Prompt function key (F4).

UNIT may be specified without a **VOLSER**, in which case the explicitly specified device type will be honored in the process of generating JCL but the UNIT parameter will not be included in the generated JCL. In this way the JCL generation process can be made aware of the device type of a data set that is *yet* to be cataloged, or is cataloged on another system. The device type is needed to generate the JCL for unit affinity. It also is needed to generate the JCL for shared queue merge processing when insufficient tape devices are available to concurrently open the log files from all subsystems.

SEQ Data set sequence number; identifies the relative position of the data set on a tape volume. Omit, or code 0 or 1 to indicate the first data set on the tape volume.

VOLSER

The volume serial number of the data set. It is only required for uncataloged data sets.

A + sign indicates that the data set spans multiple volumes.

To display the **VOLSER** List of up to 16 volumes, do one of the following:

- Place the cursor on the **VOLSER** field and press the Prompt function key (F4).
- Enter the line action **V**.

Line actions

The following line actions are valid for a data set in the list:

/	Display the menu of line actions
S	Select and process
P	Add file to the Process list panel.
I	Insert a null row after this row
R	Repeat this row
C	Copy this row
M	Move this row
A	Move/Copy after this row
B	Move/Copy before this row
D	Delete this row
U	Select a Unit from a list
V	Display the VOLSER list for this data set
X	Reverse this row's exclude status (Excluded/Included)

Primary commands

RESet This command (or **RES**) removes all pending line actions and deletes any blank rows. You can also select **Reset** from **Edit** in the action bar.

Note: The **SAVE** command is not available from this panel. Changes are saved only on Save or the Exit function key (F3) from the System Definitions panel.

Specifying monitor files for an IMS subsystem

Use this panel to associate monitor files with an IMS subsystem.

Specify the monitor data set names and attributes in a similar way to IMS log data sets. See “Specifying log files for an IMS subsystem” on page 326 for details and the available line actions.

Monitor files are not involved in automated file selection.

Specifying OMEGAMON TRF files for an IMS subsystem

Use this panel to associate OMEGAMON TRF Extractor data sets with an IMS subsystem.

Specify the TRF data set names and attributes in a similar way to IMS log data sets. See “Specifying log files for an IMS subsystem” on page 326 for details and the available line actions.

TRF Extractor files are not involved in automated file selection.

Note: OMEGAMON TRF Collector records are in the IMS log and as such, the IMS log data sets are specified as normal on the log files panel.

Specifying OMEGAMON ATF journals for an IMS subsystem

Use this panel to associate OMEGAMON ATF journal data sets with an IMS subsystem.

Specify the ATF data set names and attributes in a similar way to IMS log data sets, except ATF journals must be cataloged data sets. See “Specifying log files for an IMS subsystem” on page 326 for details and the available line actions.

ATF journals are not involved in automated file selection.

Note: ATF journals can contain data from multiple systems in an IMSplex. The system name in the System Definition is not used for JCL generation.

Assigning the IMS subsystem to groups

A system can be assigned to one or more groups.

To assign the system to a group, enter line action **I** to insert a new row in the list of groups for this system. Select a predefined group or specify the name and description of a new group.

When you press the Prompt function key (F4) from the Group field in the list of Groups for an IMS Subsystem, a selection list is displayed.

Select Groups

Row 1 to 2 of 2

Command ==> _____ Scroll ==> PAGE

Select one or more Groups then press Exit.

Group	Description
— PRODPLEX	Production IMS Sysplex
— TESTPLEX	Test IMS Sysplex

***** End of list *****

Figure 274. System Definitions: Select Groups

This is a list of groups that are available for selection for the IMS subsystem. It only shows groups that have not already been specified for that subsystem. It is a subset of the groups maintained on the Groups panel.

Enter **/** or **S** to select one or more groups then press the Exit function key (F3) to complete your selection.

A group has the following attributes:

Group A Group name is an arbitrary name used to identify a group of related IMS subsystems for reporting purposes, such as systems belonging to a

sysplex. For example, specify a Group name of PRODPLEX to identify all IMS subsystems in your production IMS sysplex. Group names can be up to eight alphanumeric (A-Z,0-9) or special (@,#,\$) characters.

Description

Description is free format text up to 36 characters to describe the group of IMS subsystems. This is for your reference only.

Line actions

/	Display the menu of line actions
S	Select one or more groups from a list
I	Insert a row after this row to add a group
R	Repeat this row
C	Copy this row
M	Move this row
A	Move/Copy after this row
B	Move/Copy before this row
D	Delete this row

Primary commands

RESet This command (or RES) removes all pending line actions and deletes any blank rows. Reset is also available from **Edit** in the action bar.

SORT Group|Description

This command sorts the list of groups on the specified column. The default is Group. The order is retained on Exit.

You can also sort by selecting a point-and-shoot column heading.

Note: The Save command is not available from this panel. Changes are saved only on Save or the Exit function key (F3) from the System Definitions panel.

Related concepts:

Chapter 27, "Defining groups," on page 331

Option **5 Groups** allows you to group IMS and IMS Connect systems for reporting and analysis purposes. When processing a group, IMS Problem Investigator merges the log files from each system in the group.

Defining IMS Connect systems

You can explicitly define standalone IMS Connect systems or you can use the systems defined in a specified IMS Connect Extensions definitions repository. Only when IMS Connect systems are defined in a repository, are they available for automated journal file selection.

One way to ensure this is to select the systems from the IMS Connect Extensions definitions repository rather than specify them explicitly. To do this:

1. Specify the data set name of the default definitions repository in option **0.3 IMS Connect Extensions Settings**.
2. Add the system to a group (from option **5 Groups**) by selecting from the prompt list of predefined systems. For details, see "Putting systems in a group" on page 333.

To explicitly define an IMS Connect system (without first specifying a definitions repository):

1. From the Primary Option Menu, select option **4 Systems**.

2. Enter the primary command:

NEW systemname CONNECT

3. You can then define:

Repository

You can leave this blank for a stand-alone set of Connect journals or if the system is in the default IMS Connect Extensions definitions repository specified in your profile settings (option **0.3 IMS Connect Extensions Settings**). If the system is in a different repository, specify the data set name here.

IMS Connect Extensions journal files

These are ignored by automated journal file selection processing. Specifying them here is just an alternative way of organizing your logs: the processing options available are the same as option **1 Process**.

Groups

You can put the system in a group, but when the group is used for reporting, the explicitly specified journal file names will be ignored. Group reporting employs automated journal file selection using the system and journal data set definitions in the repository.

Related reference:

“IMS Connect Extensions Settings” on page 278

To process IMS Connect Extensions data, provide the log record code prefix of the IMS Connect event records and the data set name of the default IMS Connect Extensions definitions repository

Chapter 27. Defining groups

Option **5 Groups** allows you to group IMS and IMS Connect systems for reporting and analysis purposes. When processing a group, IMS Problem Investigator merges the log files from each system in the group.

When defining a group, give it a name and description:

Group A Group name is an arbitrary name used to identify a group of related IMS subsystems for reporting purposes, such as systems belonging to a sysplex. For example, specify a Group name of PRODPLEX to identify all IMS subsystems in your production IMS sysplex. Group names can be up to eight alphanumeric (A-Z,0-9) or special (@,#,\$) characters.

Description

0-36 characters.

A group can contain IMS subsystems, IMS Connect systems, or both. For each type of system in the group, a count and Yes/No indicators are displayed as follows:

IMS The following fields:

The number of IMS subsystems in the group.

Auto Indicates if all IMS subsystems in this group are eligible for DBRC log selection with RECON or MDA data sets specified.

Files Indicates that IMS subsystems in the group have log files explicitly defined in System Definitions.

Connect

The following fields:

Number of IMS Connect systems in the group.

Auto Indicates whether the IMS Connect systems in the group are in the definitions repository and are eligible for automated journal file selection.

Files Indicates that the IMS Connect systems in the group have journal data sets explicitly defined in System Definitions.

Line actions

/	Display the menu of line actions
J	Submit report, extract or CSV request.
S	Select to modify or review the IMS Subsystems in the Group
I	Insert a Group
R	Repeat this row
C	Copy this row
M	Move this row
A	Move/Copy after this row
B	Move/Copy before this row
D	Delete this row

Note: A row command on this panel applies to the Group and its associated information on the subordinate panels. That is, repeating a group row also repeats the IMS subsystems for that group.

Primary commands

NEW *name*

This command defines a new group. You can also select this from **File** in the action bar.

RESET This command (or RES) removes all pending line actions and deletes any blank rows. Reset is also available from **Edit** in the action bar.

SORT **Group** | **Description**

This command sorts the list of groups on the specified column. The default is Group. The order is retained on Exit.

You can also sort by selecting a point-and-shoot column heading.

SAVE Save all changes to groups.

Note: The SAVE command is available from the Groups panel, being the top in the hierarchy of panels. Pressing the Exit function key (F3) from a subordinate panel only temporarily retains changes. No changes are permanently saved until you enter SAVE or press the Exit function key (F3) from the top panel. Pressing the Cancel function key (F12) discards all unsaved changes on this and subordinate panels.

Related reference:

“Assigning the IMS subsystem to groups” on page 328
A system can be assigned to one or more groups.

Defining a group

You can assign both IMS subsystems and Connect systems to a group by editing an existing group or defining a new group.

- To define a new group, type NEW on the command line.
- To edit an existing group, enter line action S against a row on the Groups panel.

For each group, you can specify DBRC and JES2 options:

IMSPLEX

Specify the name of the IMSPlex.

DBRC Log Selection JCL is generated with the IMSPLEX parameter:

```
//ALZDBRC EXEC PGM=ALZDBRC,PARM='IMSPLEX=name'
```

The Group IMSPlex specification is used for reporting on a group of systems.

The System IMSPlex specification is used for reporting on a system, and is ignored when reporting on a group.

DBRCGRP

Specify the DBRC group ID defined in the RECON data set used by the DBRC group.

DBRC Log Selection JCL is generated with the DBRCGRP parameter:

```
//ALZDBRC EXEC PGM=ALZDBRC,PARM='IMSPLEX=name,DBRCGRP=grp'
```

Specify IMSPLEX and DBRCGRP as you would when using the Database Recovery Control utility (DSPURX00):

```
EXEC PGM=DSPURX00,PARM='IMSPLEX=plexname,DBRCGRP=xxx,READONLY'
```

The Group DBRCGRP specification is used for reporting on a group of systems.

The System DBRCGRP specification is used when reporting on a system, and is ignored when reporting on a group.

(DBRC) Node and SYSAFF

Specify JES2 Control Statement options to run DBRC Log Selection jobs on the system where the RECONs Log files are available.

Node is the network node where the job must execute, generating: /*XEQ Node and /*ROUTE PRINT Node.

SYSAFF is the system name to process the job, generating: /*JOBPARM SYSAFF=name.

(SLDS) Node and SYSAFF

Specify JES2 Control Statement options to run report jobs on the system where the SLDS Log files are available.

Node is the network node where the job must execute, generating: /*XEQ Node and /*ROUTE PRINT Node.

SYSAFF is the system name to process the job, generating: /*JOBPARM SYSAFF=name.

Note: The JES2 Control Statements will only be generated if they are specified using Primary Option Menu **0.1 IMS PI Settings**.

Related reference:

“ALZUAUTH: Request Authorization exit” on page 435

ALZUAUTH is the Request Authorization exit. Apply USERMOD ALZU002 (supplied in the SALZSAMP library) to install and activate the exit.

“IMS PI Settings” on page 273

You can adjust the settings to customize the IMS PI dialog and batch JCL for running reports and extracts. All required options have initial settings so you can start using IMS PI immediately.

Putting systems in a group

To specify the IMS subsystems and Connect systems that belong to the Group, enter the system in the System field or select one or more from a list of available systems.

To select from a list, position the cursor on the **System** field and press the Prompt function key (F4) or enter line action **S**.

Each system in the list has the following attributes:

System

Specify the IMS subsystem or Connect system identifier.

The order in which the systems are specified on the panel is not relevant to IMS Problem Investigator. You may list them in the order that is convenient for you.

Type Type of system. The associated system can be an IMS subsystem or a Connect system.

VRM VRM is the release of the IMS subsystem. The supported releases are 121, 131, and 141.

IMS Problem Investigator uses the **VRM** to perform release-dependent processing. **VRM** is only applicable to IMS subsystems.

Description

Description of the IMS subsystem for your reference only.

A group can contain IMS subsystems, IMS Connect systems, or both.

IMS For IMS systems in the group, the Yes and No indicators are set as follows:

Auto Yes indicates that the IMS system is eligible for DBRC Log Selection, that is, it has DBRC settings (RECON or MDA data sets) specified.

Files Yes indicates that the IMS system has explicitly-specified log files.

Connect

For IMS Connect systems in the group, the Yes and No indicators are set as follows:

Auto Yes indicates that the Connect system is eligible for automated journal file selection. That is, it is defined in the IMS Connect Extensions definitions repository with at least one journal.

Files Yes indicates that the Connect system has explicitly-specified journal data sets.

Note: Although an indicator is shown for explicitly specified files, they are not used for group reporting. Group reporting is only available using batch processing when automated file selection is used to locate the files covering the requested report interval.

Selecting systems

To assign a system to a group, you can select from a list of IMS subsystems and Connect systems. The selection list only shows those systems that have been predefined and are not already assigned to this group.

To select a system from a selection list, press the Prompt function key (F4) from the **System** field in the Group of Systems panel.

Enter **/** or **S** to select one or more Systems then press the Exit function key (F3) to complete your selection.

Chapter 28. Defining User Log records

IMS PI allows you to process IMS User Log records using the same formatting and navigation features available to system log records.

To process User Log records:

1. Register the User Log Code, used to identify User Log records in IMS log files that require special processing.
2. Create the Knowledge Module used to format the User Log record.

This topic explains how to prepare for User Log record processing.

Listing User Log codes

User Log codes are saved (registered) into the IMS PI Control Data Set (CDS). If you share the control data set with other users then you can also share User Log Code definitions.

Select option 7 **User Log** from the Primary Option Menu to display the list of User Log codes.

To define a new User Log code enter the NEW command.

```
File Menu Help
-----
User Log Codes                               Row 1 to 3 of 3
Command ==> NEW FA_____ Scroll ==> PAGE

Enter NEW to register a new User Log Code or select from the list to process.

/ Code Description
- A3   ACME Inc. Transaction Records
- FFFF ACME Inc. System Reports
- FF01 ACME Inc. Database Codes
***** Bottom of data *****
```

Figure 275. List of User Log Codes

Line actions

- / Display the selection list of valid line actions.
- S or E** Select the User Log Code to perform Knowledge Module maintenance.
- D** Delete User Log Code.

Primary commands

NEW code

Define a new User Log Code. The code must be a unique hexadecimal number in the range A0 to FF.

The Knowledge Module maintenance panel is displayed so you can continue your preparation for User Log record reporting.

RESet Clears all outstanding line actions.

FIND 'search string'

Find the next occurrence of a character string. Press F5 to repeat.

Related concepts:

Chapter 21, "Defining a Control Data Set (CDS)," on page 269

The Control Data Set (CDS) is a VSAM KSDS that is the repository for Filters, Object Lists, Forms, and User Log records. You can define your own personalized CDS or you can use a common CDS that allows you to share definitions with others.

Editing a User Log record definition

After you define a new IMS User Log Code, or select an existing code from the list, you are presented with the Knowledge Module maintenance panel.

Perform the following three steps to prepare the Knowledge Module:

1. Create the Knowledge Module assembler source code. IMS PI builds the initial source code by scanning the User Log record mapping DSECT.
2. Edit the source code to tailor the Knowledge Module field descriptions to suit your requirements.
3. Assemble and Link the Knowledge Module into the User Load Library.

User Log Code

Command ==> _____

User Log Code . . . : FA
Description User Log record type FA _____

Knowledge Module processing option:
— 1. Create source from Mapping Member
2. Edit source
3. Assemble and Link

User Log Record Data Set:
Macro Library . . 'ALZ.V2R4M0.SALZSAMP'
Mapping Member . . ALZUFA01 + _____

Knowledge Module Libraries:
Source 'IMSPI.USERSRC'
Load 'IMSPI.USERLOAD' _____

SYSLIB Macro Libraries:
1. 'ALZ.V2R4M0.SALZSAMP' _____
2. 'IMS.SDFSMACT' _____
3. 'SYS1.MACLIB' _____

Figure 276. Maintain User Log Code Knowledge Module

The Edit panel presents the following fields:

User Log Code

The IMS User Log record code must be in the A0-FF range. Avoid using the log code prefix used by IMS Connect Extensions or OMEGAMON TRF. You can also specify a subcode in the 00-FF range. All of the following are valid user log codes:

A1FF
F0
B211

Description

A brief description of the User Log code. IMS PI uses this description when browsing the log file in Formatted mode.

Knowledge Module processing option

To create the Knowledge Module for a new User Log code, perform the following three steps in sequence:

1. Create source from Mapping Member

IMS PI builds the initial source code by scanning the User Log record mapping DSECT as specified in the **Mapping Member**. The Knowledge Module assembler source code is presented in an edit session so that you can tailor the Knowledge Module to meet your reporting requirements. If IMS PI encounters a problem while interpreting the mapping macro then the edit session will include one or more error messages that will need to be resolved before processing can continue. IMS PI saves the Knowledge Module source code in the **Knowledge Module Source Library**.

2. Edit source

Edit the Knowledge Module source code. Use this option when you want to modify a Knowledge Module source that has already been created.

3. Assemble and Link

Edit JCL to assemble the Knowledge Module source code and link-edit it into the Knowledge Module Load Library. This is the **User Load Library** specified in your IMS PI Settings.

User Log Record Data Set

The User Log record mapping DSECT that is to be used to create the User Log record Knowledge Module source code. A sample is provided in member ALZUFA01 in the SALZSAMP library.

IMS PI supports MVS assembler macros that map the User Log record with a DSECT. If the record is mapped by another type of copybook, for example COBOL, then an assembler macro must be prepared first before generating a Knowledge Module.

Macro Library

The macro library that contains the mapping macro for the User Log record.

Mapping Member

The member name of the User Log code mapping macro. IMS PI scans the DSECT to extract log record field information to build the Knowledge Module source.

Knowledge Module Libraries

Source

The library where the Knowledge Module source is saved with member name ALZ`ccss` where `cc` is the User Log Code and `ss` is the optional subcode.

Load The load library where the executable Knowledge Module is saved.

SYSLIB Macro Libraries

The additional SYSLIB macro libraries required for the assembly of the Knowledge Module.

IMS PI includes these data sets in the assembly SYSLIB DD concatenation.

Initial settings:

1. ALZ.V2R4M0.SALZSAMP

IMS PI macro library, required for Knowledge Module macro ALZUKMF.

Note: Your cataloged SALZSAMP library will be substituted if detected.

2. IMS.SDFSMAC

IMS macro library, required if your User Log record uses IMS macros.

3. SYS1.MACLIB

MVS macro library, required for miscellaneous system macros, for example YREGS.

Note: The User Log Record Macro Library does not need to be specified as a SYSLIB macro library. IMS PI automatically includes it in the SYSLIB DD concatenation because it contains the User Log record mapping macro.

Related concepts:

“ALZUKMF macro: Define Knowledge Module fields” on page 340
Use the ALZUKMF macro to define fields in the Knowledge Module.

Related reference:

“IMS PI Settings” on page 273

You can adjust the settings to customize the IMS PI dialog and batch JCL for running reports and extracts. All required options have initial settings so you can start using IMS PI immediately.

“ALZUFA01: Map User Log fields” on page 436

Sample User Log record mapping DSECT.

Editing Knowledge Module assembler source

The Knowledge Module source generated by scanning the mapping DSECT often requires editing to resolve problems.

There may also be other reasons for changing the field definitions to meet your reporting requirements, such as:

- Field attributes are incomplete:
 - Variable length fields require a Field exit to calculate the field length.
 - Flag fields require that their bit settings are correctly specified.
- The record consists of more than one section or segment:
 - Additional sections in the log record that require their own addressability require a Base exit to resolve the base address.
 - Repeating sections (MULT=YES) require a special Base exit to ensure that all segments in the record are processed.
- The mapping DSECT includes fields not defined in the macro member:
 - The scanning process cannot detect when the mapping macro uses other macros or copybooks to define additional log record fields. To include these fields you will need to manually insert the missing field definitions.
- Customized processing:
 - You can change the format of reported field values or include additional information into the report, requiring changes to field definitions and Field exits.

- Insert informative comments to improve the presentation of the formatted log record.

Related concepts:

“Knowledge Module source”

IMS PI can generate Knowledge Module source and then assemble and link-edit the source to generate a Knowledge Module.

Assembling and linking a Knowledge Module

Sample JCL to assemble and link a Knowledge Module.

```
//IMSPI    JOB (ACCOUNT), 'NAME'
// *
//ASM      EXEC PGM=ASMA90,PARM='OBJECT,NODECK,RENT'
//SYSUT1   DD UNIT=SYSDA,SPACE=(CYL,(5,2))
//SYSLIB   DD DISP=SHR,DSN=ALZ.V2R4M0.SALZSAMP
//         DD DISP=SHR,DSN=IMS.SDFSMA
//         DD DISP=SHR,DSN=SYS1.MACLIB
//SYSIN    DD DISP=SHR,DSN=IMSPI.USERSRC(ALZFA)
//SYSLIN   DD DSN=&&OBJECT,DISP=(NEW,PASS),
//           SPACE=(CYL,(5)),UNIT=SYSDA,
//           RECFM=FB,LRECL=80,DSORG=PS
//SYSPRINT DD SYSOUT=*
// *
// IF ASM.RC EQ 0 THEN
//LINK      EXEC PGM=IEWL,PARM='LIST,NCAL,XREF,RENT'
//SYSUT1   DD UNIT=SYSDA,SPACE=(TRK,(5,2))
//SYSLMOD  DD DISP=SHR,DSN=IMSPI.USERLOAD(ALZFA)
//SYSPRINT DD SYSOUT=*
//SYSLIN   DD DISP=(SHR,DELETE),DSN=&&OBJECT
// ENDIF
```

Knowledge Modules reference

To use IMS PI to analyze your IMS user log records, you need to define a Knowledge Module. IMS PI assists in this task by generating the Knowledge Module source, but you might need to edit the generated source to support more complex record formats.

Defining and editing Knowledge Modules assumes the following understanding:

- The structure of the Knowledge Module source.
- The syntax of the ALZUKMF macro.
- How to code exit routines for Knowledge Modules.
- The tasks you need to perform when modifying Knowledge Module source.

Related reference:

“IMS user log data” on page 68

IMS PI can process user-defined IMS log records. However, you must first define the user log code and generate the corresponding Knowledge Module.

“ALZSAMP8: Select specified IMS user log records” on page 434

Sample JCL to report all type DE user log records. IMS user log records have log codes in the range A0 to FF.

Knowledge Module source

IMS PI can generate Knowledge Module source and then assemble and link-edit the source to generate a Knowledge Module.

The Knowledge Module source consists of:

Mapping macro

A copy of your original mapping macro. This DSECT maps all fields in your User Log record.

ALZUKMF invocations

ALZUKMF is an IMS PI macro that controls the formatting of log record fields.

Exit routines

Allow you to programmatically alter field attributes, including field lengths, location in record, formatting, and descriptions.

Related reference:

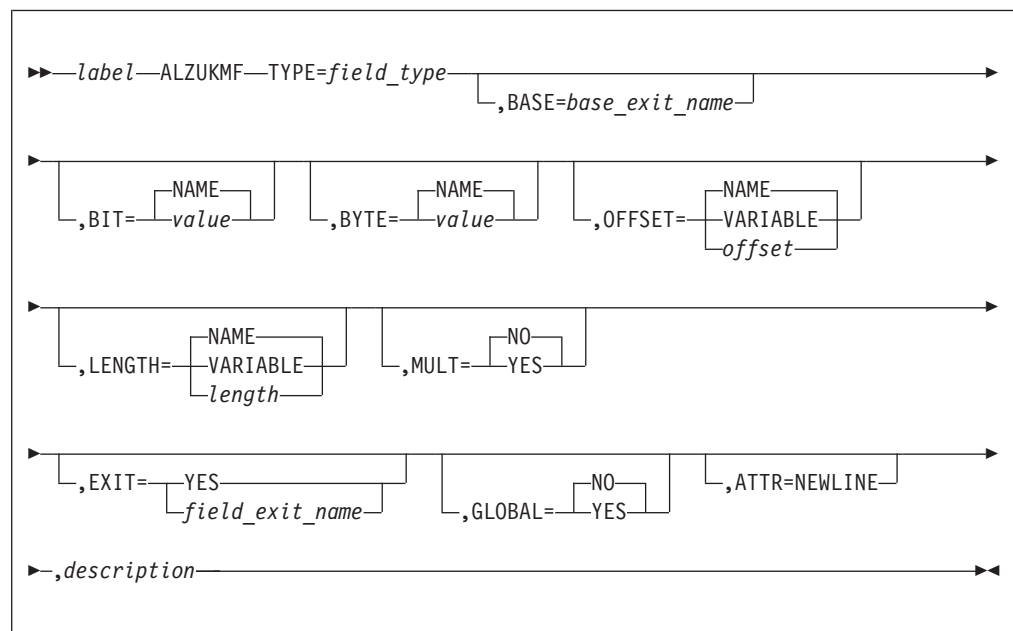
"Editing Knowledge Module assembler source" on page 338

The Knowledge Module source generated by scanning the mapping DSECT often requires editing to resolve problems.

ALZUKMF macro: Define Knowledge Module fields

Use the ALZUKMF macro to define fields in the Knowledge Module.

Syntax



Parameters

label

The name of the field as defined in the assembler mapping macro. This name is used to identify the field in the formatted report.

ATTR=

Specifies the field reporting attribute.

ATTR=NEWLINE

Specifies that the field is always reported at the start of a new line.

BASE=base_exit_name

Required for TYPE=SEGMENT only, specifies the name of the Base exit. If not specified, label is used as the *base_exit_name*. The Base exit has an entry point

of *BASE_base_exit_name* and establishes the base address of the segment and all the fields that follow in the segment. See “Base Exits” on page 344 for an explanation of how to code Base exits.

BIT=

Required for TYPE=BIT only, specifies the bit value of a Flag byte. The default is BIT=NAME requesting that the name field of the EQU instruction is used. BIT specifications must be preceded by a TYPE=FLAG field, for example:

```
FLAG1 DS X      - TYPE=FLAG
F1TRAN EQU X'80' - TYPE=BIT,BIT=NAME
F1TERM EQU X'40' - TYPE=BIT,BIT=NAME
```

BYTE=

Required for TYPE=BYTE only, specifies the whole byte value of a Flag byte. The default is BYTE=NAME requesting that the name field of the EQU instruction is used. BYTE specifications must be preceded by a TYPE=FLAG field, for example:

```
STATUS DS X      - TYPE=FLAG
OPEN EQU 1        - TYPE=BYTE,BYTE=NAME
ACTIVE EQU 2       - TYPE=BYTE,BYTE=NAME
CLOSED EQU 3       - TYPE=BYTE,BYTE=NAME
```

EXIT=YES or *label*

Specifies that the Field exit is to be invoked for each log record. Field exits can be used to change field attributes based on the current log record, for example a variable length field whose length can only be determined from the log record itself.

The Field exit has an entry point of *EXIT_label*. For EXIT=YES, the field name label is used. See “Field Exits” on page 346 for an explanation of how to code Field exits.

GLOBAL=NO or YES

Optional for the first TYPE=SEGMENT only. Specify GLOBAL=YES when the log record has a Global exit. Global exits are used to set the global field values, for example TRANCODE and USERID.

See “Global Exits” on page 348 for an explanation of how to code Global exits.

LENGTH=NAME or *length*

Specifies the length of the field. Specify LENGTH=NAME (the default) to request the implied length of the field from the DS instruction.

You can use a Field exit (EXIT=) to change the field length.

MULT=NO or YES

Optional for TYPE=SEGMENT fields only. Specifies whether the segment can be repeated multiple times in the record. The Base exit is invoked once for each repeating segment.

See “Base Exits” on page 344 for an explanation of how to code Base exits.

OFFSET=NAME or *offset*

Specifies the offset to the field from the start of its Segment. Specify OFFSET=NAME (the default) to request the offset calculated as the difference between the field and its segment location. The offset is used to calculate the address of the field in the record.

You can use a Field exit (EXIT=) to change the field address.

TYPE=*field_type*

Specifies the type of field and is used to determine how the field is processed and reported:

BIT Defines the field as a bit setting and must follow a TYPE=FLAG field, for example:

```
FLAG1 ALZUKMF TYPE=FLAG, 'Shutdown Status'
F1SHUT ALZUKMF TYPE=BIT, 'Normal Shutdown'
F1DUMP ALZUKMF TYPE=BIT, 'Shutdown was DUMPQ/PURGE'
F1STAE ALZUKMF TYPE=BIT, 'STAE Exit Termination'
F1RSTA ALZUKMF TYPE=BIT, 'Restart in Progress'
```

BYTE Defines the field as a byte value and must follow a TYPE=FLAG field, for example:

```
SFLAG1 ALZUKMF TYPE=FLAG, 'System Flag'
S1OS ALZUKMF TYPE=BYTE, 'System OS'
S1VSR ALZUKMF TYPE=BYTE, 'System VS and V=R'
S1VSV ALZUKMF TYPE=BYTE, 'System VS and V=Virtual'
```

CHAR Defines the field as a character string.

DSECT Generates the Field Definition DSECTs required by the Knowledge Module to support the field definitions and exits.

DUMP Defines the field as a long string to be reported in dump format.

EOF Indicates the end of the Field definitions.

FLAG Defines the field is a Flag byte. The TYPE=BIT or TYPE=BYTE fields that follow are associated with this flag, allowing the Flag to be broken down (using zoom) into its individual bit settings.

FLOAT Defines the field as a floating point number (4/8 bytes microseconds).

HEX Defines the field as a hexadecimal string.

INFO Inserts an informational comment (based on the specified description) into the formatted report. INFO field definitions do not relate to any field in the record.

INT Defines the field as an integer. The length of an integer cannot exceed 4 bytes.

MICRO Defines the field as a 4/8 byte microsecond value.

MICROT Defines the field as a tenths of a second value formatted to microseconds.

PACKD Defines the field as a packed decimal number.

PACKT Defines the field as a packed time value (8 byte microseconds).

RELMIC Defines the field as a relative microsecond value from 1 January 2000.

SEGMENT

Identifies the start of a new section or segment in the log record.

TYPE=SEGMENT must be the first field specified in the Knowledge Module to indicate the start of the record.

Each segment must have a Base exit to establish the address of the segment in the log record. See "Base Exits" on page 344 for an explanation of how to code Base exits.

All subsequent fields in the Segment are located by adding their offset to this address.

Each Segment definition must be paired with a TYPE=SEGMENTEND specification at the end of the fields for this segment to establish the segment boundary. Segments can be nested.

SEGMENTEND

Identifies the end of a section or segment in the log record.

STCK Defines the field as an 8-byte store-clock value. For STCK values that represent a date and time, the field value is reported in ISO date and time format. For small STCK values that represent an elapsed time, the field value is reported in ISO time format.

TU Defines the field as CPU timer units (8 bytes).

TIMEH Defines the field as time since midnight in hundredths of seconds.

TIMES Defines the field as time since midnight in seconds.

UTC Defines the field as aa081 coordinated universal time (UTC) field.

Related reference:

“Editing a User Log record definition” on page 336

After you define a new IMS User Log Code, or select an existing code from the list, you are presented with the Knowledge Module maintenance panel.

“ALZUKMF: Define User Knowledge Module fields” on page 439

ALZUKMF is used by IMS PI Knowledge Modules (and associated routines) to define fields in IMS log records. Each log record supported by IMS PI must have a Knowledge Module. Every field in the log record is defined using an ALZUKMF macro call.

ALZUKMF example

ALZUKMS is a sample Knowledge Module supplied in the SALZSAMP sample library. It shows multiple invocations of the ALZUKMF macro to perform field definitions.

```
DBTRACE  ALZUKMF TYPE=SEGMENT,
          GLOBAL=YES,'Database trace event'
LL        ALZUKMF TYPE=HEX,'Log Record length'
ZZ        ALZUKMF TYPE=HEX,'QSAM ZZ, always zero'
TYPE      ALZUKMF TYPE=FLAG,'Log record type'
TYPEFA    ALZUKMF TYPE=BIT,'Type FA'
SUBT      ALZUKMF TYPE=HEX,'Log record subtype'
SUBT01    ALZUKMF TYPE=BIT,'FF Database trace'
SUBT02    ALZUKMF TYPE=BIT,'FP Database trace'
FLAG1     ALZUKMF TYPE=FLAG,'Flag Byte 1'
FIMPP     ALZUKMF TYPE=BIT,'MPP'
F1BMP     ALZUKMF TYPE=BIT,'BMP'
F1IFP     ALZUKMF TYPE=BIT,'IFP'
TRANCD    ALZUKMF TYPE=CHAR,'Transaction Code'
DBENT     ALZUKMF TYPE=SEGMENT,MULT=YES,'Database entry'
DBNAME    ALZUKMF TYPE=CHAR,'Database name'
DBINTENT  ALZUKMF TYPE=FLAG,'Intent'
DBUPDATE  ALZUKMF TYPE=BYTE,'Database was updated'
DBREAD    ALZUKMF TYPE=BYTE,'Database was read only'
DBNONE    ALZUKMF TYPE=BYTE,'Database was not used'
UPDATES   EQU   DBUPDCNT
UPDATES   ALZUKMF TYPE=INT,'Update DLI call count'
GETS      EQU   DBGETCNT
GETS      ALZUKMF TYPE=INT,'Get DLI call count'
DBENT     ALZUKMF TYPE=SEGMENTEND
DBTRACE   ALZUKMF TYPE=SEGMENTEND
```

Related reference:

“ALZUKMS: Sample User Knowledge Module” on page 440

Sample IMS PI Knowledge Module for IMS user log record FA01. Use ALZUKMA to assemble and link.

Coding exit routines

Exit routines are used when the Knowledge Module requires special segment or field processing based on the contents of the current record.

There are three types of exits:

Base Exits

Used to calculate the starting address (base) of a segment.

Field Exits

Used when the field requires special processing.

Global Exits

Used when the record contains one or more global field values. For example, transaction code or database name.

Rules for coding exits

Rules for coding Knowledge Module exits.

1. All exits are invoked in AMODE 31 and problem program state, and must exit the same.
2. Return code (register 15) is preset upon entry to indicate that the segment (RC=8) or field (RC=4) does not exist and must always return a supported value otherwise IMS PI will fail.
3. Registers 3 to 14 must remain unchanged. Use the 32K work area (register 13) to save and restore the registers if necessary.

Performance considerations for Knowledge Modules

A Knowledge Module exit routine can affect the response time of the IMS Problem Investigator ISPF-based log browser and batch processing.

To improve performance:

- Keep the code path to a minimum
- Avoid using MVS services such as GETMAIN
- Use the allocated work area

Base Exits

Base Exits calculate the starting address (base) of a Segment. All segments (TYPE=SEGMENT) must have a base exit. Fields belonging to the segment are offset from the start of the segment.

The address of the field in the record is the Base address plus the field offset. A special Base Exit (MULT=YES) is required when the Segment can occur multiple times, one segment after another.

The Base Exit entry point label is "BASE_*segment-field-name*". At least one Base Exit is always required to identify the start of the log record.

Input registers

Knowledge Module Base Exits use the following input registers:

Register

Contents

- | | |
|---|--|
| 3 | Address of the log record. |
| 4 | Exit entry point BASE_ <i>segment-field-name</i> . |

- 5 Address of segment field descriptor control block mapped by DSECT FLDDEF.
- 6 Address of the parent segment if the segment is nested, otherwise zero.
- 13 32K work area.
- 14 Return address.
- 15 Return code initialized to 8, indicating the segment does not exist.

Output registers

Knowledge Module Base Exits use the following output registers:

Register

Contents

0 to 2 Can be used as work registers and need not be restored upon return.

3 to 14

Must remain unchanged.

15 Return code indicating how IMS PI is to process the segment:

RC	Meaning
----	---------

- | | |
|---|---|
| 0 | Segment exists in the log record and is to be reported. Register 1 points to the start of the segment. |
| 4 | Repeating segment (MULT=YES) exists in the log record and is to be reported. Register 1 points to the start of the segment. When the segment and all its fields have been reported, the base exit is re-invoked so that positioning can be set to the start of the next segment. RC=8 signifies that all segments have been processed. FDWPLACE is DSECT FLDDEF can be used as a place-holder for the current segment address, and FDWCOUNT as a counter of the number of segments remaining. |
| 8 | Segment does not exist or all repeating segments have been processed. IMS PI skips the segment and all its fields and proceeds to the next segment or end of record. |

All other return codes will cause unpredictable results.

Example 1: Single segment

In the following example, an Exit routine is coded against an invocation of ALZUKMF:

```

DBTRACE  ALZUKMF TYPE=SEGMENT,'Database trace event'
        . . .
        USING WorkArea,R13
        USING DBTRACE,R3
        USING FLDDEF,R5
        USING BASE_DBTRACE,R4
BASE_DBTRACE DS 0H
        LA    R1,DBTRACE
        SR    R15,R15
        BR    R14
        DROP  R3,R4,R5
        EJECT ,

```

Figure 277. Base Exit example

Example 2: Repeating segment

In the following example, an Exit routine for a recurring segment is coded:

```

DBTRACE  ALZUKMF TYPE=SEGMENT,MULT=YES,'Database entry'
        . . .
        USING DBTRACE,R3
        USING FLDDEF,R5
        USING BASE_DBENT,R4
BASE_DBENT DS 0H
        LM    R1,R2,FDWDATA
        LTR    R1,R1
        BNZ    BASE_DBENT_1
        LA    R1,DBENT1
        LA    R2,0
        B      BASE_DBENT_2
BASE_DBENT_1 DS 0H
        USING DBENT,R1
        LA    R1,DBENT+DBENTLEN
        DROP  R1
BASE_DBENT_2 DS 0H
        CL    R2,COUNT
        BNLR   R14
        LA    R2,1(R2)
        STM    R1,R2,FDWDATA
        SR    R15,R15
        BR    R14
        DROP  R3,R4,R5

```

Figure 278. Base Exit for recurring segment example

Field Exits

Field Exits are used when the field requires special processing based on the current record being reported.

Field Exits can change most field attributes by updating the field descriptor control block mapped by DSECT FLDDEF in macro ALZUKMF:

FDTYPE

Field type, used for example to change from hexadecimal to character.

FDADDR

Offset to the field in the log record, used when the field offset varies due to other factors in the record, for example preceding optional fields based on flag settings. Setting the top bit of FDADDR indicates that it contains the *address* of the target field rather than the *offset* to the target field (as shown in the Field Exit example in the following figure).

FDLENGTH

Field length, used for dump or other fields with variable length.

FDADDR with FD1EXTRN bit set

Field value external to the log record, used when the field value is difficult to interpret and can be better presented in an easy-to-understand format. Alternative values of length 8 bytes or less can be saved in FDADATA. For longer field values, use working storage (register 13), however in this case you must ensure that no two fields use overlapping the same storage.

FDADESC

Alternative field description, used when the field description can change due to other factors, for example a flag setting determines the contents of a character field.

The Field Exit entry point label is `EXIT_field-name`.

Input registers

Knowledge Module Field Exits use the following input registers:

Register

Contents

- 1 Address of owning Segment.
- 3 Address of the log record.
- 4 Exit entry point `EXIT_field-name`.
- 5 Address of the field descriptor control block mapped by DSECT FLDDEF.
- 13 32K work area.
- 14 Return address.
- 15 Return code initialized to 4, indicating the field does not exist.

Output registers

Knowledge Module Field Exits use the following output registers:

Register

Contents

- 0 to 2 Can be used as work registers and need not be restored upon return.
- 3 to 14 Must remain unchanged.
- 15 Return code indicating how IMS PI is to process the field:

RC Meaning

- 0 Field exists in the log record and is to be reported.
- 4 Field does not exist, skip it and go to the next field in the segment. This is useful when a field can have more than one purpose.
- 8 Field does not exist and the segment has ended, skip the remaining fields in the segment and go to the next segment. This is useful when a segment can sometimes end prematurely and needs to be truncated.

All other return codes will cause unpredictable results.

Example

In the following example, a Field Exit routine is coded against an invocation of ALZUKMF with TYPE=STCK. It shows how a new field, elapsed time, can be derived from start and stop time fields.

```
Elapsed  ALZUKMF TYPE=STCK,EXIT=YES,OFFSET=0,'Transaction elapsed time (STCK)'  
      . . .  
      USING DBTRACE,R3  
      USING FLDDEF,R5  
      USING EXIT_Elapsed,R4  
EXIT_Elapsed DS 0H  
      LG    R1,STOSTCK  
      LG    R2,STASTCK  
      SLGR  R1,R2  
      STG   R1,FDXDATA      Save value in target  
      LA    R0,FDXDATA      Address target field  
      ST    R0,FDADDR        Set address of target  
      OI    FDADDR,X'80'     Show content=address
```

Figure 279. Field Exit example

Global Exits

Global Exits are used when the record contains one or more global field values that you want to see in the formatted list of log records. For example, transaction code or database name.

A user log record can participate in tracking by setting one or more of the tracking fields. See “Transaction tracking” on page 20.

The Global Exit entry point label is GLOBAL_EXIT.

Input registers

Knowledge Module Global Exits use the following input registers:

Register

Contents

- 3 Address of the log record.
- 4 Exit entry point GLOBAL_EXIT.
- 5 Address of Global fields list mapped by DSECT ALZGF.
- 13 32K work area.
- 14 Return address.

Output registers

Knowledge Module Global Exits use the following output registers:

Register

Contents

- 0-2, 15 Can be used as work registers and need not be restored upon return.
- 3-14 Must remain unchanged.

Example

In the following example, Global fields are set against an invocation of a Segment with GLOBAL=YES. The fields TRANCD, USID, LTRM, and TERM from the mapping macro are set to populate Global variables.

```

        USING DBTRACE,R3          .R3=>Log Record
        USING ALZGF,R5            .R5=>KM Global Fields
        USING GLOBAL_EXIT,R4      .R4=>Entry Point
GLOBAL_EXIT DS 0H                 .Set Global Variables
*Set the following Global variables if available in the record
        MVC  GF_TRAN,TRANCD       .Transaction Code
*        MVC  GF_PROG,...          .Program (PSB) Name
        MVC  GF_USID,USID         .User ID
        MVC  GF_LTERM,LTRM        .Logical Terminal
        MVC  GF_TERM,TERM         .VTAM Node/APPC NetID/OTMA Tpipe
*        MVC  GF_DBASE,...         .Database Name
*        MVC  GF_RBA,...           .VSAM RBA or OSAM RBN
        MVC  GF_PST,PST           .PST (Region) ID
        MVC  GF_ORGID+0(8),IMSID   .Originating
        MVC  GF_ORGID+8(8),ORGUOWID .Tracking UOWID
        MVC  GF_IMSID,IMSID        .IMS System ID
        MVC  GF_RECTK+0(8),IMSID   .Recovery
        MVC  GF_RECTK+8(8),RECTOKEN .Token
*        MVC  GF_INFO,INFO         .User Information
*        MVC  GF_DESC,...          .Alternative description
        SR   R15,R15              .RC=0=Global Fields are set
        BR   R14                  .Return to caller
        DROP R3,R4,R5
```

Figure 280. Global Exit example

Part 5. Troubleshooting

This part provides message explanations and technical references to help you troubleshoot and diagnose IMS Problem Investigator problems.

Topics:

- Chapter 29, “Messages,” on page 353
- Chapter 30, “Gathering diagnostic information,” on page 383

Chapter 29. Messages

This topic describes the messages issued by IMS Problem Investigator.

Messages issued exclusively by the dialog (and that do not have a message number) are not listed here. Instead refer to the online help.

Message format

Each IMS PI batch processor message begins with a unique message identifier, followed by message text which may contain variable information to identify the particular circumstance that caused the message.

The message identifier has the format `ALZnnnnx` where:

- ALZ** The **program identifier** identifies the message as an IMS PI message. All IMS PI messages begin with ALZ.
- nnnn** The **message identification number** is a four-digit number that uniquely identifies each message.
- x** The **severity level** is a letter that indicates the return code (RC), the purpose of the message and the type of response required.

The severity levels, from least to most severe, are:

- I** Information. RC=00. For advisory purposes. Requires no action.
- W** Warning. RC=04. A possible error condition has occurred but processing continues. User should evaluate results. Action is required if results are not as expected.
- E** Error. RC=08. An error has occurred which requires action by the user. IMS PI stops processing.
- C** An internal IMS PI error. IMS PI immediately stops processing. Contact your IBM representative.

The **message text** provides concise information about an event or condition of interest to the user, and may include *variable information* to identify system components or to provide other detailed information about the specific circumstance which caused the message.

Message descriptions

The message descriptions provide an explanation of why the message was issued, what action was taken by the system, and what is the suggested user response.

IMS PI messages have the prefix ALZ and are described here in message number order in the following categories:

Message No.

Description

0001-0019

IMS PI batch reporting

0020-0049

Log record field processing - Filters and Forms

0050-0094

Knowledge Modules

0095-0099

Export/Import - Filters and Forms

0100-0199

Dialog Browse API

0200-0299

Command Input

0500-0599

Automated file selection

0700-0799

ALZEXEC REXX command processor

1000-1099

Dialog Browse API

3000-3099

Control Data Set

5000-5099

IMS Connect Journal File Selection

8000-8099

ALZEXEC REXX command processor; messages set in ALZ.MSG.

Related reading: IMS Problem Investigator messages can contain the text of messages with prefix:

FUN IMS Connect Extensions functional support message. Refer to the "Messages and Codes" in the *IMS Connect Extensions for z/OS: User's Guide*.

IPI IMS Connect Journal File Selection message. Refer to the "Messages" in the *IMS Performance Analyzer for z/OS: User's Guide*.

ALZ0001E SYSPRINT DD is missing

Explanation: SYSPRINT DD was not specified in the JCL. SYSPRINT contains the system messages and runtime event log.

System action: IMS PI immediately stops processing with RC=16. This message is issued by a WTO to the JOBLOG because no message output file is available.

User response: Specify SYSPRINT DD in the JCL then retry request.

Explanation: SYSIN DD was not specified in the JCL. SYSIN specifies commands for the Report and Extract requests.

System action: IMS PI immediately stops processing.

User response: Specify the SYSIN DD in the JCL with the required report request commands then retry request.

ALZ0003E OUTPUT ddname is missing from JCL; DDname=xxxxxxx

Explanation: The OUTPUT ddname was not specified in the JCL. The OUTPUT ddname is where report

ALZ0002E SYSIN DD is missing

output or extract data is written.

System action: IMS PI immediately stops processing.

User response: Specify the OUTPUT ddname in the JCL then retry request.

ALZ0004E A supported IMS VRM is not specified in EXEC PARM

Explanation: A supported release of IMS was not specified in the JCL EXEC PARM. IMS PI needs to know the version of IMS so that it can correctly interpret the log records.

System action: IMS PI immediately stops processing.

User response: Specify PARM='Vvrn' on your job EXEC statement. The following values are supported: V121, V131, and V141.

ALZ0005I Log File processing has started; DDname=xxxxxxx, Time=yyyy-mm-dd hh.mm.ss.thmiju, LSN=xxxxxxxxxxxxxxx

Explanation: The first Log record in the specified Log file data set has been read. Record processing does not commence until the Start time (if specified) is reached. The log record suffix (STCK time stamp and LSN) are formatted to help identify the start of this Log file.

System action: Processing continues.

User response: None required.

Related concepts:

"Viewing report output" on page 180
The formatted records are reported in time sequence. When reporting from merged files, the ddname identifies the source file.

ALZ0006I Record processing has started; Time=yyyy-mm-dd hh.mm.ss.thmiju, LSN=xxxxxxxxxxxxxxx

Explanation: The first Log record after the required start time has been read and is about to be processed. The log record suffix (STCK time stamp and LSN) are formatted to help identify the first record.

System action: Processing continues.

User response: None required.

ALZ0007I xxxxxx processing has ended; DDname=xxxxxxx, Record count=xxxxxxxxx

Explanation: Report or CSV processing to the specified output file ddname has completed. The Record count indicates the number of records reported.

System action: Processing continues.

User response: None required.

Related concepts:

"Viewing report output" on page 180
The formatted records are reported in time sequence. When reporting from merged files, the ddname identifies the source file.

ALZ0008I Extract processing has ended; DDname=xxxxxxx, Record count=xxxxxxxxx

Explanation: Extract processing to the specified output file ddname has completed. The Record count indicates the number of records written.

System action: Processing continues.

User response: None required.

ALZ0009I IMS PI processing has completed, RC=xx

Explanation: IMS PI has completed processing. The specified return code indicates how the job completed:

- 00** Processing completed successfully
- 04** Processing completed with some warnings
- 08** An unrecoverable error has prematurely stopped processing

System action: IMS PI completes processing.

User response: None required.

Related concepts:

"Viewing report output" on page 180
The formatted records are reported in time sequence. When reporting from merged files, the ddname identifies the source file.

ALZ0010W Report processing has reached page limit; DDname=xxxxxxx

Explanation: Report processing for the specified output data set ddname has reached its page limit. No more records will be written to this file. The PAGELIM command specifies the page limit, and if not specified, defaults to 10,000.

System action: Log file processing stops for this report. Other processing continues.

User response: Increase the PAGELIM specification to meet your requirements. The format of the command is PAGELIM(nnnnn).

ALZ0011E REXX exec not found; exec=exec_name

Explanation: REXX processing for the specified exec could not be done. The exec might not exist in the specified SYSEXEC concatenation.

System action: IMS PI processing terminates.

User response: Check that the name is correct and

that the REXX exec is in the SYSEXEC concatenation.

ALZ0012E REXX exec not processed;
exec=exec_name

Explanation: The REXX exec was not processed. Invalid arguments specified in the ARG parameter.

System action: IMS PI processing terminates.

User response: Check the name of the exec and that its arguments are correct.

ALZ0013E REXX environment could not be initialized

Explanation: The REXX environment ALZEXEC failed to initialize.

System action: IMS PI processing terminates.

User response: Contact IBM Software Support for help.

ALZ0014E SYSTSPRT DD missing

Explanation: REXX command is specified and the SYSTSPRT DD was not specified in the JCL.

System action: IMS PI processing terminates.

User response: Specify SYSTSPRT DD in the JCL then retry the request.

ALZ0015E Extract record length exceeds data set BLKSIZE; DDname=ddname, BLKSIZE=xxxxx, RecLen=xxxxx

Explanation: A log record to be extracted to the specified extract file has a record length exceeding the maximum allowed (4 less than BLKSIZE).

System action: IMS PI processing terminates.

User response: Increase the Extract data set BLKSIZE specification.

ALZ0016E DB2 active log file error; DDname=ddname, Service=xxxxxxx, Ret=xxxxxxx, Reas=xxxxxxx

Explanation: An error occurred processing the specified DB2 active log file. The service for processing VSAM linear data sets failed with a bad return and reason code.

System action: IMS PI processing terminates.

User response: Verify that the failing ddname refers to a valid DB2 active log file (VSAM linear data set). If the data set specification is correct, refer to the return and reason codes for the specified service to identify the cause of the problem.

ALZ0017E DB2 log record processing error; DDname=ddname, RBA=xxxxxxxxxxx, STCK=xxxxxxxxxxx

Explanation: An error occurred during reconstruction of a DB2 log record from the specified DB2 log file. The specified RBA and STCK values (located at the end of the 4K physical record in the DB2 log) uniquely identify the record being processed.

System action: IMS PI processing terminates.

User response: Verify that the failing ddname refers to a valid DB2 log (either active or archive). Use the DSN1LOGP utility to report and verify the contents of the DB2 log. Otherwise contact IBM Software Support for help.

ALZ0019E GETDSAB macro error; Ret=xx, Reas=xx

Explanation: IMS PI received a bad return code from the GETDSAB macro.

System action: IMS PI processing terminates.

User response: IMS PI error. Contact IBM Software Support for help.

ALZ0020E Field name is unknown; Code=xxxx; Name=xxxxxxx

Explanation: The specified Field name is not known for this Log Record Code.

System action: IMS PI immediately stops processing.

User response: Correct the Field name and retry your request. If you are using the IMS PI dialog to build a Filter, use the Prompt function key (F4) to select from the list of allowed Field names.

ALZ0021E Log Record Code is not supported; Code=xxxx

Explanation: The specified Log Record Code is not supported by IMS PI. IMS PI supports most IMS system record types, but does not support user defined log records. If the Log Record Code is unknown to IMS PI, requests that require field level interpretation cannot be honored:

- The record cannot be formatted, only dumped.
- Filter Conditions cannot specify field names, only offsets.
- A Form cannot be defined.

Some log record types require a subcode. For example, the Fast Path log record types have a code of 59 and subcode to further identify them. In this case, specifying 59 is insufficient and the subcode (for example, 5937) must be specified for IMS PI to accept it.

System action: Requests for Field level information

cause IMS PI to immediately stop processing. Other requests may continue. For example, Record formatting requests cause IMS PI to display the record in Dump format only.

User response: Ensure that you have specified the required log record code. If you are using the IMS PI dialog, use the Prompt function key (F4) in the Log Code field to select from the list of supported Log Codes.

ALZ0022E Offset is invalid; Offset=xx

Explanation: The specified record or field offset is invalid.

Log record offsets must be either:

- A decimal number in the range 1 to 32760. The offset is taken from the first byte of the log record and is relative to 1. For example, 5 represents the fifth byte of the record which is always the log record code.
- A hexadecimal number in the range X'00' to X'7FF7'. The offset is taken from the start of the log record and is relative to 0. For example, X'04' or X'0004' represents the fifth byte of the record which is always the log record code. The hexadecimal number represents the same offset as shown in assembler output for the log record macro.

Field offsets indicate an offset past the beginning of the specified log record field. The offset must be a decimal number in the range 1 to 32757 where (1) indicates the first byte of the field, and so on. For example:

TRANCODE(5) EQ 'IN'

will *match* PARTINQY but will *not match* PINQUIRY or ORDERPIN.

System action: IMS PI immediately stops processing.

User response: Specify a valid offset and retry the request.

ALZ0023E Comparison Operator is invalid; Operator=xx

Explanation: The specified Comparison Operator is invalid. Allowed operators are:

EQ	Equal to
NE	Not equal to
GT	Greater than
LT	Less than
GE	Greater than or equal to
LE	Less than or equal to

For Flag bit checking, allowed operators are:

ON	Bits are On
OFF	Bits are Off

System action: IMS PI immediately stops processing.

User response: Specify a valid Comparison Operator and retry your request.

ALZ0024E Character value end quote is missing; Value=xxxx

Explanation: The specified character value requires an end quote to identify the end of the string. This can be caused by truncation when the length of the specified value (including the enclosing quotes) exceeds the allowed maximum length.

System action: IMS PI immediately stops processing.

User response: Specify a quote at the end of the value ensuring that the maximum length of the value is not exceeded, and retry your request.

ALZ0025E Hexadecimal value is invalid; Value=xx

Explanation: The specified hexadecimal value is invalid. A hexadecimal string is specified as X'nn...nn' where nn is a hexadecimal number from 00 to FF.

System action: IMS PI immediately stops processing.

User response: Specify a correct hexadecimal value and retry your request.

ALZ0026E Numerical value is invalid; Value=xx

Explanation: The specified numerical value is invalid. Numbers must be in the range 0 to 99999999.

System action: IMS PI immediately stops processing.

User response: Specify a correct numerical value and retry your request. If the intention is for this value to be a character string that starts with a digit, then use quotes.

ALZ0027E Time stamp has invalid format (YYYY-MM-DD-hh.mm.ss.thmiju); TIME=date-time

Explanation: The specified time stamp is invalid. The time stamp format is YYYY-MM-DD-hh.mm.ss.thmiju. Date must be a valid calendar date and within the range allowed by your system. Time is optional and defaults to 00.00.00.000000. Time can also be abbreviated. For example, specify 2008-06-24-16.47 for 04.47 PM on June 24, 2008.

System action: IMS PI immediately stops processing.

User response: Correct the time stamp specification and retry your request.

ALZ0028E Log Record Code is invalid; Code=xxxx

Explanation: The specified Log Record Code is invalid. The code must be a one (code) or two (code and subcode) byte hexadecimal number. For example, 01 or 5937.

The log record code identifies the log record type and is always located at the start of the log record (after the 4 byte record descriptor word).

System action: IMS PI immediately stops processing.

User response: Correct the Code specification and retry your request.

**ALZ0029E Log Sequence Number is invalid;
LSN=xxxxxx**

Explanation: The specified Log Sequence Number is invalid. The LSN is an 8 byte hexadecimal number. For example, 00000000D451C28.

The Log Sequence Number is located at the end of every log record, and between cold starts of IMS, uniquely identifies the record.

System action: IMS PI immediately stops processing.

User response: Correct the LSN specification and retry your request.

**ALZ0030E VSAM RBA/OSAM RBN is invalid;
RBA=xx**

Explanation: The specified RBA is invalid. The RBA is a 4 byte hexadecimal number representing a VSAM RBA or OSAM RBN.

System action: IMS PI immediately stops processing.

User response: Correct the RBA specification and retry your request.

ALZ0031E PST (Region) ID is invalid; PST=xx

Explanation: The specified PST (Region) ID is invalid. The PST is a 2-byte hexadecimal number representing the Region PST ID.

System action: IMS PI immediately stops processing.

User response: Correct the PST specification and retry your request.

**ALZ0032E IMS Release not supported;
IMSREL=xxx**

Explanation: The specified IMS Release is not supported. IMS Problem Investigator supports IMS versions 9, 10, and 11.

System action: IMS PI immediately stops processing.

User response: Correct the IMS Release and retry your request.

ALZ0033E Originating Tracking UOW ID is invalid; ORGUOWID=xx

Explanation: The specified Originating Tracking Unit of Work ID is invalid. The format is *Originating IMS ID/time stamp token*. For example IMSA/B7ADFE54E81F3680.

In a sysplex where originating IMS ID is not known, specify **/time stamp token*.

System action: IMS PI immediately stops processing.

User response: Correct the Tracking UOW ID and retry your request.

**ALZ0034E Recovery Token is invalid;
RECTOKEN=xx**

Explanation: The specified Recovery Token is invalid. The format is *IMS ID/OASN+Commit Number*. For example, IMSA/0000002300000001.

System action: IMS PI immediately stops processing.

User response: Correct the Recovery Token and retry your request.

ALZ0036E Value not allowed; Field=xxxxxxxx

Explanation: You cannot set a value for the specified Field name because it is a Flag bit setting. For example, consider the following flag definition in the type 01 log record macro QLOGMSGP.

```
MSGFLAGS DS      X      MESSAGE FLAGS
MSGFFRST EQU    X'80'   FIRST RECORD OF MSG
```

To test for MSGFFRST, you can specify the following conditions:

```
COND MSGFLAGS ON X'80'
or
COND MSGFFRST ON
```

MSGFFRST cannot specify a value because its value is pre-determined by its definition, in this case X'80'.

System action: IMS PI immediately stops processing.

User response: Remove the Field value and retry your request.

**ALZ0037E Object List name is invalid;
Name=xxxxxxxx**

Explanation: The specified Object List name is invalid. The Object List name must be a valid 1 to 8 character member name.

System action: IMS PI immediately stops processing.

User response: Correct the Object List name and retry your request.

**ALZ0038E PORT number is invalid;
PORT=portnumber**

Explanation: The specified Port number is invalid. It must be a numeric value less than 65536.

System action: IMS PI immediately stops processing.

User response: Correct the Port number and retry your request.

**ALZ0039E Connect Logon Token is invalid;
LOGTOKEN=logtoken**

Explanation: The specified Connect Logon Token is invalid. The format is a time stamp token. For example, B7ADFE54E81F3680.

System action: IMS PI immediately stops processing.

User response: Correct the Connect Logon Token and retry your request.

**ALZ0040E Logical Unit of Work ID is invalid;
LUWID=luid**

Explanation: The specified logical unit of work ID is invalid. The format is: *Network ID/ LU name/ Unique value/ Commit count*. For example, NET1/DB2LUA/B7ADFE54E81F/0001.

System action: IMS PI immediately stops processing.

User response: Correct the logical unit of work ID and retry your request.

**ALZ0050E LOAD failed; Module=xxxxxxx
ABEND=xxxxxxx-xxxxxxx,
Reason=reason[, Type=log type]**

Explanation: The specified module could not be loaded into storage for any of the following reasons:

- Missing IMS PI Load Library module.
- Missing Knowledge Module for the type of log file.

System action: IMS PI immediately stops processing.

User response: If the ABEND Code is S806-04 and the module name has a prefix of ALZ, then verify that the correct STEPLIB or IMS PI Load Library has been specified.

If the ABEND Code is S806-04 and the module name has a prefix of DFS, then verify that the correct IMS RESLIB library has been specified.

If the ABEND Code is not S806-04, then an environmental error caused the LOAD SVC to fail. Look for associated system error messages or check the System Code for the failure reason. You may need to increase the REGION size of your job.

If you cannot correct the problem, then contact IBM Software Support.

**ALZ0051E Log Record formatting failed;
Code=xxxx LSN=xxxxxxx KM=xxxxxxx
Reason=xx Field=xxxxxxx**

Explanation: The log record with the specified Log Sequence Number could not be formatted. The specified Knowledge Module (KM) could not interpret the fields in the record for any of the following reasons:

- 01 The named field is beyond the end of the current record

- 02 The named field is before the start of the current record
- 03 KM has undefined Field type (Extraction)
- 04 Log record has more than 4096 fields
- 05 KM has undefined Field type (Formatting)
- 06 KM has undefined Field type (Zoom)

This error can occur when the format of the log record changes due to IMS maintenance.

System action: IMS PI does not format this log record. The record is reported in dump format only.

User response: Log record formats can change from IMS release to release, so ensure that you have specified the correct IMS release for this log file.

If you cannot resolve the problem, contact IBM Software Support.

**ALZ0052W Form cannot be used to format record;
Record Code=xxxx Form=xxxxxxx
Field=xxxxxxx**

Explanation: The specified Form cannot be used to format the log record for either of the following reasons:

- 01 The Form is not for this log record code
- 02 The log record Knowledge Module is not compatible with the Form.

System action: IMS PI immediately stops processing.

User response: Correct the Form specification and retry your request.

**ALZ0090E Virtual Storage obtain request failed,
RC=xx**

Explanation: IMS PI could not obtain Virtual Storage required for Log file processing. The STORAGE OBTAIN return code identifies the failure reason.

System action: Log file processing stops.

User response: Ensure that the TSO region size is sufficient to run IMS PI and other ISPF applications in parallel. About 10 megabytes is required for large log files, to keep I/O buffers and filtering and tracking information.

IMS PI must share the region with other ISPF applications running in split screen mode. Closing other sessions may alleviate the shortage of virtual storage. Otherwise increase the REGION size in your logon procedure or at logon time.

ALZ0095I *Type Name Action*

Explanation: Export/Import information message giving the type of data processed, the name and the action performed.

System action: Processing continues.

User response: Check that the required action was completed.

ALZ0096E **AMATERSE has returned an error**

Explanation: Export/Import has encountered an error response back from AMATERSE.

System action: Processing terminates.

User response: Check the messages in AMAPRINT to determine the error and required action.

ALZ0100E **Log record processing failed, RC=xx**

Explanation: IMS PI encountered a problem reading a log record from the Log file data set.

System action: Log file processing stops.

User response: Verify that the Log File has valid DCB attributes, specifically RECFM=VB.

If the DCB attributes are correct, then browse the data set using ISPF Browse. Scroll to the bottom of data to verify that all records are read successfully. Otherwise contact IBM Software Support.

ALZ0101E **PDS Member does not exist;
Name=xxxxxxx BLDL RC=xxxx-xxxx**

Explanation: The Log input file is a PDS but the specified member name does not exist. The BLDL return and reason codes indicate the failure reason.

System action: Log file processing stops.

User response: None required.

ALZ0102E **Log input file is not RECFM=VB;
DCBRCFM=xx**

Explanation: The Log input file does not have variable length records, or the data set has spanned records.

IMS PI only supports Log files with RECFM=VB. DCBRCFM is the unsupported RECFM from the DCB.

System action: Log file processing stops.

User response: Ensure that the specified Log input file is a valid IMS Log data set with RECFM=VB.

ALZ0103E **Log input file is empty**

Explanation: The Log input file is empty

System action: Log file processing stops.

User response: Ensure that the specified Log input file contains IMS Log records.

ALZ0104W **Attention Interrupt has stopped Log File processing**

Explanation: IMS PI has stopped reading the Log Input file because an Attention Interrupt was received.

System action: IMS PI stops reading the Log file and displays only data read to this point.

User response: Press Enter to resume Log Input file processing.

ALZ0105E **Log input file is not available. DDname
xxxxxxx allocation error; RDJFCB
RC=xx**

Explanation: The RDJFCB system service determined that the Log input file is not allocated to the specified ddname.

System action: Log file processing stops.

User response: Verify that the Log file data set name is specified correctly. The data set must reside on an online DASD volume. If the data set is cataloged, it must reside on the cataloged VOLSER. If the data set is not cataloged, it must reside on the specified VOLSER.

ALZ0106E **Log input file does not reside on the
specified volume; VOLSER=xxxxxxx;
OBTAIN RC=xx**

Explanation: The DADSM OBTAIN system service determined that the Log input file does not reside on the required volume, as indicated in the Catalog or the specified VOLSER.

System action: Log file processing stops.

User response: Verify that the Log file data set name is specified correctly. The data set must reside on an online DASD volume. If the data set is cataloged, it must reside on the cataloged VOLSER. If the data set is not cataloged, it must reside on the specified VOLSER.

ALZ0107E **Zone specification is invalid;
ZONE=xxxxxx**

Explanation: The specified time zone offset is invalid. Allowed values are LOCAL, GMT, +hhmm and -hhmm.

System action: IMS PI processing stops.

User response: Correct the ZONE specification and retry your request.

**ALZ0108E Log File Open request failed;
ABEND=xxxxxxx-xxxxxxx**

Explanation: The requested IMS log file could not be opened because the OPEN request failed. ABEND Code specifies the reason for the failure. The most common reason is that access was denied due to an authorization failure, which returns ABEND=ABENDS913.

System action: IMS PI processing stops.

User response: Check the OPEN SVC messages for the failure reason, correct the problem, and retry your request.

**ALZ0109E Log input file is not DSORG=PS;
DS1DSORG=xxxx**

Explanation: The Log input file does not have a Data Set Organization (DSORG) of PS. DS1DSORG is the unsupported DSORG from the DSCB.

System action: Log file processing stops.

User response: Ensure that the specified Log input file is a valid IMS Log data set with DSORG=PS.

**ALZ0110E SALZLINK Load Libraries are
mismatched; Starting=maint-level-system,
Profile=maint-level-specified. Go to option
0.1 IMS PI Settings.**

Explanation: Your IMS PI dialog session was started by a program that was loaded from a SALZLINK load library at the *Starting* level of maintenance. But this library does not match your *Profile* setting. IMS PI requires that your Starting and Profile SALZLINK libraries are the same data set. This ensures that the dialog uses only modules loaded from the same library, to avoid problems caused by incompatibility.

System action: Log file processing stops.

User response: Correct the IMS PI Load Library setting to specify the most recent IMS PI Load Library data set name. The IMS PI Load Library is specified in your IMS PI Settings (dialog option 0.1).

Related reference:

"Upgrading to IMS PI V2R4" on page 52
Upgrading to the next release of IMS PI should be simple and straightforward, but check this list of considerations.

ALZ0111E Unrecoverable logical IO error

Explanation: I/O processing for the log files failed due to an internal processing error. IMS PI keeps an in-storage index of the data it reads. Problems occur when data that is re-read from DASD does not match the index. The most common cause is when the contents of the log file has changed, possibly an OLDS that has been recycled.

System action: IMS PI processing stops.

User response: Retry your request. If I/O errors persist, contact IBM.

ALZ0112E Maximum record number exceeded

Explanation: The number of records in the result set reached the maximum 99,999,999 records before completion.

System action: IMS PI processing stops.

User response: Create a subset of the file using extract facilities or use time-slicing (line action W in the Process list).

**ALZ0115E CSI processing error: R15=nn
MODID=nn RETC=nn REAS=nn
DSN=xxxx**

Explanation: The Catalog Search Interface (CSI) failed while checking the attributes of a VSAM data set. The return and reason codes are those returned by the DFSMS IGGCSI00 service, and are documented in *z/OS DFSMS Managing Catalogs*. The only types of VSAM data set that are allowed are the OMEGAMON for IMS ATF journal and DB2 active log. It is likely that the specified VSAM data set was not one of these types, or the data set has a catalog problem. In the case of a catalog problem an accompanying IDC3009I message may have been issued to further explain the problem.

System action: The processing of the VSAM data set does not proceed.

User response: Ensure that the VSAM data set is a type that is supported.

ALZ0200E Command is invalid

Explanation: The specified input command is invalid. Valid commands are: START, STOP, ZONE, REPORT, EXTRACT, CSV, REXX and COND.

System action: IMS PI processing stops.

User response: Correct the command input then resubmit the job.

ALZ0202E CODE specification is invalid

Explanation: The CODE operand does not specify a valid 1 or 2 byte hexadecimal log record code (such as 07 or 5937) or ALL.

System action: IMS PI processing stops.

User response: Correct the command input then resubmit the job.

ALZ0203E Parentheses not paired

Explanation: The command input specified parentheses (brackets) that were not paired.

System action: IMS PI processing stops.

User response: Correct the command input then resubmit the job.

ALZ0204E Quotes not paired

Explanation: The command input specified a character or hexadecimal string in quotes that were not paired.

System action: IMS PI processing stops.

User response: Correct the command input then resubmit the job.

ALZ0205E Field name is not specified

Explanation: The Field name in the COND statement is not specified. COND requires a Field name, Comparison operator and Field value to be specified. For example:

```
COND TRANCODE EQ 'INQUIRY'
```

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0206E Comparison Operator is not specified

Explanation: The Comparison Operator in the COND statement is not specified.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0207E Field value is not specified

Explanation: The Field value in the COND statement is not specified.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0208E REPORT, EXTRACT or CSV command has invalid keyword

Explanation: The REPORT, EXTRACT or CSV command has an invalid keyword. Allowed keywords for REPORT, EXTRACT and CSV are OUTPUT and FILTER. Additional keywords for CSV are FORM, DELIMITER, and LABELS or NOLABELS.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0209E OUTPUT DDname is invalid

Explanation: The REPORT, EXTRACT or CSV command specified an invalid OUTPUT ddname. The ddname must be 1 to 8 characters long. For example: OUTPUT (LOGRPT)

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0210E FILTER or FORM name is invalid

Explanation: The REPORT, EXTRACT, CSV or REXX command specified an invalid Filter name, or the CODE command specified an invalid FORM name. The name must be 1 to 8 characters long. For example: FILTER(MYRECS) or FORM(MY01)

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

**ALZ0211E FILTER and FORM not allowed;
ALZCDS DD missing**

Explanation: FILTER or FORM cannot be specified because the Control Data Set (ddname ALZCDS) is not included in the JCL.

System action: IMS PI immediately stops processing.

User response: Either remove the FILTER or FORM specification or include the Control Data Set (ddname ALZCDS) in the JCL. The Control Data Set is specified on the Primary Option Menu.

ALZ0212E No REPORT, EXTRACT, CSV or REXX requests

Explanation: The SYSIN command input did not specify any REPORT, EXTRACT, CSV or REXX requests. At least one REPORT, EXTRACT, CSV or REXX request must be specified.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0213E DDname already used by another request; DDname=ddname

Explanation: The specified OUTPUT ddname for the REPORT or EXTRACT request cannot be used because a previous request has already reserved it. Each REPORT and EXTRACT request must specify a unique OUTPUT ddname.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0214E CODE must be preceded by a REPORT, EXTRACT, CSV or REXX request

Explanation: The CODE command must be preceded by a REPORT, EXTRACT, CSV or REXX request.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0215E CODE command has invalid keyword

Explanation: The CODE command has an invalid keyword. See "CODE command" on page 396 for details.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0217E COND must be preceded by a CODE command

Explanation: The COND command must be preceded by a CODE command. COND identifies a record filtering condition for the previously specified log record code. Multiple COND statements per CODE can be specified.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0219E FORM cannot be used for this CODE; Form Code=xxxx

Explanation: The specified Form cannot be used for this Log code because it was built using another log code.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0220E START time is after STOP time

Explanation: The START and STOP time stamps for an invalid reporting interval because the START time stamp is after the STOP time stamp.

System action: IMS PI immediately stops processing.

User response: Correct the time stamp specification and retry your request.

ALZ0221E TRACK must be preceded by a REPORT, EXTRACT or REXX request

Explanation: The TRACK command must be preceded by a REPORT, EXTRACT, or REXX request. TRACK specifies that Tracking is to be activated for this

REPORT, EXTRACT, or REXX request.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0222E CONNECT record code must be in the range A0 to FF

Explanation: The CONNECT command must specify either a hexadecimal record code in the range A0 to FF, or no record code, in which case all records in the A0 to FF range are treated as Connect records.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0223E FORMAT option is invalid

Explanation: The specified FORMAT option is not supported. Supported formatting options are: STD, FORM, DUMP, HEX0, and HEX1.

System action: IMS PI immediately stops processing.

User response: Correct the command input then resubmit the job.

ALZ0224E More than one REXX command or a REXX command and REPORT or EXTRACT not allowed

Explanation: REXX requests and EXTRACT and REPORT requests are mutually exclusive. Also only one REXX request is allowed at a time.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0225E REXX command has invalid keyword

Explanation: The REXX command has an invalid keyword. Allowed keywords are FILTER, EXEC, and ARG.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0226E EXEC name is invalid

Explanation: The REXX command specified an invalid exec name. The exec must be 1 - 8 characters long. For example, EXEC(ALZTRANS) is a valid exec name.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0227E ARG name is invalid

Explanation: The REXX command specified an invalid argument. If the argument contains blanks it must be enclosed in quotes. For example:

ARG('P1 P2 P3')

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0228E Level value must be 3 digits and in the range 1 to 255

Explanation: The Level value must specify between 1 to 255. The Level value must be 3 digits.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0229E ZONE command has invalid keyword

Explanation: The ZONE command has an invalid keyword. See "ZONE command" on page 407 for the command format and allowed keywords.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0230E Option is not allowed for LSO

Explanation: The LSO command has no option to specify. The only allowed keyword is LSO.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0231E ELAPSED command has invalid keyword

Explanation: The ELAPSED command has an invalid keyword. The only allowed keywords are MICRO or NANO

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0232E IMPORT command with another command

Explanation: The IMPORT command cannot appear with any other command. Only one IMPORT command is allowed.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0233E IMPORT command has invalid keyword

Explanation: The IMPORT command has an invalid keyword. The only allowed keywords are REPLACE or NOREPLACE.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0234E EXPORT command with another command

Explanation: The EXPORT command cannot appear with any other command. Only one EXPORT command is allowed.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0235E FILTER, as a separate command, must appear with EXPORT command

Explanation: FILTER, as a separate line command, must appear with an EXPORT command.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0236E FORM, as a separate command, must appear with EXPORT command

Explanation: FORM, as a separate line command, must appear with an EXPORT command.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0237E OBJECTLIST, as a separate command, must appear with EXPORT command

Explanation: OBJECTLIST, as a separate line command, must appear with an EXPORT command.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0238E FORM must be provided for CSV command

Explanation: FORM must be completed for a CSV command. The Form describes the format of the CSV output record.

System action: IMS PI immediately stops processing.

User response: Correct the command input and then resubmit the job.

ALZ0500I Input file selection processing completed, RC=xx

Explanation: IMS PI has completed automated file selection processing, and issues the following return codes:

00	Processing completed successfully
04	Processing completed, warning message issued
08	Processing failed, error message issued
16	Operand specification error

System action: If the return code is 0 or 4, automated file selection completed successfully, and the IMS PI report JCL has been submitted. If the return code is 8 or 16, automated file selection has failed. Previous error messages explain the reason for the error.

User response: None required. If the return code is 8 or 16, respond to the previous message.

ALZ0501E FROM operand not specified

Explanation: The automated file selection utility FROM time operand was not specified, but is required.

System action: Automated file selection processing terminates.

User response: Ensure the FROM operand is specified in the command input, then resubmit the job.

ALZ0502E TO operand not specified

Explanation: The automated file selection utility TO time operand was not specified, but is required.

System action: Automated file selection processing terminates.

User response: Ensure the TO operand is specified in the command input, then resubmit the job.

ALZ0503E Duplicate IMS subsystem ID specified, IMSID=ssss

Explanation: The automated file selection utility detected an IMSID operand with a duplicate subsystem ID. A subsystem ID can only be specified once in the input.

System action: Automated file selection processing terminates.

User response: Correct the duplicated subsystem ID specification, then resubmit the job.

ALZ0504E Operand specified at column xx is invalid, "yyyyyyyyyy"

Explanation: The automated file selection utility encountered an invalid operand starting at column xx. yyyyyyyyyy is the first 8 characters of the invalid operand.

System action: Automated file selection processing terminates.

User response: Remove or correct the invalid operand, then resubmit the job.

ALZ0505E IMSID operand has invalid character at column xx

Explanation: The automated file selection utility encountered an invalid character in the IMSID operand specification starting at column xx.

System action: Automated file selection processing terminates.

User response: Correct the IMSID specification, then resubmit the job.

ALZ0506E xxxxxxxx operand has invalid syntax

Explanation: The automated file selection utility detected that the specified operand had a syntax error.

System action: Automated file selection processing terminates.

User response: Correct the syntax error, then resubmit the job.

ALZ0507E Date specified in xxxxxxxx operand invalid, RSN=nnn

Explanation: The automated file selection utility has found an invalid date specified in the xxxxxxxx operand, and issues one of the following reason codes:

001	Date specification is wrong length
002	Year specification is zero or wrong length
003	Julian day specification is zero or wrong length
004	Hour specification is zero or wrong length
005	Minute specification is invalid
006	Second specification is zero or wrong length
007	Fraction of second specification is wrong length
008	Month is not between one (1) and twelve (12)
009	Day specification is zero or wrong length
010	Relative date exceeded 9999 days

System action: Automated file selection processing terminates.

User response: Correct the date specification, then resubmit the job.

ALZ0508E IMSID operand not specified

Explanation: The automated file selection utility requires at least one IMSID operand to be specified.

System action: Automated file selection processing terminates.

User response: Specify the IMS subsystem name in the IMSID operand, then resubmit the job.

ALZ0509E Start time of first SLDS not found in RECON data set, SSID=xxxxxxx

Explanation: The automated file selection utility processing could not determine the start time of the first SLDS record. The DBRC API failed to return the start time. The message can be issued for the following reasons:

- There are no SLDS records in the RECON data sets.
- There is a problem with the RECON data sets.
- There is a problem with DBRC.

System action: Automated file selection processing terminates.

User response: Verify that the RECON data sets contain SLDS records for the requested IMS subsystem. Otherwise, contact your IBM representative for help.

ALZ0510E End time of first SLDS not found in RECON data set, SSID=xxxxxxx

Explanation: The automated file selection utility processing could not determine the end time of the first SLDS record. The DBRC API failed to return the start time. The message can be issued for the following reasons:

- There are no SLDS records in the RECON data sets.
- There is a problem with the RECON data sets.
- There is a problem with DBRC.

System action: Automated file selection processing terminates.

User response: Verify that the RECON data sets contain SLDS records for the requested IMS subsystem. Otherwise, contact your IBM representative for help.

ALZ0511E Start time of last SLDS not found in RECON data set, SSID=xxxxxxx

Explanation: The automated file selection utility processing could not determine the start time of the last SLDS record. The DBRC API failed to return the start time. The message can be issued for the following reasons:

- There are no SLDS records in the RECON data sets.
- There is a problem with the RECON data sets.
- There is a problem with DBRC.

System action: Automated file selection processing terminates.

User response: Verify that the RECON data sets contain SLDS records for the requested IMS subsystem. Otherwise, contact your IBM representative for help.

ALZ0512E End time of last SLDS not found in RECON data set, SSID=xxxxxxx

Explanation: The automated file selection utility processing could not determine the end time of the last SLDS record. The DBRC API failed to return the start time. The message can be issued for the following reasons:

- There are no SLDS records in the RECON data sets.
- There is a problem with the RECON data sets.
- There is a problem with DBRC.

System action: Automated file selection processing terminates.

User response: Verify that the RECON data sets contain SLDS records for the requested IMS subsystem. Otherwise, contact your IBM representative for help.

ALZ0513E No Log files for the required time range are available, SSID=xxxxxxx

Explanation: The automated file selection utility detected that there were no SLDS records in the RECON data set within the specified time range for the subsystem.

System action: Automated file selection processing terminates.

User response: Correct the reporting time range, then resubmit the job.

ALZ0514W Log files not available for the complete time range, report period truncated, SSID=xxxxxxx

Explanation: The automated file selection utility detected that the SLDS records in the RECON data set for the subsystem only partially cover the required date range. The report interval is truncated.

System action: Automated file selection processing continues.

User response: If reporting is required for the entire date/time range, ensure that SLDS records for that range are available in the RECON data set, then resubmit the job.

ALZ0515E DBRC Utility (DSPURX00) failed to return the LOG variable

Explanation: The DBRC routine did not return the LOG variable in the skeleton.

System action: Automated file selection processing terminates.

User response: Automated file selection utility error.

Contact your IBM representative for help.

ALZ0516E DBRC Utility (DSPURX00) ATTACH error, RC=xx

Explanation: The automated file selection utility received a bad return code from the ATTACH macro.

System action: Automated file selection processing terminates.

User response: Automated file selection utility error. Contact your IBM representative for help.

ALZ0517E RDJFCB error for DDname dddddd, RC=xx

Explanation: The automated file selection utility received a bad return code from the RDJFCB macro for ddname dddddd.

System action: Automated file selection processing terminates.

User response: Automated file selection utility error. Contact your IBM representative for help.

ALZ0518E DDname xxxxxxxx not specified in JCL

Explanation: The automated file selection utility ddname xxxxxxxx was not specified in the JCL, but is required.

System action: Automated file selection processing terminates.

User response: Ensure the ddname xxxxxxxx is specified in the JCL, then resubmit the job.

ALZ0519E DBRC Utility (DSPURX00) Skeleton generation failed, LOG FROM time expected

Explanation: The automated file selection utility has found output from the DBRC routine in the wrong sequence or missing.

System action: Automated file selection processing terminates.

User response: Automated file selection utility error. Contact your IBM representative for help.

ALZ0520E DBRC Utility (DSPURX00) Skeleton generation failed, LOG TO time expected

Explanation: The automated file selection utility has found output from DBRC in the wrong sequence or missing.

System action: Automated file selection processing terminates.

User response: Automated file selection utility error.

Contact your IBM representative for help.

ALZ0521E DBRC Utility (DSPURX00) has failed, RC=xx

Explanation: The DBRC routine has failed to return SLDS information to the automated file selection utility. The SYSPRINT output file contains run information, including DBRC error messages to further explain the problem.

System action: Automated file selection processing terminates.

User response: Check the output from DBRC routine in the SYSPRINT output file. If you cannot resolve the problem, contact your IBM representative for help.

ALZ0522S DBRC Utility (DSPURX00) has abended, CODE=xxxx

Explanation: The automated file selection utility has detected an abend in the DBRC routine. The SYSPRINT output file contains run information, including DBRC error messages to further explain the problem.

System action: IMS PI processing terminates.

User response: Check the output from DBRC routine in the SYSPRINT output file. If the abend code is S806, check the specified RESLIB and that the DBRC API is available in the RESLIB. If you cannot resolve the problem, contact your IBM representative for help.

ALZ0523E OPEN failed for DDname xxxxxxxx, RC=xx

Explanation: The automated file selection utility received a bad return code from the OPEN SVC when opening the specified ddname.

System action: Automated file selection processing terminates.

User response: Automated file selection utility error. Contact your IBM representative for help.

ALZ0524E IMSID operand exceeds maximum length (4)

Explanation: The automated file selection utility has detected that the IMS subsystem ID specification in the IMSID operand is longer than the maximum of four characters.

System action: Automated file selection processing terminates.

User response: Correct the IMSID operand, then resubmit the job.

ALZ0525E TO time is not greater than FROM time

Explanation: The automated file selection utility has detected that the TO time specified is not greater than the FROM time.

System action: Automated file selection processing terminates.

User response: Correct the FROM and TO times, then resubmit the job.

ALZ0526E IMS release xxx is not supported

Explanation: The automated file selection utility has detected an unsupported release of IMS specified in the VRM operand. IMS PI supports IMS releases of 121 and higher.

System action: Automated file selection processing terminates.

User response: Correct the VRM operand, then resubmit the job.

ALZ0527E Date format is invalid

Explanation: The automated file selection utility encountered a date that did not adhere to the required format. Date must be a valid calendar date in the format yyyy-mm-dd, or a relative date such as 0, -1, -2 representing today, yesterday, and so on.

System action: Automated file selection processing terminates.

User response: Correct the date format, then resubmit the job.

ALZ0528E Dynamic Allocation failed, DDname dddddd, SSID=sssssss, RC=xx/EC=eeee/IC=iiii

Explanation: The automated file selection utility has failed to allocate the specified ddname. The error and information codes explain the cause of the problem.

System action: Automated file selection processing terminates.

User response: If you cannot correct the problem, then contact your IBM representative for help.

ALZ0529E RECON specification error; RECON1 and RECON2 is the minimum specification

Explanation: The automated file selection utility detected an error in the RECON data set specification. The DBRC routine requires at least two RECON data sets to be specified. At least RECON1 and RECON2 must be specified.

System action: Automated file selection processing terminates.

User response: Specify at least two RECON data sets, then resubmit the job.

ALZ0530E BLDL failed for xxxx MDA Members, RC=xx/Reas=yy

Explanation: The automated file selection utility received a bad return code from the BLDL macro.

System action: Automated file selection processing terminates.

User response: Automated file selection utility error. Contact your IBM representative for help.

ALZ0531E LOAD failed for xxxx MDA member mmmmmmmmm, ABEND=aaaa-rr

Explanation: The automated file selection utility failed to load an MDA member. The ABEND code explains the reason for the failure. This abend code could indicate:

- The job region size is too small
- MDA member has an I/O error

System action: Automated file selection processing terminates.

User response: Check the abend code, and if possible, correct the problem. Otherwise, contact your IBM representative for help.

ALZ0532E xxxx RECON MDA member mmmmmmmmm has invalid format

Explanation: The automated file selection utility detected the MDA member for the specified RECON is not in MDA format.

System action: Automated file selection processing terminates.

User response: Verify that RECON MDA member has been generated correctly. Otherwise, contact your IBM representative for help.

ALZ0533E Specified xxxx RECON data sets do not exactly match RECON MDA members

Explanation: The automated file selection utility detected that the explicitly specified RECON data sets do not exactly match the RECON MDA members. When the RECON data sets are explicitly specified, the automated file selection utility also checks the RECON MDA members. If at least one RECON MDA member is detected, then the specified RECON data set names must exactly match the RECON MDA members. This ensures that the DBRC RECON data sets are not corrupted by the DBRC API routine DSPAPI00.

System action: Automated file selection processing terminates.

User response: Correct the RECON data sets

specification, then resubmit the job.

ALZ0534E Operand xxxxxxxx specified more than once

Explanation: The automated file selection utility detected that the specified operand was duplicated for the subsystem. Each operand can only be specified once per subsystem.

System action: Automated file selection processing terminates.

User response: Correct the duplicated operand specification, then resubmit the job.

ALZ0536E Data set name is longer than 44 characters

Explanation: The automated file selection utility has detected a data set name longer than 44 characters.

System action: Automated file selection processing terminates.

User response: Correct the data set name specification, then resubmit the job.

ALZ0537E IMS subsystem ssss has no VRM operand

Explanation: The automated file selection utility requires that each IMS subsystem has a VRM operand to specify the release of the subsystem, or that it can be determined from the RESLIB using DFSVC000.

System action: Automated file selection processing terminates.

User response: Ensure each IMS subsystem has a VRM operand specified, then resubmit the job.

**ALZ0539E Dynamic Deallocation failed,
DDname=ddddddd, SSID=sssssss,
RC=xx/EC=eeee/IC=iiii**

Explanation: The automated file selection utility has failed to deallocate the specified ddname. The error and information codes explain the cause of the problem.

System action: Automated file selection processing terminates.

User response: If you cannot correct the problem, then contact your IBM representative for help.

**ALZ0540E LOCATE failed for xxxx Log data set,
RC=xx/DSN=ddddddd**

Explanation: The automated file selection utility could not locate the catalog entry for the specified Log data set.

IMS PI requires the device type (UNIT) information of each Log data set when using shared queue merge

processing. IMS PI uses the catalog when UNIT information is not available in the RECON.

System action: Automated file selection processing terminates.

User response: Either catalog the Log data set or use DBRC utilities to update UNIT and VOLSER information in the RECON.

ALZ0541W xxxx Log data set UNIT information is incomplete, DSN=ddddddd

Explanation: The automated file selection utility has detected that the specified Log data set has VOLSER information in the RECON, but UNIT information was not available.

System action: Automated file selection processing terminates.

User response: Use DBRC utilities to update the UNIT information in the RECON.

ALZ0542E xxxx Log data set has unsupported UNIT type, DSN=datasetname

Explanation: The automated file selection utility has detected that the specified Log data set is not eligible as it is not defined as either a TAPE or DASD device on this processor.

System action: Automated file selection processing terminates.

User response: Move the log data set to an eligible device or exclude the log data set.

**ALZ0543E xxxx LOG data set is not cataloged,
DSN=ddddddd**

Explanation: The automated file selection utility failed to locate the catalog entry for the specified Log data set. IMS PI requires the UNIT information from the catalog if this information is not available from the RECON.

System action: Automated file selection processing terminates.

User response: Either catalog the LOG data set or use DBRC utilities to update unit information in your RECON data set.

ALZ0544E xxxx Log data set has more than 255 volumes, DSN=ddddddd

Explanation: The automated file selection utility has detected that the specified Log data set has more than 255 volumes. IMS PI does not support more than 255 volumes per Log data set.

System action: Automated file selection processing terminates.

User response: The automated file selection utility cannot be used for this Log file.

ALZ0545E No input files were eligible for processing

Explanation: The automated file selection utility has found no SLDS log data sets or IMS Connect Extensions journal data sets to process for one of the following reasons:

- No IMS subsystems were specified.
- No Log data sets are available for the specified time period.
- DBRC failed to return Log data set information from the RECON.
- The IMS Connect Extensions definitions repository contained no eligible journals.

A previous message will explain the reason for the error.

System action: Automated file selection processing terminates.

User response: Correct the problem, then resubmit the job.

ALZ0546E ALZSMQW1 Merge Work File DD statement not found in Report JCL skeleton

Explanation: The IMS Problem Investigator automated file selection utility could not find the ALZSMQW1 DD statement in the Report JCL skeleton.

IMS Problem Investigator requires merge work files for shared queue processing. When insufficient tape units are available to concurrently process the log input from all subsystems, IMS Problem Investigator requires merge work files.

System action: IMS Problem Investigator automated file selection processing terminates.

User response: Specify ALZSMQW1 DD statement in the Report JCL skeleton, then resubmit the job.

ALZ0547I DBRC Utility (DSPURX00) completed, RC=xx, SSID=sssssss, FROM=ffffff, TO=tttttt

Explanation: The automated file selection utility has successfully invoked the DBRC API routine DSPAPI00. When RC=0, DBRC has returned SLDS entries for the specified time range. When RC=4, DBRC could not find any SLDS entries for the specified time range. In this case, IMS PI will re-invoke DBRC with a modified time range to retrieve the first required SLDS entry.

System action: Automated file selection processing continues.

User response: None required if RC=0 or 4. When

RC=12, check that the RECON data set is at the same IMS level as the library that contains the DBRC routine (usually specified by the RESLIB parameter).

ALZ0548I Report JCL has been submitted, Jobname=jjjjjjj, Jobno.=nnnn

Explanation: The automated file selection utility has submitted the JCL. The job name and job number are specified.

System action: Automated file selection processing continues.

User response: None required.

ALZ0549E CAT operand must be YES or NO

Explanation: The automated file selection utility detected that the CAT operand was not specified as YES (SLDS data sets are cataloged) or NO (SLDS data sets are not cataloged).

System action: Automated file selection processing terminates.

User response: Correct the CAT operand, then resubmit the job. The dialog generates this operand from **Log Data Sets are Cataloged** on the Log Input - IMS Subsystem panel.

ALZ0550E SSID operand exceeds maximum length (8)

Explanation: The SSID operand is longer than the maximum allowed.

System action: Automated file selection processing terminates.

User response: Correct the SSID operand, then resubmit the job.

ALZ0551E SSID operand has invalid character at column cc

Explanation: The SSID operand contains invalid characters.

System action: Automated file selection processing terminates.

User response: Correct the SSID operand, then resubmit the job.

ALZ0552E SLDS operand must be SEC or PRI

Explanation: The automated file selection utility SLDS operand was incorrectly specified.

System action: Automated file selection processing terminates.

User response: Ensure the OLDS operand is specified as SEC or PRI, then resubmit the job.

ALZ0553E **More than 1035 log files required for
SSID=ssssssss**

Explanation: The FROM and TO date range selected has resulted in the selection of more than the maximum allowed number of log data sets for this subsystem.

System action: Automated file selection processing terminates.

User response: Reduce the FROM, TO time range, then resubmit the job.

ALZ0555E **xxxxxxx VOLSER name is too long.
DSN=datasetname, VOLSER=vvvvvvvvvv**

Explanation: The VOLSER specified for the data set is greater than 6 characters.

System action: Automated file selection processing terminates.

User response: Automated file selection utility error. Contact IBM Software Support for help.

ALZ0556I **IMS DBRC API module DSPAPI00 not
found**

Explanation: The DBRC API module DSPAPI00 was not found in the RESLIB specified. If RESLIB was not specified, then the DSPAPI00 module was not found in the STEPLIB or JOBLIB concatenation. Message ALZ0558I follows.

System action: Automated file selection processing continues.

User response: None required.

ALZ0557I **The RECON data set has not been
upgraded, SSID=ssssssss**

Explanation: The RECON data sets have not been upgraded to the format required by the IMS version specified by the RESLIB parameter. Message "ALZ0558I" follows.

System action: Automated file selection processing continues.

User response: None required.

ALZ0558I **The log data sets will be located using
DSPURX00**

Explanation: This message will always come after message ALZ0556E or ALZ0557I.

System action: Automated file selection processing continues.

User response: None required.

ALZ0559I **DBRC API (DSPAPI00) completed,
RC=rc, SSID=ssssssss, FROM=fromdate,
TO=todate**

Explanation: IMS PI has completed DSPAPI log selection processing, and issued the following return codes:

00	Processing completed successfully
04	Processing completed, warning message issued
08	Processing failed, error message issued
16	Operand specification error

System action: If the return code is 0 or 4, automated file selection completed successfully, and the IMS PI report JCL has been submitted. If the return code is 8 or 16, automated file selection has failed. Previous error messages explain the reason for the error.

User response: None required.

ALZ0560E **OLDS operand must be YES or NO**

Explanation: The automated file selection utility OLDS operand was incorrectly specified.

System action: Automated file selection processing terminates.

User response: Ensure the OLDS operand is specified as YES or NO, then resubmit the job.

ALZ0561E **DBRC API interface module has
abended, CODE=xxxxx**

Explanation: The automated file selection API interface has detected an ABEND in the DBRC API interface module ALZDBRCA. The JESMSG LG output file contains the summary ABEND information.

System action: Automated file selection processing terminates.

User response: If you cannot resolve the problem, contact IBM Software Support for help.

ALZ0562E **No IMS Log files were eligible for
processing**

Explanation: IMS logs and IMS Connect Extensions journal data sets were requested for this run, however the automated file selection utility did not find any IMS systems with SLDS log data sets to process for one of the following reasons:

- No Log data sets are available for the specified time period.
- DBRC failed to return Log data set information from the RECON.

A previous message will explain the reason for the error.

System action: Automated file selection processing terminates.

User response: Correct the problem, then resubmit the job.

ALZ0563E No CEX journals were eligible for processing

Explanation: IMS logs and IMS Connect Extensions journals were requested for this run, however the automated journal file selection utility did not find any IMS Connect systems with journal data sets to process for one of the following reasons:

- No journals are available for the specified time period.
- The IMS Connect Extensions definitions repository contained no eligible journals.

A previous message will explain the reason for the error.

System action: Automated file selection processing terminates.

User response: Correct the problem, then resubmit the job.

ALZ0564E No CEX journals were eligible for processing

Explanation: The automated journal file selection utility did not find any IMS Connect Extensions journal data sets to process for one of the following reasons:

- No journals are available for the specified time period.
- The IMS Connect Extensions definitions repository contained no eligible journals.

A previous message will explain the reason for the error.

System action: Automated file selection processing terminates.

User response: Correct the problem, then resubmit the job.

ALZ0565E xxxxxxxx operand is blank

Explanation: IMSID or HWSID has not been specified.

System action: Automated file selection processing terminates.

User response: Correct the IMSID or HWSID operand, then resubmit the job.

ALZ0566E Authorization failed: IMSID=xxxx, IMSPLEX=xxxxxx

Explanation: The Request Authorization exit ALZUAUTH disallowed the use of the IMSPLEX name for the IMS subsystem.

System action: Automated file selection processing terminates.

User response: Correct the IMSPLEX specification, then resubmit the job. If the IMSPLEX specification is correct and the problem still occurs, then the authorization exit needs updating. See SALZSAMP members ALZU002 and ALZUAUTH for more details.

ALZ0578W Timezone for HWSID=xxxxxxx is zero and local timezone is non-zero

Explanation: The timezone offset in the IMS Connect Extensions definitions repository is zero and the local system timezone (CVTLDTO) is not.

System action: Automated file selection processing continues.

User response: If this situation is unexpected, check that the corequisite IMS Connect Extensions APAR has been applied.

ALZ0579I xxxxxxxx Journals selected: xxxxxx

Explanation: The IMS Connect journal file selection utility selected xxxxxx journals, archive or active.

System action: Automated file selection processing continues.

User response: None required.

ALZ0580E IMS Connect Extensions service failed, RC=rc

Explanation: The IMS Connect Journal File Selection utility was unable to initialize its IMS Connect Extensions services environment.

System action: Automated file selection processing terminates.

User response: See the job log for the reason for failure and contact an IBM representative for help.

ALZ0581E CEX Definitions Data Set access failed; DDname CEXDEF missing or invalid

Explanation: The specified IMS Connect Extensions definitions repository data set is invalid or the required DD CEXDEF is missing from the JCL.

System action: Automated file selection processing terminates.

User response: Specify a valid IMS Connect Extensions definitions repository and resubmit the job.

ALZ0582E No journal data sets found for HWSID=hhhhhhhhh in the CEX Definitions Data Set

Explanation: Either there are no archive records in the IMS Connect Extensions definitions repository for this

HWSID, or this HWSID does not exist in the IMS Connect Extensions definitions repository.

System action: Automated file selection processing terminates.

User response: Correct the HWSID and resubmit the job.

ALZ0583E CEX Definitions Data Set access failed

Explanation: The IMS Connect Journal File Selection utility could not use the IMS Connect Extensions definitions repository.

System action: Automated file selection processing terminates.

User response: Specify a valid IMS Connect Extensions definitions repository and resubmit the job.

ALZ0584W CEX Journals not available for the complete time range, report period truncated, HWSID=hhhhhhhh

Explanation: The IMS Connect Journal File Selection utility could not locate journal data sets that cover the entire requested reporting time range.

System action: Reporting continues with only partial coverage of the requested reporting time range.

User response: None required.

ALZ0585E Duplicate CEX subsystem ID specified, HWSID=hhhhhhhh

Explanation: The automated file selection utility detected a HWSID operand with a duplicate ID. An ID can only be specified once in the input.

System action: IMSPA automated file selection processing terminates.

User response: Correct the duplicated HWSID specification, then resubmit the job.

ALZ0586E HWSID operand exceeds maximum length (8)

Explanation: The HWSID operand is longer than the maximum allowed.

System action: Automated file selection processing terminates.

User response: Correct the HWSID operand, then resubmit the job.

ALZ0587E DSPAPI Error, FUNC=function, RC=rc, RSN=X'reasoncode', SSID=sssssss

Explanation: Automated file selection utility error. An unexpected return code and reason code were returned from the IMS DBRC API call. See Database Recovery

Control (DBRC) in the *IMS System Programming API Reference* for a detailed explanation of the reason code.

System action: Automated file selection processing terminates.

User response: If the RECON data sets that you want to use belong to an IMSplex:

- Ensure that you have correctly specified the name of the IMSplex in the PARM parameter of the EXEC statement for the automated file selection utility program. See "Preparing for DBRC Log Selection" on page 107.
- Ensure that the structured call interface (SCI) address space is running.

Otherwise, contact IBM Software Support for help.

ALZ0588E DSPAPI Error, xxxx data returned does not match the requested ID, Requested=rrrr, Returned=tttt

Explanation: Unexpected data was returned from the IMS DBRC API call. Possible data corruption.

System action: automated file selection processing terminates.

User response: Automated file selection utility error. Contact IBM Software Support for help.

ALZ0589I CEX xxxxxxxx Journal selection completed, RC=rc, HWSID=hhhhhhhh, FROM=fromdate, TO=todate

Explanation: IMS Connect Journal File Selection processing completed, and issued one of the following return codes:

- | | |
|----|--|
| 00 | Processing completed successfully |
| 04 | Processing completed, warning message issued |
| 08 | Processing failed, error message issued |
| 16 | Operand specification error |

System action: If the return code is 0 or 4, IMS Connect Journal File Selection completed successfully, and the report JCL has been submitted. If the return code is 8 or 16, IMS Connect Journal File Selection has failed. Previous error messages explain the reason for the error.

User response: None required.

ALZ0700E ALZEXEC Command is invalid

Explanation: ALZEXEC encountered an invalid command and could not process it.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0701E ALZEXEC Parentheses not paired

Explanation: The REXX command string specified parentheses that were not paired.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0702E ALZEXEC Parameter is invalid; Parameter=*parameter*

Explanation: The parameter keyword is not valid for the command.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0703E ALZEXEC Required parameter missing; Parameter=*parameter*

Explanation: A required parameter has not been specified for the command.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0704E ALZEXEC Only one of the parameters RRN, NEXT or PREV may be specified

Explanation: For the READ command, the parameters RRN, NEXT, and PREV are mutually exclusive.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0705E ALZEXEC Only one of the parameters APPEND, PREPEND, REPLACE, EDIT, VIEW or BROWSE may be specified

Explanation: For the DISPLAY command, parameters APPEND, PREPEND, REPLACE, EDIT, VIEW and BROWSE are mutually exclusive.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0706E ALZEXEC Required parameter value is missing; Parameter=*parameter*

Explanation: The parameter requires a value.

System action: Return code 20 is set and REXX processing continues.

User response: Correct the REXX exec then rerun.

ALZ0707E ALZEXEC Parameter has an invalid number of values; Parameter=*parameter*

Explanation: The parameter contains an invalid number of values. For example, too many values, or an odd number when an even number is required.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0708E ALZEXEC Parameter value is invalid; Parameter=*parameter*

Explanation: The parameter value contains invalid characters or is too long

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0709E ALZEXEC Parameter requires no values; Parameter=*parameter*

Explanation: The parameter is a keyword parameter and accepts no values in parentheses.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0710E ALZEXEC Parameters FILTER and CODE are mutually exclusive

Explanation: For the READ command you can only specify either FILTER, or CODE, or neither.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0711E ALZEXEC Duplicate parameter is invalid; Parameter=*parameter*

Explanation: A duplicate parameter has been encountered.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0712E ALZEXEC Parameter is invalid in batch mode; Parameter=*parameter*

Explanation: Only sequential reads forwards are allowed in batch mode. The parameters RRN and PREV are not valid for the READ command when run in batch mode.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0713E ALZEXEC DISPLAY command is invalid in batch

Explanation: The DISPLAY command cannot be used in batch. The command displays data in the IMS Problem Investigator browser.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0714E ALZEXEC IO error

Explanation: An I/O error has occurred while reading the log file. The most likely cause is an attempted read past EOF. For a READ command the REXX exec must check for EOF by testing the return code.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Correct the REXX exec then rerun.

ALZ0715E ALZEXEC Storage not available

Explanation: ALZEXEC cannot GETMAIN the storage required for processing.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Increase TSO logon size or batch region size and retry.

ALZ0716E ALZEXEC DISPLAY request but log file not yet open

Explanation: The DISPLAY command cannot be used until the log file has been opened.

System action: Return code 20 is set and ALZEXEC processing stops.

User response: Run the selected REXX exec once the log file has been opened. For example, after log file browse (ALZPRBRF).

ALZ1000C ALZBRAPI - action

Explanation: IMS PI has detected an internal failure in the ALZBRAPI component while performing *action*

System action: IMS PI immediately stops processing.

User response: This is an IMS PI error. If the problem recurs, contact IBM Software Support.

ALZ1001E Parameter list error; Module=*value*

Explanation: An IMS Performance Analyzer Online Interface module was passed an invalid parameter.

System action: Processing is terminated.

User response: Contact IBM Software Support.

ALZ1002E File not allocated; DDname=*value*

Explanation: An IMS Performance Analyzer Online Interface module has detected that the specified DDname was not allocated.

System action: Processing is terminated.

User response: Contact IBM Software Support.

ALZ1003E CONVTO macro error; Ret=*value*

Explanation: IMS Performance Analyzer could not upgrade your old System Definitions because the CONVTO macro failed.

System action: Upgrading of your old System Definitions is terminated but System Definition processing continues.

User response: Contact IBM Software Support.

ALZ1020E Table Library not available; DDname=*value*

Explanation: An IMS Performance Analyzer Online Interface module has detected that the specified DDname for the Table library was not allocated.

System action: Processing is terminated.

User response: Contact IBM Software Support.

ALZ1021E System Definition Table for IMS PA *value* has a format error

Explanation: IMS Performance Analyzer determined that the Table containing your IMS System and SMF File definitions is not in the correct format.

If the IMS Performance Analyzer version is V1R1, then IMS Performance Analyzer was attempting to upgrade your IMS Performance Analyzer V1R1 definitions to V1R2, but failed to do so.

If the IMS Performance Analyzer version is V1R2, then IMS Performance Analyzer failed to read your saved System Definitions. The Systems Definition Table is a member in your Permanent ISPF Table Library, which is specified in your IMS Performance Analyzer Settings. For IMS Performance Analyzer V1R1, the member name is CPASMF1. For IMS Performance Analyzer V1R2, the member name is CPASMF12.

System action: Processing is terminated.

User response: If the problem occurred during an

| upgrade from IMS Performance Analyzer V1R1 to
 | V1R2, then you can retry your request. When prompted
 | to upgrade your IMS Performance Analyzer V1R1
 | System Definitions, reply EXIT or CANCEL.

| For IMS Performance Analyzer V1R2, delete member
 | CPASMF12 from your Permanent ISPF Table Library,
 | then retry your request.

| In both cases, you will lose your saved System
 | Definitions and you will not be able to recover them. If
 | this problem is occurring regularly, or you do not want
 | to delete your saved System Definitions, contact IBM
 | Software Support.

| **ALZ1024E Member *value* is not a Report Set**

| **Explanation:** IMS Performance Analyzer determined
 | that the specified member is not in the correct format
 | for a Report Set.

| **System action:** Processing is terminated.

| **User response:** Verify that the specified member in the
 | Report Set library is a Report Set. Otherwise, contact
 | IBM Software Support.

| **ALZ1025E Report Set data set not available;
 | DDname=*value***

| **Explanation:** An IMS Performance Analyzer Online
 | Interface module has detected that the specified
 | DDname for the Report Set library was not allocated.

| **System action:** Processing is terminated.

| **User response:** Contact IBM Software Support.

| **ALZ1026E No systems are defined**

| **Explanation:** No systems have been defined in System
 | Definitions.

| **System action:** Processing is terminated.

| **User response:** From System Definitions, define the
 | IMS systems, DB2 subsystems and System Loggers that
 | you wish to report against.

| **ALZ1027E Report Set JCL generation failed.
 | System or Group is not defined**

| **Explanation:** IMS Performance Analyzer has detected
 | that your System Definitions do not contain the System
 | or Group of systems that were requested for report
 | processing. Message CPA1030E is issued in conjunction
 | with this message to identify the offending System or
 | Group, as well as the report that is causing the failure.

| **System action:** Processing is terminated.

| **User response:** Either from System Definitions, define
 | the System or Group that you wish to report against, or
 | alter the report to specify a System or Group that is
 | eligible for report processing.

| **ALZ1028E Report Set JCL generation failed.
 | System or Group not specified**

| **Explanation:** You have not specified the System or
 | Group of systems to be reported. System or Group can be
 | specified at the following System Definition points:

- | 1. In the individual reports or extracts of the Report Set
- | 2. At submission time in the Run Report Set panel
- | 3. In the Global Options of the Report Set

| The preceding list also reflects the precedence of
 | selecting systems for reporting.

| **System action:** Processing is terminated.

| **User response:** Specify the System or Group that you
 | wish to report against.

| **ALZ1029E Report Set JCL generation failed.
 | System or Group has no Log/Monitor
 | Files**

| **Explanation:** IMS Performance Analyzer has detected
 | that System or Group requested for report processing
 | has no SMF Files specified. Message CPA1030E is
 | issued in conjunction with this message to identify the
 | offending System or Group, as well as the report that is
 | causing the failure.

| **System action:** Processing is terminated.

| **User response:** From System Definitions, define SMF
 | Files for the offending System or Group.

| **ALZ1030E *info*, Output=*value***

| **Explanation:** This message details failure information,
 | and is issued in conjunction with a previous error
 | message. *aaaaaa=ssssssss* is the offending System or
 | Group name. *rrrrrrrr* is the Report that specified the
 | offending System or Group name. *oooooooo* is the
 | Report Output DDname or Extract Data Set name that
 | further identifies the report.

| **System action:** Action is determined for the
 | previously issued error message.

| **User response:** Response is determined from the
 | previously issued error message. Use this message to
 | determine which report is causing the failure.

| **ALZ1031E Report Set JCL generation failed. No
 | reports are active**

| **Explanation:** IMS Performance Analyzer has detected
 | that no reports are active in the Report Set.

| **System action:** Processing is terminated.

| **User response:** Activate the required reports in the
 | Report Set.

ALZ1035E Object List data set not available;
DDname=value

Explanation: An IMS Performance Analyzer Online Interface module has detected that the specified DDname for the Object List library was not allocated.

System action: Processing is terminated.

User response: Contact IBM Software Support.

ALZ1036E Report Set JCL generation failed. Object List is not defined

Explanation: IMS Performance Analyzer has detected that an Object List specified in a report is not in the Object List library. Message CPA1038E is issued in conjunction with this message to identify the offending Object List, as well as the report that is causing the failure.

System action: Processing is terminated.

User response: From Object Lists, define the required Object List, or alter the report to specify an Object List that is defined.

ALZ1037E Report Set JCL generation failed. Object List not in correct format

Explanation: IMS Performance Analyzer determined that the specified member is not in the correct format for an Object List.

System action: Processing is terminated.

User response: Verify that the specified member in the Object List library is an Object List. Otherwise, contact IBM Software Support.

ALZ1038E Object List=info, Output=value

Explanation: This message details failure information, and is issued in conjunction with a previous error message. *llllllll* is the offending Object List. *rrrrrrrr* is the Report that specified the offending Object List. *oooooooo* is the Report Output DDname or Extract Data Set name that further identifies the report.

System action: Action is determined for the previously issued error message.

User response: Response is determined from the previously issued error message. Use this message to determine which report is causing the failure.

ALZ1039E System Definitions are corrupted

Explanation: IMS Performance Analyzer has detected that your System Definitions are corrupted. The System Definitions are stored in your IMS Performance Analyzer Table Library, member CPASMF1 for V1R1 and CPASMF12 for V1R2.

System action: System validation processing is terminated.

User response: Contact IBM Software Support.

ALZ1040E Report Set JCL generation failed. Systems to be reported have no Log/Monitor Files specified

Explanation: IMS Performance Analyzer has detected that all systems and/or groups to be reported do not have any SMF Files specified.

System action: Processing is terminated.

User response: From System Definitions, define SMF Files for the Systems or Groups that you wish to report against. Alternatively, change the missing SMF File option on the Run Report Set panel from 3 (Disregard offending reports) to one of the following options:

- 1 Issue error message. IMS Performance Analyzer will inform you which System or Group does not have SMF Files specified.
 - 2 Leave DSN unresolved in JCL. IMS Performance Analyzer will generate the report JCL, but leave the SMF File data set names unresolved in the JCL.
-

ALZ1041E Reason=value Member=value DSN=value

Explanation: IMS Performance Analyzer could not SAVE your currently active EDIT session. The reasons why your SAVE request may have failed are:

1. ABEND - Save request has abended.
2. PDS Directory Full - The PDS directory is full.
3. BLDL or STOW error - Unsupported return code from BLDL/STOW SVC.

System action: The SAVE request is aborted.

User response: For ABENDSx37 conditions, compress the data set or re-allocate the data set with a larger primary/secondary space allocation. For Directory Full or ABENDSB14-000000C conditions, re-allocate the data set with a larger directory block allocation. For all other conditions, contact IBM Software Support.

ALZ3000E CDS Register VSAM Error,
DDname=ddddddd Func=ffff/i
RC=RC/RS Req=ALZCDOLI
Key=kkkkkkkk

Explanation: A VSAM I/O request to the CDS Register failed. Refer to *z/OS DFSMS Macro Instructions for Data Sets* for an explanation of the VSAM return code (RC) and reason code (RS). The I/O error can be caused by:

- Records in the KSDS not in the format or expected sequence, or
- A physical error with the KSDS data set

Other system messages may provide additional information about the error, and suggestions for

corrective action. For example, an OPEN request with RC=08/98 indicates a security violation, and not a problem with the data set.

System action: The CDS Register request is aborted.

User response: If the message suggests a corruption of the data set then report the problem to IBM Software Support.

ALZ3001E CDS Data Set is corrupted, Reason=xx

Explanation: Your Control Data Set is corrupted, or an update action cannot be performed against it.

The Reason codes are:

- 01 CDS is empty on a non-Initialization call. IMS PI automatically initializes the CDS data set when you first use it. This indicates an internal error.
- 02 CDS does not contain the CDS Control record. This indicates an internal error.
- 11 Filter Codes are missing.
- 21 Filter has too many Expressions.
- 31 Form Record is missing.

System action: IMS PI immediately stops processing.

User response: The required action depends on the reason code:

- 01 Contact IBM.
- 02 Verify that the CDS has only ever been updated by the IMS PI dialog. Then contact IBM.
- 11 Delete the offending Filter. If the problem reoccurs, contact IBM.
- 21 Reduce the number of Conditions in the offending log record code for the Filter you are editing. The maximum number of Conditions is 434.
- 31 Delete the offending Form. If the problem re-occurs, contact IBM.

ALZ3002W CDS Object in use, try later. Name=name

Explanation: Your request to edit a CDS object cannot be honored because another user is already editing it. The object can be a Filter, Form or Object List.

System action: IMS PI immediately stops processing.

User response: Retry your request when the object becomes available.

ALZ3003E object not found, Name=name

Explanation: The specified object could not be found in the Control Data Set. The object can be a Filter, Form or Object List.

System action: IMS PI immediately stops processing.

User response: Refresh the list of objects by exiting the current panel, then retry your request. If the object still appears in the list but cannot be selected, then contact IBM.

ALZ3004W CDS Data Set not available, try later

Explanation: Your request to update the Control Data Set could not be honored because another user is already updating it.

System action: IMS PI immediately stops processing.

User response: Updates should complete very quickly, so retry your save request.

ALZ3005E ENQ macro failed, RC=xx

Explanation: The ENQ macro has failed with an unsupported return code.

System action: IMS PI immediately stops processing.

User response: Exit ISPF to free the ENQ and then retry your request. If the problem re-occurs, contact IBM.

ALZ3007W object already exists, Name=name

Explanation: The specified object already exists in the Control Data Set. You cannot create a new object with the same name. The object can be a Filter, Form or Object List.

System action: IMS PI immediately stops processing.

User response: Select another name for the object and retry your request.

ALZ3008W object is required, Name=name

Explanation: The specified object cannot be deleted from the Control Data Set because another object references it. The object can be a Form or Object List.

System action: IMS PI immediately stops processing.

User response: None. The object cannot be deleted.

ALZ3009C CDS - failing component and action

Explanation: IMS PI has suffered a catastrophic failure in the specified component.

System action: IMS PI immediately stops processing.

User response: If the problem recurs, contact IBM Software Support.

ALZ5000I Input options specified:

Explanation: IMS Connect Journal File Selection utility input commands follow.

System action: Processing continues.

User response: None required.

**ALZ5001I Connect Archive Selection
completed | failed, CC=*rc***

Explanation: Indicates the success or failure of IMS Connect Journal File Selection processing:

- For RC=0, journal file selection successfully completed submitting your report request.
- For RC=4, journal file selection successfully completed submitting your report request, but a warning message was issued.
- For RC greater than 4, the journal file selection utility issued an error message and did not proceed to submit your report request.

System action: Processing continues.

User response: If RC is not 00, then refer to the previous warning or error messages for the required action.

**ALZ5002I Selected Archive files range from *start*
date time to *end* date time**

Explanation: The IMS Connect Journal File Selection utility selected journal files in the specified date/time range.

System action: Processing continues.

User response: None required.

**ALZ5003I Connect Report JCL submitted,
Jobname=*xxxxxxxx*, JobID=*xxxxxxxx***

Explanation: The IMS Connect Journal File Selection utility submitted the specified job to run your report request.

System action: Processing continues.

User response: None required.

ALZ5004E Invalid *xxxxxx* operand specified

Explanation: The specified operand is not a valid IMS Connect Extensions Journal File Selection utility command or operand.

System action: Processing stops.

User response: Correct the specified operand and resubmit the job.

**ALZ5005E Invalid Jobcard specified in ALZSKEL
input**

Explanation: An invalid job card was specified in your ALZSKEL DD report request skeleton.

System action: Processing stops.

User response: Correct the jobcard in the JCL or in IMS PI Settings in your Profile Options, then resubmit the job.

ALZ5006E *xxxx* has invalid syntax

Explanation: The specified operand is incorrectly specified in the IMS Connect Extensions Journal File Selection utility input commands.

System action: Processing stops.

User response: Correct the specified operand and resubmit the job.

**ALZ5007E Invalid date or time specified in the
xxxx operand, Reason=*reason***

Explanation: The FROM/TO date or time was incorrectly specified. The allowed date formats are yyyy/mm/dd or 0,-1,... and the allowed time format is hh:mm:ss.th.

System action: Processing stops.

User response: Correct the specified date or time and resubmit the job.

**ALZ5008E Archive data set not cataloged,
DSN=*datasetname***

Explanation: The specified data set defined in the IMS Connect Extensions definitions repository is not cataloged. This data set is required to satisfy your report request. The data set has been deleted or is cataloged on another system.

System action: Processing stops.

User response: If the data set is no longer available, then you cannot report against the required time range.

ALZ5009E *xxxxx* operand specified more than once

Explanation: The specified operand was specified more than once in the IMS Connect Extensions Journal File Selection utility input commands.

System action: Processing stops.

User response: Remove the duplicate operand and resubmit the job.

ALZ5010E **IMS Connect Extensions service failed**

Explanation: The IMS Connect Extensions Journal File Selection utility was unable to initialize its IMS Connect Extensions services environment.

System action: Processing stops.

User response: See the job log for the reason for failure and contact IBM.

ALZ5011E **Definitions Data Set access failed;
DDname CEXDEF missing or invalid**

Explanation: The specified IMS Connect Extensions definitions repository data set is invalid or the required DD CEXDEF is missing from the JCL.

System action: Processing stops.

User response: Specify a valid IMS Connect Extensions definitions repository and resubmit the job.

ALZ5012E **Definitions Data Set access failed**

Explanation: The IMS Connect Extensions Journal File Selection utility could not use the IMS Connect Extensions definitions repository data set.

System action: Processing stops.

User response: Specify a valid IMS Connect Extensions definitions repository and resubmit the job.

ALZ5013E **No Archive files found for specified
HWSID**

Explanation: The required IMS Connect HWS system does not have any archive journal data sets defined. Journal data sets are created by IMS Connect Extensions.

System action: Processing stops.

User response: Verify that IMS Connect Extensions is collecting event data for this HWSID.

ALZ5014E **TO time is not greater than FROM time**

Explanation: The TO date and time must be greater than the FROM date and time.

System action: Processing stops.

User response: Correct the FROM/TO specification and resubmit the job.

ALZ5015E **Unable to open file, DDname=ddname**

Explanation: IMS Problem Investigator was unable to open the file with the specified ddname.

System action: Processing stops.

User response: Correct the JCL and resubmit the job.

ALZ5016E **No Archive files found for required
time range**

Explanation: The IMS Connect Extensions Journal File Selection utility could not find any journal data sets (archive or active) for the required reporting time range.

System action: Processing stops.

User response: Verify that IMS Connect Extensions is collecting event data to meet your reporting requirements.

ALZ5017W **Archive files not available for the
complete time range. Report period
truncated.**

Explanation: The IMS Connect Extensions Journal File Selection utility could not locate journal data sets (archive or active) that cover the entire requested reporting time range.

System action: Reporting continues with only partial coverage of the requested reporting time range.

User response: None required.

ALZ5018E **Required operand missing. HWSID,
FROM and TO operands must be
specified**

Explanation: One or more of the required IMS Connect Journal File Selection utility operands is missing.

System action: Processing stops.

User response: Add missing operands and resubmit the job.

ALZ5019E **Specified HWSID is not defined in the
Definitions Data Set**

Explanation: The IMS Connect Journal File Selection utility could not locate the specified HWSID in the IMS Connect Extensions definitions repository. IMS Connect systems are defined in IMS Connect Extensions, not IMS Problem Investigator.

System action: Processing stops.

User response: Correct the HWSID, or specify the correct IMS Connect Extensions definitions repository, and resubmit the job.

ALZ8000E **ALZEXEC Record not found;
RRN=relative_record_number**

Explanation: The specified relative record number was not found in the current log file.

System action: ALZEXEC returns and sets RC to 8.

User response: None required. You may want to test

for RC 8 in your REXX exec.

ALZ8001E **ALZEXEC Segment not found;**
 Segment=segment_name

Explanation: The segment specified in the FETCH command was not found in the current record.

System action: ALZEXEC sets RC to 8 and continues processing.

User response: None required. You may want to test for RC 8 in your REXX exec.

ALZ8002E **ALZEXEC Field not found;**
 Field=field_name

Explanation: One or more of the fields specified in the FETCH command was not found in the current record,

or segment if POSITION was specified.

System action: ALZEXEC will set the REXX variables for the fields that are found, and set the REXX variables for the fields not found to null. RC is set to 8.

User response: None required. You may want to test for RC 8 in your REXX exec.

ALZ8003E **ALZEXEC Field values ambiguous**

Explanation: One or more fields specified in the FETCH command have more than one possible values. This is because the record contains multi-segments.

System action: ALZEXEC returns and sets RC to 8.

User response: Use the POSITION parameter to specify the particular segment from which the field value is required.

How to look up message explanations

You can use several methods to search for messages and codes.

Searching an information center

In the search box that is located in the top left toolbar of any Eclipse help system, such as the IBM Information Management Software for z/OS Solutions Information Center, enter the number of the message that you want to locate. For example, you can enter DFS1065A in the search field.

Use the following tips to help you improve your message searches:

- You can search for information on codes by entering the code; for example, enter -327.
- Enter the complete or partial message number. You can use the asterisk wildcard character (*) to represent multiple characters, and you can use the question mark wildcard character (?) to represent a single character.

The information center contains the latest message information for all of the information management products that are included in the information center.

Searching for messages on the Web

You can use any of the popular search engines that are available on the Web to search for message explanations. When you type the specific message number or code into the search engine, you will be presented with links to the message information in IBM information centers.

Using LookAt

LookAt is an online facility that you can use to look up explanations for most of the IBM messages you encounter, as well as for some system abends and codes. Using LookAt to find information is faster than a conventional search because in most cases LookAt goes directly to the message explanation.

You can use LookAt from the following locations to find IBM message explanations for z/OS elements and features, z/VM®, VSE/ESA, and Clusters for AIX® and Linux:

- The Internet. You can access IBM message explanations directly from the LookAt website at <http://www.ibm.com/eserver/zseries/zos/bkserv/lookat/>.
- Your z/OS TSO/E host system. You can install code on your z/OS or z/OS.e systems to access IBM message explanations, using LookAt from a TSO/E command line (for example, a TSO/E prompt, ISPF, or z/OS UNIX System Services running OMVS).
- Your Microsoft Windows workstation. You can install code to access IBM message explanations on the z/OS Collection (SK3T-4271) using LookAt from a Microsoft Windows command prompt (also known as the DOS command line).
- Your wireless handheld device. You can use the LookAt Mobile Edition with a handheld device that has wireless access and an Internet browser (for example, Internet Explorer for Pocket PCs, Blazer, or Eudora for Palm OS, or Opera for Linux handheld devices). Link to the LookAt Mobile Edition from the LookAt website.

You can obtain code to install LookAt on your host system or Microsoft Windows workstation from a disk on your z/OS Collection (SK3T-4271) or from the LookAt website (click **Download** and select the platform, release, collection, and location that suit your needs). More information is available in the LOOKAT.ME files available during the download process.

Chapter 30. Gathering diagnostic information

Before you report a problem with IMS Problem Investigator to IBM Software Support, you need to gather the appropriate diagnostic information.

Procedure

Provide the following information for all IMS Problem Investigator problems:

- A clear description of the problem and the steps that are required to recreate the problem
- All messages that were issued as a result of the problem
- Product release number and the number of the last program temporary fix (PTF) that was installed
- The version of DB2/IMS that you are using and the type and version of the operating system that you are using

Provide additional information based on the type of problem that you experienced:

For online abends, provide the following information

- A screen shot of the panel that you were using when the abend occurred
- The job log from the TSO session that encountered the abend
- The job log from the server
- A description of the task that you were doing before the abend occurred

For errors in batch processing, provide the following information

- The complete job log
- Print output
- Contents of the any data sets that were used during the processing

Obtaining dumps

If an IMS PI batch process abends, a system dump is written to the SYSUDUMP data set if the DD statement is included in the JCL. If possible, obtain a dump before contacting your IBM representative for help. A dump will expedite problem identification and resolution.

To permanently insert a SYSUDUMP DD statement into JCL generated by the IMS PI dialog, modify the JCL skeletons in the SALZSENU library.

```
//userid EXEC PGM=ALZBATCH,PARM='V141'  
.  
.  
.  
//SYSUDUMP DD SYSOUT=*
```

Figure 281. Specifying SYSUDUMP DD in the JCL

Part 6. Reference

This part provides reference information for IMS Problem Investigator.

Topics:

- Chapter 31, "Log record types and codes," on page 387
- Chapter 32, "ALZBATCH: Report and extract utility," on page 395
- Chapter 33, "Sample library SALZSAMP," on page 409
- Chapter 34, "How to read syntax diagrams," on page 445

Chapter 31. Log record types and codes

IMS Problem Investigator can analyze log records from a variety of sources.

All records listed in these tables can be formatted by IMS Problem Investigator. Other records that are *unknown*, IMS Problem Investigator presents in dump format.

Related concepts:

“What does IMS Problem Investigator do?” on page 10

IMS Problem Investigator allows interrogation of log files from a variety of sources to assist in the analysis of performance problems associated with your IMS system environment.

Related reference:

“Specifying log codes in a filter” on page 288

A log record code is specified by a log type to identify the source, for example IMS, CQS, DB2, and a hexadecimal code to identify record type and sometimes subtype. There are also special cases such as specifying ALL.

ATF: OMEGAMON for IMS ATF codes

The ATF log type consists of log codes for Tivoli OMEGAMON XE for IMS Application Trace Facility journal records.

Table 11. ATF log codes supported by IMS Problem Investigator

Record code	Description
01	DLI
03	Fast Path
04	Summary
05	DLI IOPCB
06	Monitor
82	DB2
87	Generic External Subsystem (ESS)
88	WebSphere MQ
F1	Transaction end

Related concepts:

“OMEGAMON ATF data” on page 201

OMEGAMON ATF complements the summary-level transaction data collected by the Transaction Reporting Facility (TRF).

CON: IMS Connect event codes

The CON log type consists of log codes for IMS Connect events.

IMS Connect Extensions collects event records with details of incoming transaction requests as IMS Connect processes them. IMS Connect Extensions writes these event records to active journal data sets and later archived.

Which records are available depends on the types of IMS Connect events that occurred and the IMS Connect Extensions collection level that was set.

The log code of a CON record consists of four hexadecimal digits:

- The first two digits are the log record prefix that IMS Connect Extensions used when it wrote the event records. If the event record identifier for your IMS Connect Extensions installation is not A0, then adjust your IMS PI profile settings. See “IMS Connect Extensions Settings” on page 278.
- The last two digits identify the type of event. For details, see the information about event record types in the *IMS Connect Extensions User's Guide*.

CQS record codes

The CQS log type consists of log codes for IMS Common Queue Server (CQS) records.

The log code of a CQS record consists of four hexadecimal digits: the first two digits represent the record type; the last two digits represent the record subtype. For details, see the information about CQS log records in *IMS Diagnosis*.

DB2: DB2 log record codes

The following table describes the DB2 umbrella log record codes used by IMS PI and the corresponding actual DB2 log record codes included under that umbrella.

IMS Problem Investigator has introduced umbrella log codes specifically for DB2 to enable you to view and process the various log records written by DB2. All codes are 2 byte hexadecimal values.

Each umbrella code represents a category of DB2 log record. Each DB2 record type belongs to an umbrella code, enabling you to filter against DB2 records.

This technique is especially useful when applied to the category of DB2 checkpoint records which are many in both form and number. You can choose to exclude all DB2 checkpoint records from this view and thereby create a more transaction-centric view of the log data.

Table 12. DB2 umbrella log codes processed by IMS Problem Investigator

Umbrella log code	Description	Actual DB2 log codes included
0002	Pageset Control	0002
0004	Syscopy Utility	0004
0008	Non-UR Lock	0008
0010	System Event	0010, 0800, 10xx, 2200, 20xx, 40xx, 80xx
0020	Unit of Recovery	0020, 0200, 0400, 0600
0100	Checkpoint	01xx, 2100

where xx represents any combination of hexadecimal digits 00 to FF.

Related concepts:

“Umbrella log record codes” on page 209

IMS Problem Investigator has introduced umbrella log codes specifically for DB2 to enable you to view and process the various log records written by DB2.

FRP: IMS Repository Audit log record codes

The following table describes the IMS Repository Audit log record types that IMS Problem Investigator can process.

Table 13. FRP log record codes processed by IMS PI

Log code	Description
ALL	All supported FRP record codes
01	FRP Server
02	FRP Repository
03	FRP Control
04	FRP Register
05	FRP Connect
06	FRP Client
07	FRP UOW
08	FRP UOW Syncpoint
09	FRP RDS Recovery

IMS log codes

The IMS log type consists of log codes for IMS log records. Not all log codes are applicable to all releases of IMS.

The log code of an IMS record matches the IMS log record type and, if applicable, subtype. For a list of IMS log record types and subtypes, see the information about IMS log records used to analyze IMS problems in *IMS Diagnosis*.

Notes for specific log codes:

- 67FA** Trace table. IMS Problem Investigator formats these records as individual trace entries (log type ITR).
- 67FF** Exception condition SNAP. IMS Problem Investigator formats 67FF IMS trace table records as individual trace entries (log type ITR).
- CA01** IMS transaction index.
- CA20** IMS Connect transaction index.

ITR: IMS trace table entry codes

The ITR log type consists of log codes that identify IMS trace table entries in IMS log records of type 67FA and 67FF.

An ITR log code consists of either two or four hexadecimal digits.

The first two digits represent the first byte of the table entry, which identifies the table entry type.

Some table entries have a subtype, represented by the second two digits of the log code.

Subtype values are derived differently depending on the table entry type.

For details, see the information about trace records in *IMS Diagnosis*.

MON: IMS monitor codes

The MON log type consists of log codes for IMS monitor records.

Table 14. IMS monitor record types supported by IMS PI

Log code	Description
ALL	All supported Monitor record codes
4E01	System Configuration
4E02	BMP Scheduling start
4E03	BMP Scheduling end
4E04	BMP Termination start
4E05	BMP Termination end
4E06	IFP Scheduling start
4E07	IFP Scheduling end
4E08	IFP Termination start
4E09	IFP Termination end
4E10	MPP Scheduling start
4E11	MPP Scheduling end
4E12	Dependent Region start
4E13	MPP Termination start
4E14	Scheduling IWAIT start
4E15	Scheduling IWAIT end
4E16	PSB Block Loader IWAIT start
4E17	PSB Block Loader IWAIT end
4E18	DMB Block Loader IWAIT start
4E19	DMB Block Loader IWAIT end
4E20	Storage IWAIT start
4E21	Storage IWAIT end
4E22	OSAM IWAIT start
4E23	OSAM IWAIT end
4E24	VSAM IWAIT start
4E25	VSAM IWAIT end
4E26	QMGR IWAIT start
4E27	QMGR IWAIT end
4E28	HSAM IWAIT start
4E29	HSAM IWAIT end
4E30	FBP IWAIT start
4E31	FBP IWAIT end
4E32	MFS Directory IWAIT start
4E33	MFS Directory IWAIT end
4E36	MFS Block IWAIT start
4E37	MFS Block IWAIT end
4E38	IFP Message IWAIT start
4E39	IFP Message IWAIT end
4E40	Communications start
4E41	Communications end
4E42	Transaction Originator
4E43	Fast Path Buffer Activity
4E44	MSC Message Enqueue
4E45	MSC Message Dequeue
4E46	TP Paging Request
4E47	BALG Dequeued
4E48	External Subsystem Call start
4E49	External Subsystem Call end
4E50	Checkpoint start
4E51	Checkpoint end

Table 14. IMS monitor record types supported by IMS PI (continued)

Log code	Description
4E54	QMGR SNAPQ IWAIT start
4E55	QMGR SNAPQ IWAIT end
4E56	MSDB I/O IWAIT end
4E57	DEDB I/O IWAIT end
4E58	IRC10 start
4E59	IRC10 end
4E60	DLI Call start
4E61	DLI Call end
4E62	DLA00 start
4E63	DLA00 end
4E64	DLA30 start
4E65	DLA30 end
4E66	PI/IRLM ENQ IWAIT start
4E67	PI/IRLM ENQ IWAIT end
4E68	DEDB Lock IWAIT start
4E69	DEDB Lock IWAIT end
4E70	DLI Systems call start - MFS Prefetch start
4E71	DLI Systems call end - MFS Prefetch end
4E72	DEDB I/O Write start
4E73	DEDB Write to SF
4E74	PSB Block Loaded from 64-bit Storage Pool start
4E75	PSB Block Loaded from 64-bit Storage Pool end
4E76	DMB Block Loaded from 64-bit Storage Pool start
4E77	DMB Block Loaded from 64-bit Storage Pool end
4E78	Synchronous Callout start
4E79	Synchronous Callout end
4E80	Intent Failure
4E82	Pool Space Failure
4E83	Deadlock (FP)
4E84	VSO Castout start
4E85	VSO Castout end
4E86	Deadlock (FF)
4E87	OThread Activity
4E88	VSO Preload start
4E89	VSO Preload end
4E90	Monitor start
4E91	Monitor end
4E94	VSO CF Read IWAIT end
4E95	Lock Activity
4E98	User SLOG
4E99	User SLOG
4EAA	Pseudo-End-of-File

MQ: WebSphere MQ log codes

The MQ log type consists of log codes that identify WebSphere MQ log extract records.

Table 15. Websphere MQ log extract records supported by IMS PI

Log code	Description
0001	Put
0002	Get
0003	Object Alteration

Table 15. Websphere MQ log extract records supported by IMS PI (continued)

Log code	Description
0004	Object Definition
0005	Message Expiry
0006	Commit Phase 1
0007	Commit Phase 2
0008	Backout
00FF	Log Extract

Related concepts:

“MQ log record codes” on page 226

IMS PI has introduced new log record codes specifically for MQ.

TRF: OMEGAMON for IMS TRF record codes

Transaction performance and resource utilization statistics are collected by OMEGAMON subsystems with the Transaction Reporting Facility (TRF) Trace running. IMS Problem Investigator can process records written by the TRF Collector to the IMS log. IMS Problem Investigator can also process TRF Extractor output records after running the TRF post-processor to extract the TRF records from the IMS log.

TRF Collector records

The following table lists the TRF Collector log record codes (two bytes hexadecimal) that IMS Problem Investigator can format.

The record codes in the table have the default prefix B0. If the prefix identifier of your OMEGAMON TRF records as they are written to the IMS log is not X'B0', then adjust your IMS PI profile settings (see “OMEGAMON for IMS TRF Settings” on page 279) and the table accordingly.

Table 16. OMEGAMON TRF Collector records processed by IMS PI

Log code	Description
B001	Resource Trace
B021	DLI Database Trace
B022	DB2 Trace
B023	FP Database Trace
B024	DLI Call Trace
B031	DLI Database Summary
B032	DB2 Summary
B033	DEDB Database
B034	MSDB Database Summary

TRF Extractor records

You can run the TRF post-processor to extract the TRF records from the IMS log. IMS Problem Investigator can also process the TRF Extractor output records. Note that the Zone setting is not relevant to TRF Extractor records as they are created in local time.

The following table lists the TRF Extractor output record codes (one byte hexadecimal) that IMS Problem Investigator can format.

Table 17. OMEGAMON TRF Extractor records processed by IMS PI

Log code	Description
10	Transaction Message
11	Output Message
12	IMS System Message
13	Database Detail
15	MSDB Detail
16	DEDB Detail
17	Database Summary
18	DB2 Summary
19	FP Database Summary

Related concepts:

“OMEGAMON TRF data” on page 189

The OMEGAMON Transaction Reporting Facility (TRF) provides detailed transaction accounting by collecting performance and resource utilization data for every IMS transaction.

SMF: IRLM Long Lock record code

The IRLM long lock record is the SMF 79.15 record (decimal), but is referenced in IMS Problem Investigator as X'4F0F' (hexadecimal) for consistency with the other types of log record that it supports.

IMS Problem Investigator does not currently recognize all SMF records. However, since every SMF record definition begins with a common header area, this area can be correctly interpreted and formatted for every SMF record in the range X'00' to X'7F'.

For the X'4F0F' record, data after the header is formatted, whilst the other SMF records are reported in dump format.

Related concepts:

“What does IMS Problem Investigator do?” on page 10

IMS Problem Investigator allows interrogation of log files from a variety of sources to assist in the analysis of performance problems associated with your IMS system environment.

Chapter 32. ALZBATCH: Report and extract utility

The IMS PI batch commands are used to request reports, extracts, and CSV files.

The commands are generated automatically from the dialog but you are given the opportunity to edit them before job submission.

Related reference:

“ALZBATCH JCL statements” on page 103

Explanation of ALZBATCH JCL which is used to process explicitly specified log files.

Command syntax and rules

The IMS PI dialog generates the commands and JCL to execute your batch requests. You can run the generated jobs or edit them before submission.

The IMS PI commands in the following list are presented in the order they appear in the generated JCL.

PAGELIM(*nnnn*)

START *date-time*

STOP *date-time*

ZONE GMT|LOCAL|+*hhmm*|-*hhmm*

REPORT [OUTPUT(*ddname*)] [FILTER(*filter*)] [LOGINFO]

REXX EXEC(*exec_name*) [ARG(*arguments*)] [FILTER(*filter*)|CODE(*logcode*)]

EXTRACT [OUTPUT(*ddname*)] [FILTER(*filter*)]

CSV FORM(*form*) [OUTPUT(*ddname*)] [FILTER(*filter*)] [DELIMITER(,)] [LABELS|NOLABELS]

FORMAT ([FORM] [,STD] [,BRIEF] [,DUMP] [,HEX0] [,HEX1]

ELAPSED [MICRO|NANO]

CONNECT[(*logcode*)]

TRF[(*logcode*)]

CODE(ALL) LEVEL(*n*)

COND *fieldname*|*offset operator value*

⋮

(*logcode*) LEVEL(*n*) [EXCLUDE]

COND *fieldname*|*offset operator value*

COND ...

CODE(*logcode*) [FORM(*form*)]

COND *fieldname*|*offset operator value*

⋮

TRACK

SCRUB

The rules are:

1. If PAGELIM is not specified for a report, the report stops after 10,000 pages are written.
2. ZONE, START, and STOP can only be specified once, and before all REPORT and EXTRACT requests.
3. Multiple reports and extracts can be requested.
4. Each OUTPUT ddname must be unique.
5. CODE and FILTER are mutually exclusive, that is, CODEs cannot be specified when FILTER is used.
6. The COND statements for CODE(ALL) or CODE(logtype,ALL) can specify global fields or explicit offsets.
7. The COND statements for CODE(logtype,logcode) can specify any field for that log record type or explicit offsets.
8. If you use more than one output command (for example, a REPORT and an EXTRACT command) you need to enter any CODE and COND commands immediately after each. For example:

```
REPORT
CODE(A000)
COND CERE_00_VER# EQ 12
EXTRACT
CODE(A000)
COND CERE_00_VER# EQ 12
```
9. TRACK will invoke Tracking only if the first CODE specified includes a COND.
10. SCRUB ensures that output from all REPORT, EXTRACT, and CSV requests is scrubbed so that sensitive or confidential information is not disclosed. Use EXTRACT with SCRUB to prepare log files that do not contain sensitive data, such as when you want to send log files to users who do not have permission to see sensitive data, or you want to send the log file to IBM or another external location.

Example

```
PAGELIM(999)
ZONE(LOCAL)
START 2014-05-23-10.00
STOP 2014-05-23-11.00
REPORT OUTPUT(LOGRPT1)
CODE(ALL)
COND TRANCODE EQ 'STOCK'
COND USERID EQ 'JOHN'
CODE(01)
COND MSGIDSTN EQ 'LTERM* '
COND MSGODSTN EQ &BANKTRAN
COND USERID EQ 'JOHN'
CODE(07) FORM(STAT07)
SCRUB
```

Figure 282. Example: Report command syntax

CODE command

An alternative way to specify filtering criteria without defining a Filter.

The format of the CODE command is:

```
CODE([logtype], logcode|ALL ) LEVEL(n) [FORM(form)] [EXCLUDE]
```

Specify a log code to select log records of a particular type, or specify ALL to select all log records.

Log type is optional. However, it is recommended that you specify the log type because there are a small number of codes that are not unique. For example, DB2 0002 and MQ 0002. If the log type is not explicitly specified, the default will be the log type of the first record that matches the log code.

Optionally the CODE statement can specify a Form to control which fields of the selected record are reported. If a Form is specified, the //ALZCDS DD statement must be included in the JCL.

Forms in a CODE statement are ignored for extract and CSV processing.

To exclude a log code from reporting (when optional Conditions are matched), specify the EXCLUDE option on the CODE command.

Related reference:

“Specifying levels for log codes” on page 294

Each log code statement in a filter has a level (1-255) to define logical AND/OR processing at the log code level. The default is 1.

“Examples of filters” on page 285

Examples that illustrate how to specify filtering criteria.

“Examples of conditions in a filter” on page 301

The following examples illustrate how IMS PI interprets your Filter specifications.

“EXCLUDE option” on page 400

The EXCLUDE option on the CODE command is used to exclude a log code from reporting (when optional Conditions are matched). Alternatively, you can use the dialog to define a Filter and exclude log codes in the Filter.

“FORM option” on page 401

Forms control the presentation of log records. Only the fields specified in the form are reported.

COND command

Condition statements allow you to filter log records based on certain field values in the log record. The statements contain conditional logic (like IF statements) to either include or exclude records from processing.

The format of the COND statement is:

```
COND fieldname|offset operator value
```

The maximum length of the specified *value* is 36 bytes.

For more information on specifying field names, operators and values, see “Specifying conditions for log codes” on page 290. If the COND statement specifies an Object List, the //ALZCDS DD statement must be included in the JCL.

For more information on how IMS PI evaluates the filtering criteria and condition statements, see “How IMS PI selects records” on page 299.

Related concepts:

“Specifying conditions for log codes” on page 290

Condition statements allow you to filter log records based on certain field values in the log record. The statements contain conditional logic to either include or exclude records from processing.

“How IMS PI selects records” on page 299

Understand the rules for record selection to specify filtering criteria that are efficient and effective.

“What is an object list?” on page 307

Object lists are used when filtering log files for online viewing or batch reports and extracts. An object list defines a list of field values, typically names, that can be specified in Condition statements for character fields. A typical use might be to define all the transaction codes that belong to a particular application system.

Related reference:

“Examples of filters” on page 285

Examples that illustrate how to specify filtering criteria.

“Examples of conditions in a filter” on page 301

The following examples illustrate how IMS PI interprets your Filter specifications.

“Using object lists in filter conditions” on page 307

An Object List name is prefixed by an ampersand (&) when specified in a Filter Condition statement. This is to identify it as an Object List and not a single character value.

CONNECT command

The CONNECT command is used to request IMS Connect reporting and specify the logcode of the IMS Connect Extensions event records being analyzed.

To request IMS Connect reporting, specify the command:

```
CONNECT [(logcode)]
```

The *logcode* is optional. The default is A0. If this is not the value of your IMS Connect Extensions installation, then adjust the command.

Related reference:

“ALZCON: IMS Connect” on page 411

Generic JCL to generate a report and extract data set for a specified IMS Connect Extensions journal data set.

“ALZDBRC: DBRC Log Selection” on page 415

Generic JCL to run Automated File Selection (DBRC Log Selection for IMS log data and Journal File Selection for Connect data), then automatically submit a job to run the IMS PI Log Reporter for the selected files.

CSV command

The CSV command requests that a subset of log records be written to a delimited text file for use, for example, by PC spreadsheets.

The format of the CSV command is:

```
CSV FORM(form) [OUTPUT(ddname)] [FILTER(filter)] [DELIMITER(:)] [LABELS|NOLABELS]
```

The rules for the CSV options are:

- The Form is required to describe the CSV output record.
- The Filter is optional, but is recommended to reduce the size of the CSV data set. Ensure that the filter specifies, as a minimum, the log code specified in the form. Otherwise, you are guaranteed an empty CSV file. Forms in Filters are ignored during processing.
- A delimiter is required to delineate the columns. The semicolon (;) is the default.

- Field labels are optional. If requested, a header record is included with the field names as labels. NOLABELS is the default.
- The default ddname is CSV. The OUTPUT parameter can be omitted if the JCL contains a DD statement such as the following to specify the name of the extract data set that is to be created:

```
//CSV DD DSN=IMSPI.csv.file,DISP=(NEW,CATLG),
//                               UNIT=SYSDA,SPACE=(CYL,(10,10),RLSE)
```

or overwritten:

```
//CSV DD DSN=IMSPI.csv.file,DISP=SHR
```

or appended to:

```
//CSV DD DSN=IMSPI.csv.file,DISP=MOD
```

Related reference:

“FORM option” on page 401

Forms control the presentation of log records. Only the fields specified in the form are reported.

“FILTER option” on page 401

FILTER is an optional operand of the REPORT, EXTRACT or CSV command to control which log records are selected for report, extract or CSV processing.

“TRACE command” on page 406

Specifies how to process IMS log records of type 67FA, and 67FF records for IMS trace tables: in their original format, or as individual IMS trace table entries (log type ITR).

“ALZCSV: CSV extract” on page 414

Generic JCL to create a CSV (comma separated value) extract.

ELAPSED command

The ELAPSED command is used for batch reports to request that record elapsed time relative to the previous record is reported in microsecond or nanosecond precision.

The format of the ELAPSED command is:

```
ELAPSED [MICRO|NANO]
```

The command applies to batch reports only; ignored for extracts and CSV requests. The default is MICRO.

```
+0004 Code... 43    Log Data Set Control
+011E STCK... C07471C201606C40    LSN.... 0000000000000B3B    Record... 1
      Date... 2007-04-16 Monday    Time... 16.41.56.465158.765

+0004 Code... 42    Log Buffer Control
+0248 STCK... C07471C201609300    LSN.... 0000000000000B3C    Record... 2
      Date... 2007-04-16 Monday    Time... 16.41.56.465161.187    Elapsed.. 0.000002.421

+0004 Code... 03    Output Message
+01D4 STCK... C07471C201636762    LSN.... 0000000000000B3D    Record... 3
      Date... 2007-04-16 Monday    Time... 16.41.56.465206.461    Elapsed.. 0.000045.273
```

Figure 283. Report output from ELAPSED NANO command

Related reference:

“Time settings” on page 87

You can configure time settings by entering the TIME primary command or

through **Time** on the action bar.

EXCLUDE option

The EXCLUDE option on the CODE command is used to exclude a log code from reporting (when optional Conditions are matched). Alternatively, you can use the dialog to define a Filter and exclude log codes in the Filter.

The format of the CODE command with the EXCLUDE operand is:

```
CODE(logcode) EXCLUDE  
COND fieldname|offset operator value  
COND ...
```

The following example reports all log records except records with log code 33 and 67:

```
REPORT  
CODE(ALL)  
CODE(33) EXCLUDE  
CODE(67) EXCLUDE
```

Note that order is not important for excluded codes. They are always excluded, even when CODE(ALL) is specified previously.

Related reference:

“CODE command” on page 396

An alternative way to specify filtering criteria without defining a Filter.

EXTRACT command

The EXTRACT command requests that a subset of log records be written to an extract data set.

The format of the EXTRACT command is:

```
EXTRACT [OUTPUT(ddname)] [FILTER(filter)]
```

The default *ddname* is EXTRACT. The OUTPUT parameter can be omitted if the JCL contains a DD statement such as the following to specify the name of the extract data set that is to be created:

```
//EXTRACT DD DSN=IMSPI.extract.dataset1,DISP=(NEW,CATLG),  
//                               UNIT=SYSDA,SPACE=CYL,(10,10),RLSE)
```

or overwritten:

```
//EXTRACT DD DSN=IMSPI.extract.dataset2,DISP=SHR
```

or appended to:

```
//EXTRACT DD DSN=IMSPI.extract.dataset3,DISP=MOD
```

The FILTER is optional, but is recommended to reduce the size of the extract data set.

Note: Extract records have the same format as log records. Forms apply to reporting but are ignored for extract processing. If the Filter contains Forms, the Forms are ignored by the extract.

Related reference:

“FILTER option” on page 401

FILTER is an optional operand of the REPORT, EXTRACT or CSV command to

control which log records are selected for report, extract or CSV processing.

“TRACE command” on page 406

Specifies how to process IMS log records of type 67FA, and 67FF records for IMS trace tables: in their original format, or as individual IMS trace table entries (log type ITR).

FILTER option

FILTER is an optional operand of the REPORT, EXTRACT or CSV command to control which log records are selected for report, extract or CSV processing.

The format of the FILTER option is:

REPORT [FILTER(*filter*)]

EXTRACT [FILTER(*filter*)]

CSV [FILTER(*filter*)] FORM(*form*)

A Filter can specify Forms to control which fields in the filtered records are to be reported. Forms within a Filter are ignored for extract and CSV processing. For CSV processing, a Form must be explicitly specified to define the record layout of the CSV file.

Filters and Forms are defined using the IMS PI dialog and are maintained in the IMS PI Control Data Set (CDS). A DD statement like the following must be included in the JCL:

```
//ALZCDS DD DSN=userid.IMSPI.cds,DISP=SHR
```

Related concepts:

Chapter 23, “Defining filters,” on page 281

Filters enable you to select the log records that you are interested in. For example, select only those records associated with a particular Transaction Code or User ID.

Related reference:

“CSV command” on page 398

The CSV command requests that a subset of log records be written to a delimited text file for use, for example, by PC spreadsheets.

“EXTRACT command” on page 400

The EXTRACT command requests that a subset of log records be written to an extract data set.

“REPORT command” on page 403

The REPORT command requests that a formatted report of log records is to be produced.

“FORM option”

Forms control the presentation of log records. Only the fields specified in the form are reported.

FORM option

Forms control the presentation of log records. Only the fields specified in the form are reported.

There are three ways to specify forms:

1. Within a filter. The format is:

```
REPORT [FILTER(filter)]
```

2. As an operand of the CODE command. The format is:
CODE([logtype,] logcode|ALL) [FORM(form)]
3. As an operand of the CSV command. The format is:
CSV FORM(form)

Forms are ignored for extract processing. For CSV processing, forms within a filter are ignored. However, a form is explicitly required to define the format of the CSV records.

Forms are defined using the IMS PI dialog and are maintained in the IMS PI Control Data Set (CDS). A DD statement like the following must be included in the JCL:

```
//ALZCDS DD DSN=userid.IMSPI.cds,DISP=SHR
```

Related concepts:

Chapter 25, “Defining forms,” on page 313

Forms enable you to tailor the formatting of log records by removing fields that are not relevant to you.

Related reference:

“CODE command” on page 396

An alternative way to specify filtering criteria without defining a Filter.

“CSV command” on page 398

The CSV command requests that a subset of log records be written to a delimited text file for use, for example, by PC spreadsheets.

“FILTER option” on page 401

FILTER is an optional operand of the REPORT, EXTRACT or CSV command to control which log records are selected for report, extract or CSV processing.

FORMAT command

FORMAT specifies one or more log record formatting options for reporting; it is ignored for extracts.

The format of the command is:

```
FORMAT ([FORM] [,STD] [,BRIEF] [,DUMP] [,HEX0] [,HEX1])
```

You can request Formatted reports, or Dump format, or both.

IMS PI Format options are:

STD Formatted according to the Log Record DSECT mapping.

FORM FORM is the default, but if a Form is not specified or defined then STD is used.

BRIEF A concise report that shows general and high-level information (record description and global fields), similar to the ISPF dialog Formatted Log Browser.

Dump Format options are:

DUMP

Dump format, similar to SYSUDUMP.

HEX1 Vertical Hexadecimal format with decimal offsets.

HEX0 Vertical Hexadecimal format with hexadecimal offsets.

Related reference:

“IMS PI format” on page 89

IMS PI format helps you to understand log record contents to make the wealth of information they contain more easily and readily available for analysis.

“Dump format” on page 91

The record is displayed in Dump format when requested by pressing the Switch function key (F4) from IMS PI format or when the log record code is unknown to IMS PI.

PAGELIM command

PAGELIM specifies the maximum number of pages to be reported. The page limit is ignored for extract processing.

The format of the PAGELIM command is:

PAGELIM(*nnnnn*)

where *nnnnn* is a positive integer, 1 - 9999999. The default is 10000 pages.

It is recommended that you include a page limit in your report job because a formatted log file can produce a large volume of output. When the page limit is reached, no further input records are read.

REPORT command

The REPORT command requests that a formatted report of log records is to be produced.

The format of the REPORT command is:

REPORT [OUTPUT(*ddname*)] [FILTER(*filter*)] [LOGINFO]

The default *ddname* is LOGRPT.

The OUTPUT parameter can be omitted if the JCL contains a DD statement such as the following to specify where the report output is to be written:

```
//LOGRPT DD SYSOUT=*
```

The FILTER operand is optional.

If one or more reports are requested, the Log Information report is always produced by default if the input file contains IMS log records. In this case, the Log Information report is written to the LOGINFO DD data set.

However, you can specify the LOGINFO operand to request the Log Information report explicitly. In this case, the report is written to the LOGRPT DD data set unless redirected using the OUTPUT(*ddname*) operand.

Related reference:

“Examples of filters” on page 285

Examples that illustrate how to specify filtering criteria.

“FILTER option” on page 401

FILTER is an optional operand of the REPORT, EXTRACT or CSV command to control which log records are selected for report, extract or CSV processing.

“TRACE command” on page 406

Specifies how to process IMS log records of type 67FA, and 67FF records for IMS trace tables: in their original format, or as individual IMS trace table entries (log type ITR).

REXX command

The REXX command executes a REXX exec for customized formatting of log records.

The format of the REXX command is:

```
REXX EXEC(exec_name) [ARG(arguments)] [FILTER(filter)]  
[CODE([logtype,]logcode)]
```

where:

EXEC The name of the REXX exec.

ARG (Optional.) An argument passed to the REXX. To pass a list of arguments, separate them with spaces and put in quotes. For example:

```
ARG('A1 A2 A3')
```

FILTER

(Optional.) The name of a filter you want to apply to READ sequential commands.

CODE (Optional.) To process only specified log codes. CODE must be on a separate line after the REXX command.

The following restrictions apply when you use the command:

- SYSEXEC DD and SYSTSPRT DD are required.
- SYSTSIN DD is optional. This is the name of the input file that PARSE EXTERNAL reads from.
- You can only have one REXX request per job step.

SCRUB command

The SCRUB command causes input log records to be scrubbed prior to report, extract or CSV processing. Use this approach to prevent sensitive or confidential data from being disclosed during log analysis, or if you want to send log files to IBM or another external location for problem determination.

The format of the SCRUB command is:

```
SCRUB
```

Only some IMS log records are scrubbed, in particular those with confidential customer business information. The records remain intact, only data such as transaction messages and database updates are modified to remove the sensitive information.

Note: To scrub records for viewing in the dialog, install the Request Authorization exit supplied in the SALZSAMP library.

Related reference:

“Log Information report” on page 101

A Log Information report is produced with every batch report request when IMS log records are processed. The default ddname is LOGININFO. If record scrubbing is requested, the report provides details of the record types copied to the output log file and scrubbed.

“Scrubbing IMS log files” on page 67

Scrub removes sensitive or confidential information from selected IMS log files prior to inhouse analysis or sending offsite for problem determination. Use data scrubbing if you have this compliance requirement.

“ALZUAUTH: Request Authorization exit” on page 435

ALZUAUTH is the Request Authorization exit. Apply USERMOD ALZU002 (supplied in the SALZSAMP library) to install and activate the exit.

START, STOP (FROM, TO) command

START and STOP specify a report interval. Only log records with a STCK time stamp within the report interval are included in the report, extract or CSV. The report interval is optional when processing a specific log file, but mandatory for automated file selection or processing a log stream.

The format of the START command is:

```
START yyyy-mm-dd-hh.mm.ss.thmiju
```

or

```
START -nnn-hh.mm.ss.thmiju
```

The format of the STOP command is:

```
STOP yyyy-mm-dd-hh.mm.ss.thmiju
```

or

```
STOP -nnn-hh.mm.ss.thmiju
```

where:

- *yyyy-mm-dd* is a calendar date
- *-nnn* is a relative date (0 for today, -1 for yesterday, and so on)
- *hh.mm.ss.thmiju* is a time of day (default 00.00.00.000000)

When processing a SUB request for a specific log file, the IMS PI dialog generates the START and STOP commands under the //SYSIN DD * statement.

For automated file selection, the dialog generates corresponding FROM and TO commands under the //ALZPARM DD * statement:

```
FROM=(yyyy-mm-dd,hh.mm.ss.th) TO=(yyyy-mm-dd,hh.mm.ss.th)
```

or

```
FROM=(-nnn-mm-dd,hh.mm.ss.th) TO=(-nnn-mm-dd,hh.mm.ss.th)
```

For automated file selection, the report interval is used initially by the DBRC API to locate the IMS log files relevant to the specified period and Journal File Selection locates the IMS Connect journals, archive or active, for that same period.

Related concepts:

“IMS Connect Journal File Selection” on page 176

IMS Connect Extensions Journal File Selection is an IMS Problem Investigator facility that automatically selects the Journal files for report processing. It offers an alternative to having to explicitly specify or select the Journal input files. Simply specify the IMS Connect system and the time period for which reporting is required, and IMS Problem Investigator will select the Journal files covering that time period.

Related tasks:

“Creating a report, extract, or CSV from specified log files” on page 98

You can use the IMS Problem Investigator ISPF dialog to request a report, extract, or CSV file from one or more log files.

Related reference:

“DBRC Log Selection” on page 107

DBRC Log Selection is an IMS PI facility that uses DBRC to select the log files from one or more IMS subsystems for report and extract processing. This facility offers an alternative to having to explicitly specify log input files. Simply by specifying the time period for which reporting is required, IMS PI will use DBRC to select the SLDS files covering that time period.

TRACE command

Specifies how to process IMS log records of type 67FA, and 67FF records for IMS trace tables: in their original format, or as individual IMS trace table entries (log type ITR).

The format of the TRACE command is:

TRACE (ON|OFF)

ON Process IMS trace records as individual trace entries (log type ITR).

OFF

Process IMS trace records in their original (67FA or 67FF) format.

For REPORT and CSV commands, the default is ON.

For EXTRACT commands, the default is OFF.

You can specify TRACE anywhere in a SYSIN data set, but only once.

Related reference:

“Formatting log files” on page 76

The primary view is IMS PI Formatted mode. In Formatted mode, there are four views of the log file. You can list records with or without the global fields and with either the time or LSN in the right hand column. Use the Left function key (F10) and the Right function key (F11) to cycle through the views. The view that is current when you Exit will be the view that is presented to you on reentry.

“CSV command” on page 398

The CSV command requests that a subset of log records be written to a delimited text file for use, for example, by PC spreadsheets.

“EXTRACT command” on page 400

The EXTRACT command requests that a subset of log records be written to an extract data set.

“REPORT command” on page 403

The REPORT command requests that a formatted report of log records is to be produced.

TRACK command

To request tracking using batch commands, specify the TRACK command. To generate this command from the dialog, specify a Filter with **Activate Tracking** selected.

In the following example, tracking for User ID DAVE is activated. Only log records attributable to transactions run by DAVE will be reported.

```
REPORT
TRACK
CODE(ALL)
COND USERID EQ 'DAVE'
CODE(33) EXCLUDE
```

Tip: Tracking is best used interactively in conjunction with the many other dialog features that help to expedite your analysis and problem investigation.

Related concepts:

“Editing a filter” on page 283

The same panel is used for editing or viewing a filter. In view mode, changes cannot be saved, however the SAVEAS command is available.

TRF command

The TRF command is used to request OMEGAMON TRF reporting from IMS logs.

The format of the command is:

```
TRF(logcode)
```

You must specify the *logcode*; there is no default. The *logcode* is the one-byte hexadecimal value of the log code prefix of the TRF records written by OMEGAMON Transaction Reporting Facility to the IMS log. For example, B0.

Related concepts:

“TRF batch reporting” on page 200

Batch processing provides formatted record reports similar to the dialog but without the advantage of interactivity. You can also create smaller, filtered extract data sets that can be further analyzed using IMS Problem Investigator.

ZONE command

ZONE is relevant if the logs were created in a different time zone to where they are being processed. IMS PI will convert the STCK time stamp in the log records and report them in the required time zone.

The format of the ZONE command is:

```
ZONE GMT|LOCAL|+hhmm|-hhmm
```

LOCAL is the default and is applicable when the log files are created in the same time zone as the system you are currently running on.

You should specify an explicit time zone offset when processing a log file that was created by an IMS system in a different time zone to the one that IMS PI is currently running on. +*hhmm* or -*hhmm* is the number of hours (and optionally minutes) east (+) or west (-) of GMT. For example, specify -08 for US Pacific time and +10 for Sydney Australia time.

Related reference:

"Time settings" on page 87

You can configure time settings by entering the TIME primary command or through **Time** on the action bar.

Chapter 33. Sample library SALZSAMP

The SALZSAMP library supplied with IMS PI contains JCL samples that you can tailor to suit your requirements.

The sample jobs show how to:

- Run the IMS PI Log Reporter to produce reports and extracts from the IMS system log (including user log records), IMS Connect event records, and CQS log records.
- Build Knowledge Modules for your IMS user log records.
- Use filtering. Sample dialog panels show how to use the IMS PI dialog to produce equivalent requests.
- Install specific-purpose user exits.

Member

Description

ALZAPPLC

REXX example: Display checkpoint PDIR segments (log code 4007) as a SYSGEN APPLCTN macro.

ALZCON

Generic JCL to run the IMS PI Log Reporter for IMS Connect data.

ALZCQS

Generic JCL to run the IMS PI Log Reporter for CQS log data.

ALZCSV

Generic JCL to extract log data to a CSV file.

ALZDBASE

REXX example: Display checkpoint DDIR segments (log code 4006) as a SYSGEN DATABASE macro.

ALZDBRC

Generic JCL to run Automated File Selection (DBRC Log Selection for IMS log data and Journal File Selection for Connect data), then in turn submits a job to run the IMS PI Log Reporter.

ALZEXPIM

Generic JCL to export filters, forms and object lists, then FTP transfer and import at another site.

ALZICONV

REXX example: For ASCII – EBCDIC translation using code page 1047.

ALZMSG

REXX example: Process IMS 01 and 03 log records to present LTERM, transaction code, user ID, terminal, and message text.

ALZMSGT

REXX example: Process IMS 01 log records and present the contents of messages spanning multiple segments and records in a merged view.

ALZRPT

Generic JCL to run the IMS PI Log Reporter for IMS log data.

ALZRTCDE

REXX example: Display checkpoint RCTE segments (log code 4083) as a SYSGEN RTCODE macro.

ALZRXPY

Sample JCL to copy the sample REXX execs to your specified SYSEXEC library.

ALZSAMP1

Sample JCL to report all type 07 Application Termination Statistics records where the transaction code matches pattern 'STOK*'.

ALZSAMP2

Sample JCL to report all type 01/03 Output Message records when the message text contains the string 'UNAUTHORIZED'.

ALZSAMP3

Sample JCL to report all type 50 Database Update records when the database name is STOCK and the RBA range is between X'1000' and X'8000'.

ALZSAMP4

Sample JCL to report all log record types with a User ID value of 'JOHN' or 'JACK'.

ALZSAMP5

Sample JCL to report all log records within the Log Sequence Number range of X'000000000000002E' to X'0000000000000097'.

ALZSAMP6

Sample JCL to report all type 01/03 Output Message records where the Originating Tracking UOW Token is X'B78306F58EC9E742'.

ALZSAMP7

Sample JCL to report all type 40 Checkpoint and type 45 Statistics log records.

ALZSAMP8

Sample JCL to report all X'DE' IMS User Log records.

ALZTRANS

REXX example: Display checkpoint SMB segments (log code 4004) as a SYSGEN TRANSACT macro.

ALZUAUTH

Request Authorization exit for DBRC log selection and scrub security.

ALZUFA01

Sample IMS user log record mapping DSECT.

ALZUKMA

Sample JCL to assemble and link an IMS user log record Knowledge Module.

ALZUKMF

Sample user Knowledge Module field definition macro.

ALZUKMS

Sample user Knowledge Module assembler source derived from the sample mapping ALZUFA01.

ALZU002

USERMOD to install ALZUAUTH and activate the Request Authorization exit.

ALZXA0A4

REXX example: For CON A0A4 fields ASCII – EBCDIC translation.

ALZDUMP

REXX example: Create a formatted hexadecimal dump.

ALZXFMT

REXX example: Translate unprintable characters to periods, useful when creating formatted dumps.

Related concepts:

Chapter 23, “Defining filters,” on page 281

Filters enable you to select the log records that you are interested in. For example, select only those records associated with a particular Transaction Code or User ID.

Related reference:

“Sample REXX execs” on page 121

REXX execs supplied in the sample library SALZSAMP.

ALZAPPLC: REXX for IMS 4007 Checkpoint PDIR

Sample REXX exec to format and display PDIR segments as SYSGEN APPLCTN macros.

Use the sample JCL ALZRXPY to copy the REXX member to your SYSEXEC library.

Execute this exec from a filter or from field zoom.

Executing from a filter

1. Create a filter and insert an IMS 4007 Checkpoint PDIR row.
2. Specify the name of the REXX (ALZAPPLC) in the REXX field. See “Sample REXX execs” on page 121.
3. Insert a global criteria ALL row if you want to include all other log records.
4. Browse an IMS log data set using the filter and select a 4007 record.
5. Position the cursor to a CHKPSB field and press Enter. The REXX exec is automatically invoked and the APPLCTN macro is displayed in view mode.

Executing from field zoom

1. Select a 4007 log record in the browser and zoom on a CHKPSB field.
2. On the command line in the zoom panel, enter ALZAPPLC to invoke the REXX exec.
3. The APPLCTN macro is displayed in view mode.

Related reference:

“ALZRXPY: Copy sample REXX to SYSEXEC library” on page 425

Sample JCL to copy (and rename) the sample REXX execs to your specified SYSEXEC library.

ALZCON: IMS Connect

Generic JCL to generate a report and extract data set for a specified IMS Connect Extensions journal data set.

```

//ALZCON JOB ,CLASS=A,NOTIFY=&SYSUID
//*****
/* Customize the job by setting the following symbols:      *
/*                                                         *
/* <vrml>                IMS Version: 121, 131, 141        *
/* <ALZ.V2R4M0.SALZLINK>  IMS PI link library              *
/* <prefix.IMSPI.CDS>     IMS PI Control Data Set           *
/* <input.log>            Input IMS Connect Extensions Archive DSN *
/* <IMSPI.CONNECT.EXTRACT> Output Connect extract DSN (optional) *
/* <yyyy-mm-dd-hh.mm.ss.thmiju> Reporting period (optional) *
/******
/*
//ALZ      EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrml>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//ALZCDS  DD DISP=SHR,DSN=<prefix.IMSPI.CDS>
//LOGIN   DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT  DD SYSOUT=*
//EXTRACT DD DISP=OLD,DSN=IMSPI.CONNECT.EXTRACT>
//SYSIN   DD *
START <yyyy-mm-dd-hh.mm.ss.thmiju> ... For example, 2014-06-24-10.00
STOP  <yyyy-mm-dd-hh.mm.ss.thmiju>                2014-06-24-10.05
REPORT OUTPUT(LOGRPT)
EXTRACT OUTPUT(EXTRACT)
CONNECT(A0)
/*

```

Figure 284. Sample JCL ALZCON: IMS Connect report and extract

Using the dialog

The JCL can be generated from the dialog using option **6 Connect** or option **1 Process** from the IMS Problem Investigator Primary Option Menu.

File Menu Help

Archive Data Sets for TRICKLE
Row 1 to 11 of 11

Command ==>
Scroll ==> PAGE

Select to browse Archive data set.

Data Set Name	----- From -----	To
CEX999.TEST.TRICKLE.D090323.T143727	2014-03-23 13.51	14.37
CEX999.TEST.TRICKLE.D090324.T095211	2014-03-23 14.37	09.52
CEX999.TEST.TRICKLE.D090324.T115845	2014-03-24 11.33	11.58
CEX999.TEST.TRICKLE.D090324.T120450	2014-03-24 11.58	12.04
CEX999.TEST.TRICKLE.D090324.T121311	2014-03-24 12.05	12.13
<u>SUB</u> CEX999.TEST.TRICKLE.D090324.T121656	2014-03-24 12.13	12.16
CEX999.TEST.TRICKLE.D090324.T125935	2014-03-24 12.17	12.59
CEX999.TEST.TRICKLE.D090324.T134154	2014-03-24 13.40	13.41
<u>P</u> CEX999.TEST.TRICKLE.D090324.T140219	2014-03-24 13.45	14.02
CEX999.TEST.TRICKLE.D090324.T142133	2014-03-24 14.09	14.21
CEX999.TEST.TRICKLE.D090324.T142936	2014-03-24 14.22	14.29

***** End of list *****

Figure 285. Submit IMS Connect report request from Connect facility

File Menu Edit Help			
-----		Process Log Files	Row 1 of 3 More: < >
Command ==>			Scroll ==> CSR
Select a Log File to browse.		IMS Release 121 +	Zone _____
/	Log File	Rel + Filter +	Zone
---	'IMSA.SLDS.D2008013.T135723.F1'	---	---
---	'IMSA.EXTRACT.D2008013.T135723.F1'	---	03
SUB	'CEX999.TEST.TRICKLE.D090324.T140219'	---	---
***** Bottom of data *****			

Figure 286. Submit IMS Connect report request from Process Log Files

Related reference:

“CONNECT command” on page 398

The CONNECT command is used to request IMS Connect reporting and specify the logcode of the IMS Connect Extensions event records being analyzed.

ALZCQS: CQS log stream

Generic JCL to generate a report and extract data set for a CQS log stream.

```
//ALZCQS JOB ,CLASS=A,NOTIFY=&SYSUID
//*****
/* Customize the job by setting the following symbols: *
/* *
/* <vrml> IMS Version: 121, 131, 141 *
/* <ALZ.V2R4M0.SALZLINK> IMS PI link library *
/* <prefix.IMSPI.CDS> IMS PI Control Data Set *
/* <input.CQS.logstream> CQS log stream name that was specified *
/* in the LOGNAME= parameter in the *
/* CQSSGxxx PROCLIB member. *
/* <IMSPI.CQS.EXTRACT> Output CQS extract DSN (optional) *
/* <yyyy-mm-dd-hh.mm.ss.thmiju> Reporting period (optional) *
//*****
/*
//ALZ EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrml>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//ALZCDS DD DISP=SHR,DSN=<prefix.IMSPI.CDS>
//LOGIN DD DSN=<input.CQS.logstream>,
// SUBSYS=(LOGR,IXGSEXIT,
// 'FROM=(2014/175,10:00),TO=(2014/175,10:05),LOCAL'),
// DCB=(BLKSIZE=32760)
//SYSPRINT DD SYSOUT=*
//LOGRPT DD SYSOUT=*
//EXTRACT DD DISP=OLD,DSN=<IMSPI.CQS.EXTRACT>
//SYSIN DD *
START <yyyy-mm-dd-hh.mm.ss.thmiju> ... For example, 2014-06-24-10.00
STOP <yyyy-mm-dd-hh.mm.ss.thmiju> 2014-06-24-10.05
REPORT OUTPUT(LOGRPT)
EXTRACT OUTPUT(EXTRACT)
/*
```

Figure 287. Sample JCL ALZCQS: CQS report and extract

Note: Log streams require the LOGR subsystem to be started before data can be read. Start the LOGR subsystem by issuing the following MVS command:

```
SETSSI ADD,SUBNAME=LOGR,INITRTN=IXGSSINT
```

ALZCSV: CSV extract

Generic JCL to create a CSV (comma separated value) extract.

```
//ALZCSV JOB ,CLASS=A,NOTIFY=&SYSUID
//*****
/* Customize the job by setting the following symbols: *
/* * *
/* <vrml> IMS Version: 121, 131, 141 *
/* <ALZ.V2R4M0.SALZLINK> IMS PI link library *
/* <prefix.IMSPI.CDS> IMS PI Control Data Set *
/* <input.log> Input IMS log files *
/* <prefix.IMSPI.CSV> Output CSV delimited text file *
/* <yyyy-mm-dd-hh.mm.ss.thmiju> Reporting period (optional) *
/* <csvform> Existing Form in CDS to specify CSV fields *
//*****
/*
//ALZ EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrml>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//ALZCDS DD DISP=SHR,DSN=<prefix.IMSPI.CDS>
//LOGIN DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT DD SYSOUT=*
//CSV DD DISP=OLD,DSN=<prefix.IMSPI.CSV>
//SYSIN DD *
START <yyyy-mm-dd-hh.mm.ss.thmiju> ... For example, 2014-06-24-10.00
STOP <yyyy-mm-dd-hh.mm.ss.thmiju> 2014-06-24-10.05
CSV FORM(<csvform>) DELIMITER(,) LABELS
/*
```

Figure 288. Sample JCL ALZCSV: CSV extract

Related reference:

“CSV command” on page 398

The CSV command requests that a subset of log records be written to a delimited text file for use, for example, by PC spreadsheets.

ALZDBASE: REXX for IMS 4006 Checkpoint DDIR

Sample REXX to format and display DDIR segments as SYSGEN DATABASE macros.

Use the sample JCL ALZRXCOPY to copy the REXX member to your SYSEXEC library.

Execute this exec from a filter or from field zoom.

Executing from a filter

1. Create a filter and insert an IMS 4006 Checkpoint DDIR row.
2. Specify the name of the REXX (ALZDBASE) in the REXX field. See “Sample REXX execs” on page 121.
3. Insert a global criteria ALL row if you want to include all other log records.
4. Browse an IMS log data set using the filter and select a 4006 record.
5. Position the cursor to a CHKTRSTR field and press Enter.
6. The REXX exec is automatically invoked and the DATABASE macro is displayed in view mode.

Executing from field zoom

1. Select a 4006 log record in the browser and zoom on a CHKTRSTR field.
2. On the command line in the zoom panel, enter ALZDBASE to invoke the REXX exec.
3. The DATABASE macro is displayed in view mode.

Related reference:

“ALZRXCPY: Copy sample REXX to SYSEEXEC library” on page 425
Sample JCL to copy (and rename) the sample REXX execs to your specified SYSEEXEC library.

ALZDBRC: DBRC Log Selection

Generic JCL to run Automated File Selection (DBRC Log Selection for IMS log data and Journal File Selection for Connect data), then automatically submit a job to run the IMS PI Log Reporter for the selected files.

```

//ALZDBRC JOB ,CLASS=A,NOTIFY=&SYSUID
//*****
/* Customize the job by setting the variables enclosed in < ... >.  *
//*****
//ALZ      EXEC PGM=ALZDBRC[,PARM='IMSPLEX=<plex>,DBRCGRP=<grp>']
//STEPLIB DD DSN=<ALZ.V2R4M0.SALZLINK>,DISP=SHR
//CEXDEF  DD <prefix.CEXDEF.REPOSTRY>,DISP=SHR  CON
//SYSPRINT DD SYSOUT=*
//ALZPRINT DD SYSOUT=*
//ALZRDR  DD SYSOUT=(*,INTRDR)
//ALZWRK1 DD SPACE=(TRK,(1,1,1)),UNIT=SYSDA
//ALZWRK2 DD SPACE=(TRK,(3,1)),UNIT=SYSDA
//SYSIN   DD SPACE=(TRK,(3,1)),UNIT=SYSDA
//ALZPARM DD *
FROM=(<yyyy-mm-dd>[<-hh.mm.ss.th>])
TO=(<yyyy-mm-dd>[<-hh.mm.ss.th>])
IMSID=<imid>
      SSID=<ssid>
      VRM=<vrn>
      CAT=<YES|NO>
      OLDS=<YES|NO>
      SLDS=<PRI|SEC>
      RESLIB=<ims.reslib.dsn>
      MDA=<ims.mda.dsn>
      RECON1=<recon1.dsn>
      RECON2=<recon2.dsn>
      RECON3=<recon3.dsn>
HWSID=<xxxxxxx>  CON
/*
//ALZSKEL DD DATA,DLM=$$
//ALZRPT  JOB
/*
//ALZ      EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrn>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//ALZCDS  DD DISP=SHR,DSN=<prefix.IMSPI.CDS>
//SYSPRINT DD SYSOUT=*
//LOGRPT  DD SYSOUT=*
//EXTRACT DD DISP=OLD,DSN=<prefix.IMSPI.EXTRACT>
//LOGIN   DD DUMMY /* Log file insert point */
//CEXIN   DD DUMMY /* Journal file insert point */  CON
//SYSIN   DD *
PAGELIM(<nnnnn>)
START <yyyy-mm-dd-hh.mm.ss.thmiju> ... For example, 2014-08-31-10.00
STOP  <yyyy-mm-dd-hh.mm.ss.thmiju> 2014-08-31-10.05
REPORT OUTPUT(LOGRPT)
CODE(07)
COND TRANCODE EQ 'STOK*'
EXTRACT OUTPUT(EXTRACT)
CODE(07)
COND TRANCODE EQ 'STOK*'
CONNECT  CON
/*
$$

```

Figure 289. Sample JCL ALZDBRC: DBRC Log Selection

CON indicates the additional statements required if processing Connect data. For automated Journal File Selection, the Connect system or systems (HWSID=) must be defined in the IMS Connect Extensions repository (CEXDEF DD).

Using the dialog

Similar JCL can be generated using the IMS PI dialog.

If processing log data from IMS systems only, there are three steps:

1. Specify DBRC Settings for the IMS Subsystem.
2. Submit the report request for an IMS Subsystem or Group of systems.
3. Specify the report interval.

Step 1: From the IMS Problem Investigator Primary Option Menu, select option **4 Systems** to display your table of IMS subsystems. Enter line action **S** to select an IMS Subsystem and specify its DBRC Settings.

```

File  Menu  Help
-----
                                IMS Subsystem                More: < >
Command ==> _____

Specify IMS Subsystem definition.

IMS Subsystem ID . . . ISYS  IMS Version (VRM) . . . 141  +
Description . . . . . IMS VSYS subsystem
RESLIB Data Set . . . . 'IMS.VSYS.RESLIB'
-----
Specify required view . . 1  1. DBRC Settings      4. Groups
                             2. Log Files          5. OMEGAMON TRF Files
                             3. Monitor Files      6. OMEGAMON ATF Journals
-----
Specify DBRC Settings for automated log file selection:

DBRC Subsystem ID . . . _____ (Specify RSENAME for XRF)
DBRC IMSplex name . . . _____ (RECON Loss Notification)
DBRC Sharing Group ID . . _____ (Parallel RECON Access)
RECON Data Set 1 . . . 'IMS.VSYS.RECON1'
                   2 . . . 'IMS.VSYS.RECON2'
                   3 . . . 'IMS.VSYS.RECON3'
MDA Data Set . . . . . 'IMS.VSYS.USERLIB'
-----
Enter "/" to select option      JES2 options:
- Log Data Sets are Cataloged   (DBRC) Node . . _____ SYSAFF . . _____
- Use OLDS that are not Archived (SLDS) Node . . _____ SYSAFF . . _____
- Use Secondary Log Data Sets

```

Figure 290. DBRC Settings for an IMS Subsystem

Step 2: Request reporting using DBRC Log Selection. There are two ways to do this:

1. Select option **4 Systems** from the Primary Option Menu. The System Definitions are displayed. Use the Left function key (F10) and the Right function key (F11) to view all columns. Enter line action **J** to select a particular system for reporting. The system must have DBRC Settings specified (system DBRC indicator is Yes).

```

File  Menu  Edit  Help
-----
                        System Definitions                      Row 1 of 3 More: < >
Command ==> _____ Scroll ==> PAGE

Select to specify input files.                                Auto_File
----- Files ----- Selection
/ System  Type   VRM + Log Mon CEX TRF ATF DBRC CEX
  VLOG    IMS    131 Yes Yes      No No  Yes
J I101    IMS    121 Yes Yes      No No  Yes
- ICAK    IMS    131 Yes Yes      No No  No
***** End of list *****

```

Figure 291. IMS Subsystem report request using DBRC Log Selection

2. Select option **5 Groups** from the Primary Option Menu. The list of Groups is displayed. Enter line action **J** to select a particular group of systems for reporting. The group must have all IMS Subsystems with DBRC Settings specified (group DBRC indicator is Yes).

```

                        Groups                                Row 1 to 2 of 2
Command ==> _____ Scroll ==> PAGE

Specify Groups of IMS and Connect systems.

/ Group      Description      ---- IMS ----  -- Connect --
J PRODPLEX   Production IMS Sysplex  3 Yes Yes    0 No No
- TESTPLEX   Test IMS Sysplex       2 Yes No     1 Yes Yes

```

Figure 292. Group report request using DBRC Log Selection

Step 3: Specify the reporting period when prompted for run-time options, then press Enter to proceed with the submit request.

```

                        Submit Batch Request
SUBMIT   Group - PRODPLEX
Command ==> _____

Filtering Criteria:      ----- Report Interval -----
Filter . . . STOK07  +      YYYY-MM-DD HH.MM.SS.TH
                          From 2014-04-24 10.00.00.00
                          To   2014-04-24 10.05.00.00

/ Extract
Data Set . . . 'prefix.IMSPI.EXTRACT'

- CSV
Form . . . . . + - Include field labels
Delimiter . . ;
Data Set . . .

/ Report
- Form / STD - Brief      Enter "/" to select option
- Dump - HEX0 - HEX1      - File is a log stream
                          - Edit JCL before submit
                          / Scrub sensitive data

```

Figure 293. Specify report interval for DBRC Log Selection

Related concepts:

“IMS Connect Journal File Selection” on page 176

IMS Connect Extensions Journal File Selection is an IMS Problem Investigator facility that automatically selects the Journal files for report processing. It offers an alternative to having to explicitly specify or select the Journal input files. Simply specify the IMS Connect system and the time period for which reporting is required, and IMS Problem Investigator will select the Journal files covering that time period.

Related reference:

“JCL using Journal File Selection” on page 177

Using options specified from the dialog, IMS Problem Investigator builds the JCL to execute the Automated File Selection utility ALZDBRC.

“ALZDBRC JCL statements” on page 113

IMS Problem Investigator generates JCL to perform automated file selection using the ALZDBRC utility.

“CONNECT command” on page 398

The CONNECT command is used to request IMS Connect reporting and specify the logcode of the IMS Connect Extensions event records being analyzed.

ALZEXPIM: Export/Import

Generic JCL to copy filters and forms from one complex to another.

The job has three steps:

1. Export from the source CDS to a work file
2. Use FTP to transfer (in binary) the work file to the target server
3. Import the transferred work file to the target CDS

```

//ALZEXPIM JOB ,CLASS=A,NOTIFY=&SYSUID
//*****
/* Customize the job by setting the following symbols:      *
/*                                                         *
/* <vrml>                IMS Version: 121, 131, 141        *
/* <ALZ.V2R4M0.SALZLINK>  IMS PI link library              *
/* <prefix.IMSPI.CDSOLD>   IMS PI Control Data Set (Source) *
/* <prefix.IMSPI.CDSNEW>   IMS PI Control Data Set (Target) *
/* <userid.IMSPI.CDSEXT>   Work file of exported CDS data   *
/* <userid.IMSPI.CDSIMPT>  Work file of imported CDS data   *
/* <hlq.TCPPARMS(FTPDATA)> For your site                    *
/* <hlq.TCPPARMS(TCPDATA)> For your site                    *
/* <IP address>           Address of remote FTP server      *
/*                                                         *
/* XEQ, JOBPARM and ROUTE are optional JES2 Control Statements *
/* <node>                  Network node where the job will execute *
/* <name>                  System name to process the job    *
//*****

//ALZEXPT EXEC PGM=ALZBATCH,REGION=6M
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//ALZCDS DD DISP=SHR,DSN=<prefix.IMSPI.CDSOLD>
//LOGIN DD DUMMY
//AMAWORK1 DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//AMAPRINT DD SYSOUT=*
//ALZTERSE DD DISP=(,CATLG),DSN=<userid.IMSPI.CDSEXT>,
//          UNIT=SYSDA,SPACE=(CYL,(1,1)),
//          DCB=(RECFM=FB,LRECL=1024,BLKSIZE=6144)
//SYSPRINT DD SYSOUT=*
//LOGRPT DD DUMMY
//SYSIN DD *
EXPORT
/*
//ALZEXPIM JOB ,CLASS=A,NOTIFY=&SYSUID
//*
//FTP EXEC PGM=FTP,REGION=6M
//SYSFTPD DD DISP=SHR,DSN=<hlq.TCPPARMS(FTPDATA)>
//SYSTCPD DD DISP=SHR,DSN=<hlq.TCPPARMS(TCPDATA)>
//SYSPRINT DD SYSOUT=*
//OUTPUT DD SYSOUT=*
//INPUT DD *,DLM=$$
//          <IP address>
//          <userid>
//          <password>
//          bin
//          quote site recfm=fb lrecl=1024 blksize=6144 cyl pri=1 sec=1
//          put '<userid.IMSPI.CDSEXT>' <IMSPI.CDSIMPT>
//          quit
//          $$
//*
//ALZEXPIM JOB ,CLASS=A,NOTIFY=&SYSUID
/*XEQ <node>
/*JOBPARM SYSAFF=<name>
/*ROUTE PRINT <node>
//*
//ALZIMPT EXEC PGM=ALZBATCH,REGION=6M
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//ALZCDS DD DISP=SHR,DSN=<prefix.IMSPI.CDSNEW>
//LOGIN DD DUMMY
//AMAWORK1 DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//AMAPRINT DD SYSOUT=*
//ALZTERSE DD DISP=OLD,DSN=<userid.IMSPI.CDSIMPT>
//SYSPRINT DD SYSOUT=*
//LOGRPT DD DUMMY
//SYSIN DD *
IMPORT NOREPLACE
/*

```

Figure 294. Sample JCL ALZEXPIM: Export/Import filters and forms

EXPORT/IMPORT commands

1 Format of the EXPORT command:

```
EXPORT
  FILTER(MY*,PROBLEM1)
  FORM(MY*,REC01)
  OBJECTLIST(*)
```

Specify the filters, forms and object lists to be exported. List the names separated by a comma. Specify names explicitly or use the masking character * to represent any number of characters or % for a single character.

FILTER, FORM and OBJECTLIST are optional. If none are specified, all filters, forms and object lists are exported.

Filters are exported along with their associated forms and object lists.

2 Format of the IMPORT command:

```
IMPORT REPLACE|NOREPLACE
```

Specify REPLACE to overwrite target members of the same type and name. Specify NOREPLACE to preserve existing members. If neither is specified, NOREPLACE is the default.

At import completion, a report is produced showing imported members, those replaced, and those not imported if NOREPLACE was specified.

Report example: EXPORT/IMPORT with NOREPLACE

V2R4M0 IMS Problem Investigator - System Messages

```
IMPORT
ALZ0095I Filter V10MON not imported (noreplace)
ALZ0095I Filter V10CEX not imported (noreplace)
ALZ0095I Filter V10IMS not imported (noreplace)
ALZ0095I Filter F5901 not imported (noreplace)
ALZ0095I Filter INSTRUM not imported (noreplace)
ALZ0095I Filter A not imported (noreplace)
ALZ0095I Filter B not imported (noreplace)
ALZ0095I Filter C not imported (noreplace)
ALZ0095I Form DB20002 not imported (noreplace)
ALZ0095I Form IMSFORM not imported (noreplace)
ALZ0095I Form MQ not imported (noreplace)
ALZ0095I Form IMS not imported (noreplace)
ALZ0095I Form OMEGA not imported (noreplace)
ALZ0095I Form IMSFORM3 not imported (noreplace)
ALZ0095I Form FORM02A not imported (noreplace)
ALZ0095I Form FORM02B not imported (noreplace)
ALZ0095I Form FORM07 not imported (noreplace)
ALZ0095I Form FORM07A not imported (noreplace)
ALZ0095I Form A not imported (noreplace)
ALZ0095I List Z not imported (noreplace)
ALZ0095I List X not imported (noreplace)
ALZ0095I List A not imported (noreplace)
ALZ0009I IMS PI processing has completed, RC=00
```

Figure 295. Report output from EXPORT/IMPORT with NOREPLACE

Report example: EXPORT/IMPORT with REPLACE

V2R4M0 IMS Problem Investigator - System Messages

```
IMPORT REPLACE
ALZ0095I Filter MYFILTER imported
ALZ0095I Filter MYFILT2 imported
ALZ0095I Filter MYWORD imported
ALZ0095I Filter PROBLEM1 imported (replaced)
ALZ0095I Form A imported (replaced)
ALZ0095I List X imported (replaced)
ALZ0095I List A imported (replaced)
ALZ0095I IMS PI processing has completed, RC=00
```

Figure 296. Report output from EXPORT/IMPORT with REPLACE

Related concepts:

Chapter 21, “Defining a Control Data Set (CDS),” on page 269

The Control Data Set (CDS) is a VSAM KSDS that is the repository for Filters, Object Lists, Forms, and User Log records. You can define your own personalized CDS or you can use a common CDS that allows you to share definitions with others.

ALZICONV: REXX for ASCII to EBCDIC translation

Sample REXX to translate ASCII to EBCDIC or EBCDIC to ASCII using EBCDIC code page 1047.

Related reference:

“ALZRXCPY: Copy sample REXX to SYSEXEC library” on page 425

Sample JCL to copy (and rename) the sample REXX execs to your specified SYSEXEC library.

ALZMSG: REXX for IMS 01 and 03 text messages

Sample REXX exec to process IMS 01 and 03 log records and present the LTERM, transaction code, user ID, terminal and message text.

Use the sample JCL ALZRXCPY to copy the REXX member to your SYSEXEC library.

Related reference:

“ALZRXCPY: Copy sample REXX to SYSEXEC library” on page 425

Sample JCL to copy (and rename) the sample REXX execs to your specified SYSEXEC library.

ALZMSGT: REXX for IMS 01 text message

Sample REXX exec to process IMS 01 log records and present the contents of messages that span multiple segments and records in a merged view.

Use the sample JCL ALZRXCPY to copy the REXX member to your SYSEXEC library.

Related reference:

“ALZRXCPY: Copy sample REXX to SYSEXEC library” on page 425

Sample JCL to copy (and rename) the sample REXX execs to your specified SYSEXEC library.

ALZRPT: IMS log

Generic JCL to run the IMS PI Log Reporter for a specified IMS log input file.

```
//ALZRPT JOB ,CLASS=A,NOTIFY=&SYSUID
//*****
//* Customize the job by setting the following variables: *
//* * *
//* <vrml> IMS Version: 121, 131, 141 *
//* <ALZ.V2R4M0.SALZLINK> IMS PI link library *
//* <prefix.IMSPI.CDS> IMS PI Control Data Set *
//* <input.log> Input IMS log data set(s) *
//* <prefix.IMSPI.EXTRACT> Output IMS log data set extract (optional) *
//* <yyyy-mm-dd-hh.mm.ss.thmiju> Reporting period (optional) *
//*****
//*
//ALZ EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrml>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//ALZCDS DD DISP=SHR,DSN=<prefix.IMSPI.CDS>
//LOGIN DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT DD SYSOUT=*
//EXTRACT DD DISP=OLD,DSN=<prefix.IMSPI.EXTRACT>
//SYSIN DD *
START <yyyy-mm-dd[-hh.mm.ss.thmiju]> ... For example, 2014-06-24-10.00
STOP <yyyy-mm-dd[-hh.mm.ss.thmiju]> 2014-06-24-10.05
REPORT OUTPUT(LOGRPT)
CODE(07)
COND TRANCODE EQ 'STOK*'
EXTRACT OUTPUT(EXTRACT)
CODE(07)
COND TRANCODE EQ 'STOK*'
/*
```

Figure 297. Sample JCL ALZRPT: IMS log report and extract

Using the dialog

Similar JCL can be generated using the IMS PI dialog as shown in the following figures.

File Menu Edit Help			
Process Log Files		Row 1 of 2 More: < >	
Command ==>		Scroll ==> CSR	
Select a Log File to browse.		IMS Release 121 +	Zone
/	Log File	Rel +	Filter + Zone
SUB	'IMSA.SLDS.D2014013.T135723.F1'		STOK07
	'IMSA.EXTRACT.D2014013.T135723.F1'		

Figure 298. Submit IMS log file report request

ALZRXCPY: Copy sample REXX to SYSEXEC library

Sample JCL to copy (and rename) the sample REXX execs to your specified SYSEXEC library.

```
//ALZRXCPY JOB ,CLASS=A,NOTIFY=&SYSUID
//COPY      EXEC PGM=IEBCOPY
//*
//SAMPLIB   DD  DISP=SHR,DSN=<ALZ.V2R4M0.SALZSAMP>
//SYSEXEC   DD  DISP=SHR,DSN=<user.sysexec>
//SYSPRINT  DD  SYSOUT=*
//SYSIN     DD  *
COPY INDD=SAMPLIB,OUTDD=SYSEXEC
      SELECT MEMBER=( (ALZAPPLC,APPLC),           +
                      (ALZDBASE,DBASE),           +
                      (ALZMSGT,MSGT),             +
                      (ALZRTCDE,RTCDE),           +
                      (ALZTRANS,TRANS))
```

Figure 300. Sample JCL ALZRXCPY: Copy sample REXX to SYSEXEC library

Remember: Specify the SYSEXEC library data set name in your IMS PI profile settings, accessible by selection option **0.1 IMS PI Settings** from the IMS Problem Investigator Primary Option Menu.

Related reference:

“IMS PI Settings” on page 273

You can adjust the settings to customize the IMS PI dialog and batch JCL for running reports and extracts. All required options have initial settings so you can start using IMS PI immediately.

“ALZAPPLC: REXX for IMS 4007 Checkpoint PDIR” on page 411

Sample REXX exec to format and display PDIR segments as SYSGEN APPLCTN macros.

“ALZDBASE: REXX for IMS 4006 Checkpoint DDIR” on page 414

Sample REXX to format and display DDIR segments as SYSGEN DATABASE macros.

“ALZICONV: REXX for ASCII to EBCDIC translation” on page 422

Sample REXX to translate ASCII to EBCDIC or EBCDIC to ASCII using EBCDIC code page 1047.

“ALZMSG: REXX for IMS 01 and 03 text messages” on page 422

Sample REXX exec to process IMS 01 and 03 log records and present the LTERM, transaction code, user ID, terminal and message text.

“ALZMSGT: REXX for IMS 01 text message” on page 422

Sample REXX exec to process IMS 01 log records and present the contents of messages that span multiple segments and records in a merged view.

“ALZRTCDE: REXX for IMS 4083 Checkpoint RCTE” on page 424

Sample REXX to format and display RCTE segments as SYSGEN RTCODE macros.

“ALZTRANS: REXX for IMS 4004 Checkpoint SMB” on page 435

Sample REXX to format and display SMB segments as SYSGEN TRANSACT macros.

“ALZXA0A4: REXX to translate CON A0A4 fields” on page 443

REXX exec to translate fields in the IMS Connect event record A0A4 from ASCII to EBCDIC.

“ALZXDUMP: REXX to create a formatted dump” on page 443

REXX exec to create a formatted hexadecimal dump.

“ALZXFMT: REXX to convert unprintable characters” on page 443
REXX exec to report unprintable characters in a binary string as periods. This function is useful when creating formatted dumps.

ALZSAMP1: Filter on transaction code

Sample JCL to report all type 07 Application Termination Statistics records where the transaction code matches pattern 'STOK*'.

```
//ALZSAMP1 JOB ,CLASS=A,NOTIFY=&SYSUID
//ALZ      EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vr>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//LOGIN   DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT  DD SYSOUT=*
//SYSIN   DD *
PAGELIM(10000)
REPORT OUTPUT(LOGRPT)
CODE(07)
COND TRANCODE EQ 'STOK*'
/*
```

Figure 301. Sample JCL ALZSAMP1: All 07 IMS log records with specified TRANCODE pattern

Using the dialog

You can use the IMS PI dialog to specify an equivalent filter.

File Menu View Help

EDIT Filter - STOK07 Row 1 of 1 More: < >

Command ==> Scroll ==> CSR

Description . . . ALZSAMP1 _ Activate Tracking

/ Log Code + Exc Description

S IMS 07 Application Terminate Accounting

Level _ Conditions Yes Form _ + REXX _

Figure 302. Define Filter for IMS log code 07

File Menu Object Lists Help

Conditions Row 1 to 1 of 1

Command ==> Scroll ==> CSR

Code: 07 Application Terminate Accounting

/ Field Name + Oper Value +

_ TRANCODE EQ 'STOK*'

Figure 303. Specify Conditions: TRANCODE masking pattern

TRANCODE is a global field. For the type 07 log record, you can also specify the transaction code field name as DLRTRNCD.

File Menu Object Lists Help			
Command ==>		Conditions	Row 1 to 1 of 1 Scroll ==> CSR
Code: 07 Application Terminate Accounting			
/	Field Name +	Oper	Value +
-	DLRTRNCD	EQ	'STOK*'

Figure 304. Specify Conditions: Equivalent field name for TRANCODE

ALZSAMP2: Select messages containing specified string

Sample JCL to report all type 01/03 Output Message records when the message text contains the string 'UNAUTHORIZED'.

```
//ALZSAMP2 JOB ,CLASS=A,NOTIFY=&SYSUID
//ALZ      EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vr>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//LOGIN   DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT  DD SYSOUT=*
//SYSIN   DD *
PAGELIM(10000)
REPORT OUTPUT(LOGRPT)
CODE(01)
COND QDF2CNT ON
COND MSGXSTXT(*) EQ 'UNAUTHORIZED'
CODE(03)
COND QDF2CNT ON
COND MSGXSTXT(*) EQ 'UNAUTHORIZED'
/*
```

Figure 305. Sample JCL ALZSAMP2: All 01/03 IMS log records with specified character string

Using the dialog

You can use the IMS PI dialog to specify an equivalent filter.

File Menu View Help			
EDIT		Filter - MSG0103	Row 1 of 2 More: < >
Command ==>			Scroll ==> CSR
Description . . . ALZSAMP2			Activate Tracking
/	Log Code + Exc	Description	
S	IMS 01	IMS Message	
	Level	Conditions	Yes Form + REXX
-	IMS 03	IMS Message	
	Level	Conditions	Yes Form + REXX

Figure 306. Define Filter for IMS log codes 01/03 (OR assumed)

File Menu Object Lists Help			
Conditions		Row 1 to 2 of 2	
Command ==>		Scroll ==> CSR	
Code: 01 IMS Message			
/	Field Name +	Oper	Value +
=	QDF2CNT	ON	
=	MSGXSTXT(*)	EQ	'UNAUTHORIZED'

Figure 307. Specify Conditions for IMS log code 01 (AND assumed)

File Menu Object Lists Help			
Conditions		Row 1 to 2 of 2	
Command ==>		Scroll ==> CSR	
Code: 03 IMS Message			
/	Field Name +	Oper	Value +
=	QDF2CNT	ON	
=	MSGXSTXT(*)	EQ	'UNAUTHORIZED'

Figure 308. Specify Conditions for IMS log code 03 (AND assumed)

ALZSAMP3: Filter on database name and RBA range

Sample JCL to report all type 50 Database Update records when the database name is STOCK and the RBA range is between X'1000' and X'8000'.

```
//ALZSAMP3 JOB ,CLASS=A,NOTIFY=&SYSUID
//ALZ      EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrm>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//LOGIN   DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT  DD SYSOUT=*
//SYSIN   DD *
PAGELIM(10000)
REPORT OUTPUT(LOGRPT)
CODE(50)
COND DATABASE EQ 'STOCK'
COND RBA      GE X'00001000'
COND RBA      LE X'00008000'
/*
```

Figure 309. Sample JCL ALZSAMP3: All type 50 IMS log records for specified database and RBA

Using the dialog

You can use the IMS PI dialog to specify an equivalent filter.

File Menu View Help			
EDIT		Filter - DB50	Row 1 of 1 More: < >
Command ==>			Scroll ==> CSR
Description . . . ALZSAMP3 Activate Tracking			
/	Log Code + Exc	Description	
S	IMS 50	Database Update	
	Level	Conditions	Yes Form + REXX

Figure 310. Define Filter for IMS log code 50

File Menu Object Lists Help			
Command ==>		Conditions	Row 1 to 4 of 4
			Scroll ==> CSR
Code: 50 Database Update			
/	Field Name +	Oper	Value +
-	DATABASE	EQ	'STOCK'
-	RBA	GE	X'00001000'
-	RBA	LE	X'00008000'
-			

Figure 311. Specify multiple Conditions (AND assumed)

DATABASE and RBA are global fields. For the type 50 log record, you can also specify the database field name as DDBDNAME, and the RBA field name as DLOGRBA.

File Menu Object Lists Help			
Command ==>		Conditions	Row 1 to 4 of 4
			Scroll ==> CSR
Code: 50 Database Update			
/	Field Name +	Oper	Value +
-	DDBDNAME	EQ	'STOCK'
-	DLOGRBA	GE	X'00001000'
-	DLOGRBA	LE	X'00008000'
-			

Figure 312. Specify Conditions: Equivalent field names for DATABASE and RBA

ALZSAMP4: Filter on User ID

Sample JCL to report all log record types with a User ID value of 'JOHN' or 'JACK'.

```

//ALZSAMP4 JOB ,CLASS=A,NOTIFY=&SYSUID
//ALZ      EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrn>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//LOGIN   DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT  DD SYSOUT=*
//SYSIN   DD *
PAGELIM(10000)
REPORT OUTPUT(LOGRPT)
CODE(ALL)
COND USERID EQ 'JOHN'
COND USERID EQ 'JACK'
/*

```

Figure 313. Sample JCL ALZSAMP4: All log records for specified User IDs

Using the dialog

You can use the IMS PI dialog to specify an equivalent filter.

File Menu Object Lists Help			
Command ==>		Conditions	Row 1 to 2 of 2 Scroll ==> CSR
Code: ALL Global Criteria for all Log Record Codes			
/	Field Name +	Oper	Value +
-	USERID	EQ	'JOHN'
-	USERID	EQ	'JACK'

Figure 314. Specify Conditions: specific User IDs

The adjacent conditions specify the same field name (USERID) and operator (EQ), therefore IMS PI will OR the condition statements.

Alternatively, you could define an Object List that contains the two names, then specify the Object List in a single Condition statement. Object Lists in the action bar allows you to link directly to where you can define the Object List.

File Menu Help			
Command ==>		Object Lists	Scroll ==> CSR
Select an Object List to edit.			
/	Name	Description	Changed ID
***** Bottom of data *****			

Figure 315. Define a new Object List

File Menu Help			
EDIT		Object List - JPEOPLE	Row 1 to 1 of 1
Command ==>			Scroll ==> CSR
Description . . . Interesting people			
Specify the Object List values:			
/			
=	JOHN	JACK	

Figure 316. Specify the list of values

File Menu Object Lists Help			
Command ==>		Conditions	Row 1 to 1 of 1
			Scroll ==> CSR
Code: ALL Global Criteria for all Log Record Codes			
/	Field Name +	Oper	Value +
=	USERID	EQ	&JPEOPLE

Figure 317. Specify the Object List in the Condition statement

ALZSAMP5: Filter on LSN range

Sample JCL to report all log records within the Log Sequence Number range of X'000000000000002E' to X'0000000000000097'.

```
//ALZSAMP5 JOB ,CLASS=A,NOTIFY=&SYSUID
//*****
//ALZ      EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrm>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//LOGIN   DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT  DD SYSOUT=*
//SYSIN   DD *
PAGELIM(10000)
REPORT OUTPUT(LOGRPT)
CODE(ALL)
COND LSN GE 000000000000002E
COND LSN LE 0000000000000097
/*
```

Figure 318. Sample JCL ALZSAMP5: All log records with LSN in a specified range

Using the dialog

You can use the IMS PI dialog to specify an equivalent filter.

File Menu Object Lists Help			
Command ==>		Conditions	Row 1 to 2 of 2 Scroll ==> CSR
Code: ALL Global Criteria for all Log Record Codes			
/	Field Name +	Oper	Value +
=	LSN	GE	000000000000002E
=	LSN	LE	0000000000000097

Figure 319. Specify Conditions: specific LSN range

The adjacent conditions specify the same field name (LSN) but different operators (GE/LE), therefore IMS PI will AND the condition statements.

ALZSAMP6: Filter on OrgUOWID

Sample JCL to report all type 01/03 Output Message records where the Originating Tracking UOW Token is X'B78306F58EC9E742'.

```
//ALZSAMP6 JOB ,CLASS=A,NOTIFY=&SYSUID
//ALZ      EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrn>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//LOGIN   DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT  DD SYSOUT=*
//SYSIN   DD *
PAGELIM(10000)
REPORT OUTPUT(LOGRPT)
CODE(01)
COND ORGUOWID EQ */B78306F58EC9E742
CODE(03)
COND ORGUOWID EQ */B78306F58EC9E742
/*
```

Figure 320. Sample JCL ALZSAMP6: All 01/03 IMS log records with a specified OrgUOWID

Using the dialog

You can use the IMS PI dialog to specify an equivalent filter.

File Menu View Help			
EDIT		Filter - ORGUOWID	Row 1 of 2 More: < > Scroll ==> CSR
Command ==>			
Description . . . ALZSAMP6		Activate Tracking	
/	Log Code + Exc	Description	
S	IMS 01	IMS Message	
		Level	Conditions Yes Form + REXX

-	IMS 03	IMS Message	
		Level	Conditions Yes Form + REXX

Figure 321. Define Filter for IMS log codes 01/03 (OR assumed)

File Menu Object Lists Help			
Command ==>		Conditions	Row 1 to 1 of 1 Scroll ==> CSR
Code: 01 IMS Message			
/	Field Name +	Oper	Value +
-	ORGUOWID	EQ	*/B78306F58EC9E742

Figure 322. Specify Conditions for IMS log code 01: specific ORGUOWID

File Menu Object Lists Help			
Command ==>		Conditions	Row 1 to 1 of 1 Scroll ==> CSR
Code: 03 IMS Message			
/	Field Name +	Oper	Value +
-	ORGUOWID	EQ	*/B78306F58EC9E742

Figure 323. Specify Conditions for IMS log code 03: specific ORGUOWID

ORGUOWID is an global field equivalent to MSGORGID/MSGORGTK. This is shown in the following example. Note that you can achieve the same result without the MSGORGID condition specified.

File Menu Object Lists Help			
Command ==>		Conditions	Row 1 to 2 of 2 Scroll ==> CSR
Code: 03 IMS Message			
/	Field Name +	Oper	Value +
D	MSGORGID	EQ	*
-	MSGORGTK	EQ	X'B78306F58EC9E742'

Figure 324. Specify Conditions for IMS log code 03: ORGUOWID equivalent

ALZSAMP7: Select all Checkpoint and Statistics log records

Sample JCL to report all type 40 Checkpoint and type 45 Statistics log records.

```
//ALZSAMP7 JOB ,CLASS=A,NOTIFY=&SYSUID
//ALZ      EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrm>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//LOGIN   DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT  DD SYSOUT=*
//SYSIN   DD *
PAGELIM(10000)
REPORT OUTPUT(LOGRPT)
CODE(40)
CODE(45)
/*
```

Figure 325. Sample JCL ALZSAMP7: All Checkpoint (40) and Statistics (45) IMS log records

Using the dialog

You can use the IMS PI dialog to specify an equivalent filter.

EDIT		Filter - CHPSTAT		Row 1 of 2 More: < >	
Command ==>				Scroll ==> CSR	
Description . . . ALZSAMP7			Activate Tracking		
/	Log Code + Exc	Description			
S	IMS 40	Unknown code			
		Level	Conditions	No	Form
					+ REXX

-	IMS 45	Unknown code			
		Level	Conditions	No	Form
					+ REXX

Figure 326. Define Filter for IMS log codes 40/45 (OR assumed)

Record types 40 and 45 usually have subcodes, for example, 4001 (Checkpoint Begin) and 45FF (End of Statistics). Consequently, 40 and 45 are not offered in the log code prompt list and are shown with description Unknown code. However, this does not prevent them being used as shown in Figure 326.

ALZSAMP8: Select specified IMS user log records

Sample JCL to report all type DE user log records. IMS user log records have log codes in the range A0 to FF.

```
//ALZSAMP8 JOB ,CLASS=A,NOTIFY=&SYSUID
//ALZ      EXEC PGM=ALZBATCH,REGION=6M,PARM='V<vrm>'
//STEPLIB DD DISP=SHR,DSN=<ALZ.V2R4M0.SALZLINK>
//LOGIN   DD DISP=SHR,DSN=<input.log>
//SYSPRINT DD SYSOUT=*
//LOGRPT  DD SYSOUT=*
//SYSIN   DD *
PAGELIM(10000)
REPORT OUTPUT(LOGRPT)
CODE(DE)
/*
```

Figure 327. Sample JCL ALZSAMP8: IMS user log records

Tip: IMS PI cannot format undefined user log records and will display them in dump format. However, you can write your own Knowledge Modules to define your user log codes and record formats to IMS PI.

Related concepts:

“Knowledge Modules reference” on page 339

To use IMS PI to analyze your IMS user log records, you need to define a Knowledge Module. IMS PI assists in this task by generating the Knowledge Module source, but you might need to edit the generated source to support more complex record formats.

ALZTRANS: REXX for IMS 4004 Checkpoint SMB

Sample REXX to format and display SMB segments as SYSGEN TRANSACT macros.

Use the sample JCL ALZRXCPY to copy the REXX member to your SYSEXEC library.

Execute this exec from a filter or from field zoom.

Executing from a filter

1. Create a filter and insert an IMS 4004 Checkpoint SMB row.
2. Specify the name of the REXX (ALZTRANS) in the REXX field. See “Sample REXX execs” on page 121.
3. Insert a global criteria ALL row if you want to include all other log records.
4. Browse an IMS log data set using the filter and select a 4004 record.
5. Position the cursor on an SMB field and press Enter. The REXX exec is automatically invoked and the TRANSACT macro is displayed in view mode.

Executing from field zoom

1. Select a 4004 log record in the browser and zoom on an SMB field.
2. On the command line in the zoom panel, enter ALZTRANS to invoke the REXX exec.
3. The TRANSACT macro is displayed in view mode.

Related reference:

“ALZRXCPY: Copy sample REXX to SYSEXEC library” on page 425
Sample JCL to copy (and rename) the sample REXX execs to your specified SYSEXEC library.

ALZUAUTH: Request Authorization exit

ALZUAUTH is the Request Authorization exit. Apply USERMOD ALZU002 (supplied in the SALZSAMP library) to install and activate the exit.

ALZUAUTH is invoked for the following functions:

1. DBRC Log Selection IMSPLEX validation.

The purpose of ALZUAUTH is to ensure that ALZDBRC never uses an incorrect PARM= because of the potential destructive nature of specifying IMSPLEX= in a "NONE" environment. ALZUAUTH does not change the PARM=, it only verifies and stops further DBRC Log Selection processing if incorrect. This discussion refers to the following JCL statement:

```
//ALZ EXEC PGM=ALZDBRC,PARM='IMSPLEX=name'
```

The dialog allows you to specify an IMSPLEX name for an IMS system or a group of systems (sysplex). The group IMSPLEX name takes precedence.

If the exit is not installed, then all DBRC requests can proceed. This has the potential of making the RECONs inaccessible if an incorrect IMSPLEX name is specified. Should this occur, the command CHANGE.RECON NOPLEX is required to resolve the problem.

2. Scrub IMS log records to remove sensitive or confidential data such as customer business information.

Use this approach when you want to make log files available to users, but you want to prevent IMS PI disclosing sensitive data in any of its reporting functions. The exit can force IMS log records to be scrubbed for all dialog and batch functions, depending on the supplied user ID, log file data set name, or other site-specific criteria.

Site-defined rules determine whether the user can only view scrubbed data. The sample exit as provided checks a hardcoded list of user IDs who can bypass scrub. Users not in the list will only be able to process scrubbed records.

Note: The “SCRUB command” on page 404 will always scrub log records, regardless of the exit.

Related reference:

“Scrubbing IMS log files” on page 67

Scrub removes sensitive or confidential information from selected IMS log files prior to inhouse analysis or sending offsite for problem determination. Use data scrubbing if you have this compliance requirement.

“SCRUB command” on page 404

The SCRUB command causes input log records to be scrubbed prior to report, extract or CSV processing. Use this approach to prevent sensitive or confidential data from being disclosed during log analysis, or if you want to send log files to IBM or another external location for problem determination.

“Security consideration” on page 109

The Request Authorization exit ALZUAUTH ensures that the DBRC Log Selection utility ALZDBRC always uses the correct IMSPLEX identification settings.

“ALZU002: Install Request Authorization exit” on page 443

Apply USERMOD ALZU002 to install and activate ALZUAUTH, the Request Authorization exit.

“Setting up an IMS subsystem for DBRC Log Selection” on page 324

Specifying your DBRC Settings allows you to use DBRC Log Selection for Log reporting. DBRC Log Selection is a facility that you can use when running your report requests. It automatically selects the required Log files from DBRC for the required reporting time period, saving you the effort of manually identifying relevant log data sets.

“Defining a group” on page 332

You can assign both IMS subsystems and Connect systems to a group by editing an existing group or defining a new group.

ALZUFA01: Map User Log fields

Sample User Log record mapping DSECT.

The user log record code is X'FA' with two subcodes. The DSECT demonstrates the coding standards required for the User Log record field definitions when using the dialog to create Knowledge Modules.

```

*****
* IMS User Log record for tracing database events *
*****
DBTRACE DSECT , .Database trace event
LL DC H'0' .Log Record length
ZZ DC H'0' .QSAM ZZ, always zero

TYPE DC X'0' .Log record type
TYPEFA EQU X'FA' . Type FA
SUBT DC X'0' .Log record subtype
SUBT01 EQU X'01' . FF Database trace
SUBT02 EQU X'02' . FP Database trace

FLAG1 DC X'00' .Flag Byte 1
FIMPP EQU X'80' . MPP
F1BMP EQU X'40' . BMP
F1IFP EQU X'20' . IFP

TRANCD DS CL8 .Transaction Code
PST DS XL2 .Region PST ID
IMSID DS CL8 .IMS ID
ORGUOWID DS XL8 .Tracking UOW ID
RECTOKEN DS XL8 .Recovery Token

TIMES DS 0C .Transaction Event Time stamps
STAUTC DS CL12 .Start time of transaction (UTC)
STASTCK DS D .Start time of transaction (STCK)
STOSTCK DS D .Stop time of transaction (STCK)

USRIDENT DS 0C .User Identification
USID DS CL8 . User ID
LTRM DS CL8 . LTERM
TERM DS CL8 . Terminal
UserInfo DS CL64 . User supplied information

DBENTS DS 0C .Database entries
COUNT DC F'0' .Number of Database entries
DBENT1 DS 0C .First Database entry

DBENT DSECT , .Database entry
DBNAME DS CL8 .Database name
DBINTENT DS C .Intent
DBUPDATE EQU C'U' . Database was updated
DBREAD EQU C'R' . Database was read only
DBNONE EQU C'N' . Database was not used
DBUPDCNT DS F .Update DLI call count
DBGETCNT DS F .Get DLI call count
DBENTLEN EQU *-DBENT .Database entry length

```

Figure 328. Sample User Log record mapping DSECT

Using the dialog

You can use the IMS PI dialog (option **7 User Log** on the IMS Problem Investigator Primary Option Menu) to create Knowledge Module source from a User Log record mapping DSECT such as the example above. The mapping macro provides the primitive field mapping and naming for the Knowledge Module.

User Log Code	
Command ==>	
User Log Code . . .	FA01
Description	User Log record type FA01
Knowledge Module processing option:	
1	1. Create source from Mapping Member
2	2. Edit source
3	3. Assemble and Link
User Log Record Data Set:	
Macro Library . . .	'ALZ.V2R4M0.SALZSAMP'
Mapping Member . .	ALZUFA01 +
Knowledge Module Libraries:	
Source	'ABC.HOLDER.WORK'
Load	'userid.IMSPI.USERLOAD'
SYSLIB Macro Libraries:	
1.	'ALZ240.GOLD.SALZSAMP'
2.	'IMS.SDFSMAC'
3.	'SYS1.MACLIB'

Figure 329. Define a Knowledge Module from a User Log record mapping DSECT

Related reference:

“Editing a User Log record definition” on page 336

After you define a new IMS User Log Code, or select an existing code from the list, you are presented with the Knowledge Module maintenance panel.

“ALZUKMA: Assemble User Knowledge Module”

Sample JCL to assemble and link a User Log record Knowledge Module, where the mapping of the User Log record is contained in the member ALZFA01 and the Knowledge Module source is in the member ALZUKMS.

“ALZUKMS: Sample User Knowledge Module” on page 440

Sample IMS PI Knowledge Module for IMS user log record FA01. Use ALZUKMA to assemble and link.

ALZUKMA: Assemble User Knowledge Module

Sample JCL to assemble and link a User Log record Knowledge Module, where the mapping of the User Log record is contained in the member ALZFA01 and the Knowledge Module source is in the member ALZUKMS.

```

//ALZUKMA JOB ,CLASS=A,NOTIFY=&SYSUID
//ASM      EXEC PGM=ASMA90,PARM='OBJECT,NODECK,RENT'
//SYSUT1   DD UNIT=SYSDA,SPACE=(CYL,(5,2))
//SYSLIB   DD DISP=SHR,DSN=ALZ.V2R4M0.SALZSAMP < Mapping macro library
//          DD DISP=SHR,DSN=ALZ.V2R4M0.SALZSAMP < IMS PI macro library
//          DD DISP=SHR,DSN=IMS.SDFSMACT < IMS macro library
//          DD DISP=SHR,DSN=SYS1.MACLIB < MVS macro library
//SYSIN    DD DISP=SHR,
//          DSN=ALZ.V2R4M0.SALZSAMP(ALZUKMS) < KM Source
//SYSLIN   DD DSN=&&OBJ,DISP=(NEW,PASS),SPACE=(TRK,(5,2)),UNIT=SYSDA
//SYSPRINT DD SYSOUT=*
//*
//          IF ASM.RC EQ 0 THEN
//LINK      EXEC PGM=IEWL,PARM='LIST,NCAL,XREF,RENT'
//SYSUT1   DD UNIT=SYSDA,SPACE=(TRK,(5,2))
//SYSPRINT DD SYSOUT=*
//SYSLOAD  DD DISP=SHR,
//          DSN=userid.IMSPI.USERLOAD(ALZFA01) < KM Load Module
//SYSLIN   DD DSN=&&OBJ,DISP=(SHR,DELETE)
//          ENDIF

```

Figure 330. Sample JCL ALZUKMA: Assemble and link a Knowledge Module

Related reference:

“ALZUFA01: Map User Log fields” on page 436

Sample User Log record mapping DSECT.

“ALZUKMS: Sample User Knowledge Module” on page 440

Sample IMS PI Knowledge Module for IMS user log record FA01. Use ALZUKMA to assemble and link.

ALZUKMF: Define User Knowledge Module fields

ALZUKMF is used by IMS PI Knowledge Modules (and associated routines) to define fields in IMS log records. Each log record supported by IMS PI must have a Knowledge Module. Every field in the log record is defined using an ALZUKMF macro call.

```

        MACRO ,
&FLDNAME ALZUKMF &TYPE=,
        &BASE=,
        &BIT=NAME,
        &BYTE=NAME,
        &OFFSET=NAME,
        &LENGTH=NAME,
        &MULT=,
        &EXIT=,
        &GLOBAL=,
        &ATTR=,
        &LEVEL=1
GBLA &FLDCTR
GBLC &FLAGNAM
GBLA &SEGLEV
GBLC &EOSEG(255),&BASENAM(255)
AIF ('TYPE' EQ 'DSECT').DSECT
AIF ('TYPE' EQ 'EOF').EOF

:

&V1      SETA  &V1+1
&V2      SETA  &V1+1
GF&V1    DC    X'00'          .End of GF Entries

GFTOTLEN EQU  *-ALZGF        .Total length of all GFs
MEND ,

```

Figure 331. IMS log record field definition macro

Related concepts:

“ALZUKMF macro: Define Knowledge Module fields” on page 340
 Use the ALZUKMF macro to define fields in the Knowledge Module.

Related reference:

“ALZUKMS: Sample User Knowledge Module”
 Sample IMS PI Knowledge Module for IMS user log record FA01. Use ALZUKMA to assemble and link.

ALZUKMS: Sample User Knowledge Module

Sample IMS PI Knowledge Module for IMS user log record FA01. Use ALZUKMA to assemble and link.

This Knowledge Module assembler source is built from the sample user log record mapping macro ALZUFA01:

```

ALZLFA01 CSECT ,
ALZLFA01 AMODE 31
ALZLFA01 RMODE ANY
        COPY  ALZUFA01
. . .

```

Followed by invocations of ALZUKMF to define the mapped fields:


```

DBTRACE  ALZUKMF TYPE=SEGMENT, GLOBAL=YES, 'Database trace event'
LL       ALZUKMF TYPE=HEX, 'Log Record length'
ZZ       ALZUKMF TYPE=HEX, 'QSAM ZZ, always zero'
TYPE     ALZUKMF TYPE=FLAG, 'Log record type'
TYPEFA   ALZUKMF TYPE=BIT, 'Type FA'
SUBT     ALZUKMF TYPE=HEX, 'Log record subtype'
SUBT01   ALZUKMF TYPE=BIT, 'FF Database trace'
SUBT02   ALZUKMF TYPE=BIT, 'FP Database trace'
FLAG1    ALZUKMF TYPE=FLAG, 'Flag Byte 1'
F1MPP    ALZUKMF TYPE=BIT, 'MPP'
F1BMP    ALZUKMF TYPE=BIT, 'BMP'
F1IFP    ALZUKMF TYPE=BIT, 'IFP'
TRANCD   ALZUKMF TYPE=CHAR, 'Transaction Code'
PST      ALZUKMF TYPE=HEX, 'Region PST ID'
IMSID    ALZUKMF TYPE=CHAR, 'IMS ID'
ORGUOWID ALZUKMF TYPE=STCK, 'Tracking UOW ID'
. . .

```

Figure 332. Knowledge Module field definitions

Exit routines for Segments allow you to set a base address for Segments, and add other logic:

```

        USING DBTRACE,R3
        USING FLDDEF,R5
        USING BASE_DBTRACE,R4
BASE_DBTRACE DS 0H
        LA    R1,DBTRACE
        SR    R15,R15
        BR    R14
        DROP  R3,R4,R5
        EJECT ,

```

Figure 333. Base Exit

Exit routines for repeating Segments allow you to set a base address for segments that recur more than once in a record, and add other logic:

```

        USING DBTRACE,R3
        USING FLDDEF,R5
        USING BASE_DBENT,R4
BASE_DBENT DS 0H
        LM    R1,R2,FDWDATA
        LTR    R1,R1
        BNZ    BASE_DBENT_1
        LA    R1,DBENT1
        LA    R2,0
        B      BASE_DBENT_2

```

Figure 334. Base Exit for a repeating segment

Exit routines for field definitions allow you to set logic routines to find the field length or location, and perform other logic, for example give a more meaningful representation of various values the field can hold:

```

        USING DBTRACE,R3
        USING FLDDEF,R5
        USING EXIT_xxxxxxx,R4
EXIT_xxxxxxx DS 0H
        SR    R15,R15
        BR    R14
        DROP  R3,R4,R5
        EJECT ,

```

Figure 335. Field Exit

Exit routines for global field definitions allow you to set specific fields as global fields:

USING DBTRACE,R3	.R3=>Log Record
USING ALZGF,R5	.R5=>KM Global Fields
USING GLOBAL_EXIT,R4	.R4=>Entry Point
GLOBAL_EXIT DS 0H	.Set Global Variables
*Set the following Global variables if available in the record	
MVC GF_TRAN,TRANCD	.Transaction Code
* MVC GF_PROG,...	.Program (PSB) Name
MVC GF_USID,USID	.User ID
MVC GF_LTERM,LTRM	.Logical Terminal
MVC GF_TERM,TERM	.VTAM Node/APPC NetID/OTMA Tpipe
. . .	

Figure 336. Global Exit

Finally, the Knowledge Module source contains the work area and mapping DSECT:

```

WorkArea DSECT ,
SaveArea DS 18F
UserData DS 0F
        DROP R13
        YREGS ,
        EJECT ,
* Field Definition mappings
        ALZUKMF TYPE=DSECT
        END ,

```

Figure 337. Work Area and Mapping DSECT

Related reference:

“ALZUKMF: Define User Knowledge Module fields” on page 439

ALZUKMF is used by IMS PI Knowledge Modules (and associated routines) to define fields in IMS log records. Each log record supported by IMS PI must have a Knowledge Module. Every field in the log record is defined using an ALZUKMF macro call.

“ALZUKMF example” on page 343

ALZUKMS is a sample Knowledge Module supplied in the SALZSAMP sample library. It shows multiple invocations of the ALZUKMF macro to perform field definitions.

“ALZUFA01: Map User Log fields” on page 436

Sample User Log record mapping DSECT.

“ALZUKMA: Assemble User Knowledge Module” on page 438

Sample JCL to assemble and link a User Log record Knowledge Module, where the mapping of the User Log record is contained in the member ALZFA01 and the Knowledge Module source is in the member ALZUKMS.

ALZU002: Install Request Authorization exit

Apply USERMOD ALZU002 to install and activate ALZUAUTH, the Request Authorization exit.

Related reference:

“Security consideration” on page 109

The Request Authorization exit ALZUAUTH ensures that the DBRC Log Selection utility ALZDBRC always uses the correct IMSPLEX identification settings.

“ALZUAUTH: Request Authorization exit” on page 435

ALZUAUTH is the Request Authorization exit. Apply USERMOD ALZU002 (supplied in the SALZSAMP library) to install and activate the exit.

ALZXA0A4: REXX to translate CON A0A4 fields

REXX exec to translate fields in the IMS Connect event record A0A4 from ASCII to EBCDIC.

Use the sample JCL ALZRXPY to copy the REXX member to your SYSEXEC library.

Related reference:

“ALZRXPY: Copy sample REXX to SYSEXEC library” on page 425

Sample JCL to copy (and rename) the sample REXX execs to your specified SYSEXEC library.

ALZXDUMP: REXX to create a formatted dump

REXX exec to create a formatted hexadecimal dump.

Use the sample JCL ALZRXPY to copy the REXX member to your SYSEXEC library.

Related reference:

“ALZRXPY: Copy sample REXX to SYSEXEC library” on page 425

Sample JCL to copy (and rename) the sample REXX execs to your specified SYSEXEC library.

ALZXFMT: REXX to convert unprintable characters

REXX exec to report unprintable characters in a binary string as periods. This function is useful when creating formatted dumps.

Use the sample JCL ALZRXPY to copy the REXX member to your SYSEXEC library.

Related reference:

“ALZRXPY: Copy sample REXX to SYSEXEC library” on page 425

Sample JCL to copy (and rename) the sample REXX execs to your specified SYSEXEC library.

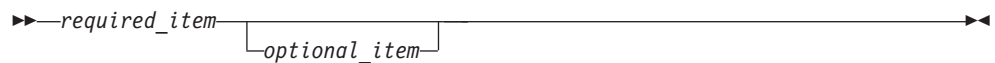
Chapter 34. How to read syntax diagrams

The following rules apply to the syntax diagrams that are used in this information:

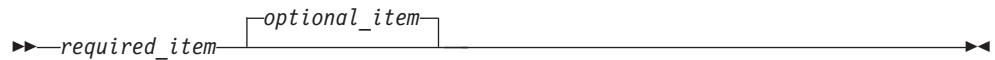
- Read the syntax diagrams from left to right, from top to bottom, following the path of the line. The following conventions are used:
 - The >>--- symbol indicates the beginning of a syntax diagram.
 - The ---> symbol indicates that the syntax diagram is continued on the next line.
 - The >--- symbol indicates that a syntax diagram is continued from the previous line.
 - The --->< symbol indicates the end of a syntax diagram.
- Required items appear on the horizontal line (the main path).



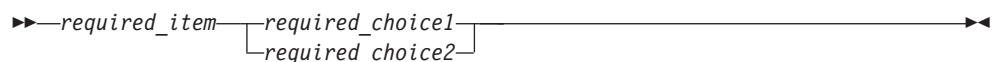
- Optional items appear below the main path.



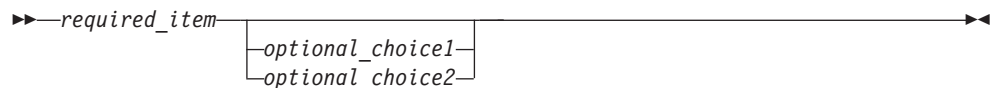
If an optional item appears above the main path, that item has no effect on the execution of the syntax element and is used only for readability.



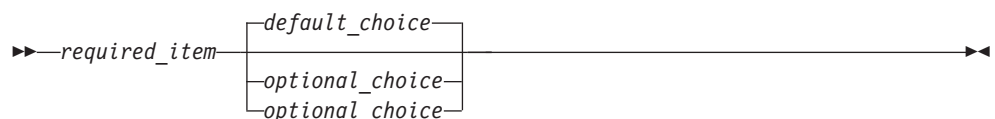
- If you can choose from two or more items, they appear vertically, in a stack. If you *must* choose one of the items, one item of the stack appears on the main path.



If choosing one of the items is optional, the entire stack appears below the main path.



If one of the items is the default, it appears above the main path, and the remaining choices are shown below.



- An arrow returning to the left, above the main line, indicates an item that can be repeated.



If the repeat arrow contains a comma, you must separate repeated items with a comma.



A repeat arrow above a stack indicates that you can repeat the items in the stack.

- Keywords, and their minimum abbreviations if applicable, appear in uppercase. They must be spelled exactly as shown. Variables appear in all lowercase italic letters (for example, *column-name*). They represent user-supplied names or values.
- Separate keywords and parameters by at least one space if no intervening punctuation is shown in the diagram.
- Enter punctuation marks, parentheses, arithmetic operators, and other symbols exactly as shown in the diagram.
- Footnotes are shown by a number in parentheses; for example, (1).

Part 7. Glossary

The glossary defines terms and abbreviations that you might see when using IMS Problem Investigator to analyze transaction activity on your IMS systems.

If you cannot find the term you are looking for, refer to the index or to the *IBM Dictionary of Computing Terminology* (SC20-1699).

A

advanced program-to-program communication

The general facility characterizing the LU 6.2 architecture and its various implementations in products.

alternate response PCB

A PCB that defines a logical terminal and can be used instead of the I/O PCB when required to direct a response to a terminal in response mode, conversational mode, or exclusive mode.

APPC Advanced Program-to-Program Communication. See also APPC/IMS.

APPC/IMS

A part of IMS TM that uses the CPI communications interface to talk to application programs.

application program checkpoint

A commit point that occurs when an application program issues a checkpoint call. IMS then releases segments it has enqueued for the program since the last commit point; makes permanent the program's changes to the database; and, if the program processes messages, sends output messages to their destinations.

archiving logs

The process of copying records or logs of IMS activity from the online log data set, which is temporarily recorded on DASD, to the system log data set, which is stored on DASD, tape, or mass storage.

B

backout

The process of removing all the database updates performed by an application program that has terminated abnormally. See also dynamic backout.

batch checkpoint/restart

The facility that enables batch processing programs to synchronize checkpoints and to be restarted at a user-specified checkpoint.

batch message processing (BMP) program

An IMS batch processing program that has access to online databases and message queues. BMPs run online, but like programs in a batch environment, they are started with job control language (JCL).

batch-oriented BMP program

A BMP program that has access to online databases and message queues while performing batch-type processing. A batch-oriented BMP does not access the IMS message queues for input or output. It can access online

databases, GSAM databases, and MVS files for both input and output. Contrast with transaction-oriented BMP.

batch processing program

An application program that has access to databases and MVS data management facilities but does not have access to the IMS control region or its message queues. See also batch message processing program and message processing program.

BMP program

Batch message processing program.

C

CCTL Coordinator controller.

CDS Control Data Set.

CF Coupling Facility.

change accumulation (CA)

The process of creating a compacted version of one or more IMS log data sets by eliminating records not related to recovery, and by merging multiple changes to a single segment into a single change. Also, the compacted log created by the process.

checkpoint

A point at which IMS automatically records its internal status (system control information with a unique checkpoint ID) and writes it to the restart data set (RDS). This information allows IMS to reconstruct its condition if later recovery is necessary. A system checkpoint is taken automatically by IMS at selected intervals; a synchronization point is taken whenever an application program requests one. System checkpoints can also be requested by the master terminal operator.

CI Control interval.

CID The VTAM/NCP communication ID. This value is given to IMS and used by VTAM and IMS to identify a session between IMS and a VTAM logical unit.

client An MVS application program that accesses IMS using the OTMA protocol. A client must be a member of an XCF group.

CNT Communication Name Table.

cold start

The starting of IMS when it is initialized for the first time or when some error condition prevents a warm or emergency restart. See also emergency restart and normal restart.

commit point

The point at which an application program commits that a section of work is done and that the data it has modified or created is consistent and complete. Its output, which has been held up to that time, is sent to its destination(s); its input is removed from the message queues; and its database updates are confirmed and made available to other applications. A commit point occurs when a program terminates normally or when it issues a checkpoint call or command. If a program processes messages, a commit point may also occur when it retrieves a new message.

commit processing

The processing that IMS performs at a commit point.

Common Programming Interface for Communications (CPI-C)

An evolving application programming interface (API), embracing functions to meet the growing demands from different application environments and to achieve openness as an industry standard for communications programming. CPI-C provides access to interprogram services such as (a) sending and receiving data, (b) synchronizing processing between programs, and (c) notifying a partner of errors in the communication.

Common Queue Server (CQS)

Manages shared queues in a sysplex. Receives, maintains, and distributes data objects from a shared queue residing in a coupling facility list structure for its client.

Conditions

In IMS PI, Conditions are a set of statements that allow you to filter records from log files based on certain field values in the log record. The statements contain conditional logic to either include or exclude records from processing. For more information, see "Specifying conditions for log codes" on page 290.

Control Data Set (CDS)

The IMS PI Control Data Set is a VSAM KSDS that is the repository for your Filter, Form, and Object List definitions. For more information, Chapter 21, "Defining a Control Data Set (CDS)," on page 269.

control interval (CI)

A fixed-length area of direct access storage in which VSAM stores records and creates distributed free space. Also, in a key-sequenced data set or file, the set of records pointed to by an entry in the sequence-set index record. The control interval is the unit of information that VSAM transmits to or from direct access storage. A control interval always comprises an integral number of physical records.

control program (IMS)

The IMS program that initiates and controls the major IMS facilities, such as IMS database, telecommunications, and message scheduling.

control region

The MVS main storage region that contains the IMS control program.

conversation

A dialog between a terminal and a message processing program using IMS conversational processing facilities. Also, a dialog between an LU 6.2 program and an IMS application program. See also conversational processing.

conversational processing

An optional facility allowing a user's application program to accumulate information acquired through multiple interchanges with a terminal, even though the program terminates between interchanges.

Coordinated Universal Time

See UTC.

Coordinator controller (CCTL)

A subsystem consisting of the database resource adapter (DRA) and a transaction management subsystem, such as CICS. A CCTL provides communications and transaction management services for a DBCTL environment, which has no transaction management facilities of its own.

coupling facility (CF)

A special, logical partition that provides high-speed caching, list processing, and locking functions in a sysplex environment.

covered database

A database or area in an RSR environment that is tracked by a tracking subsystem. Recovery information is not maintained by the tracking subsystem for databases or areas that are not covered.

CPI Communications driven application program

An application program that uses CPI Communications calls to receive an incoming message and to send a reply.

CPI-C Common Programming Interface for Communications.

CQS Common Queue Server.

CRC Command recognition character.

CSV Comma separated values. A delimited text file. In IMS Problem Investigator, the CSV data set contains data extracted from one or more merged log files, optionally filtered, and the format of the CSV records is specified by a form.

D**Database Control (DBCTL)**

An environment allowing full-function databases and DEDBs to be accessed from one or more transaction management subsystems.

database data set (DBDS)

A data set containing all or part of a database.

database description (DBD)

The collection of macro parameter statements that define the characteristics of a database, such as the database's organization and access method, the segments and fields in a database record, and the relationship between types of segments.

database description generation (DBDGEN)

The process by which a DBD is created.

database integrity

The protection of data items in a database while they are available to any application program. This includes the isolation of effects of concurrent updates to a database by two or more application programs.

database-level sharing

A kind of data sharing that enables application programs in one IMS subsystem to read data while another program in another IMS subsystem reads from the same database or updates it.

database program communication block (DBPCB)

The PCB that describes an application program's interface to a database. One DBPCB is required for each database view used by the application program.

database record

In a database, a collection of segments that contains one occurrence of the root segment type and all of its dependents arranged in a hierarchic sequence. It may be smaller than, equal to, or larger than the access method logical record.

database segment

The unit of access; the smallest amount of data that can be transferred by one IMS operation.

Database Recovery Control (DBRC)

A feature included in the IMS Database Manager to permit easier recovery of IMS databases. DBRC maintains information required for database recoveries, generates recovery control statements, verifies recovery input, maintains a separate change log for database data sets, and supports sharing of IMS databases by multiple IMS subsystems.

Data Communications Control (DCCTL)

A subsystem that allows IMS TM to act as a stand-alone, full-function transaction manager that can connect to DB2 or other external subsystems.

data communication program communication block (DCPCB)

The PCB that supports communication between an application program and a terminal or other application program. There are two types of DC-PCBs: I/O PCB and alternate PCB.

data entry database (DEDB)

A direct-access database that consists of one or more areas, with each area containing both root segments and dependent segments. The database is accessed using VSAM media manager.

Data Language/I (DL/I)

The IMS data manipulation language, a common high-level interface between a user application and IMS. DL/I calls are invoked from application programs written in languages such as PL/I, COBOL, VS Pascal, C, and Ada. It can also be invoked from assembler language application programs by subroutine calls. IMS lets the user define data structures, relate structures to the application, load structures, and reorganize structures.

data management block (DMB)

An IMS control block in main storage that describes and controls a physical database. It is constructed from information obtained from the ACB library or the DBD library.

Data Set Sequence Number (DSSN)

DBRC maintains the Data Set Sequence Number (DSSN) in the RECON data set to count when an application opens a database for update.

data sharing

The concurrent access of databases by two or more IMS subsystems. The IMS subsystems can be in one processor or in separate processors. They can share data at two levels: the database level and the block level.

data sharing group

In IMS, the components involved in sysplex data sharing. Among the components are the sharing IMS subsystems, the IRLMs they use, the IRLM, OSAM, and VSAM structures in the coupling facility, and a single set of DBRC RECONs.

data transparency

An attribute of a input message that causes ISC edit to route the message to its destination without examination or modification.

DBCTL

Database control.

DBCTL environment

A database control environment. This is essentially the IMS DB/DC environment without the message handling and queue management capabilities.

DBD Database description.

DBDGEN

Database description and block generation.

DBDS Database data set.

DBPCB

Database program communication block.

DBRC Database recovery control.

DBRC data sharing control

A subset of DBRC that facilitates the sharing of databases among IMS subsystems and controls the ability of a given application program to access a database. Share control includes DBRC log control and database recovery control.

DBRC log control

A subset of DBRC that keeps track of and controls IMS logging for online and batch systems.

DBRC Log Selection

An IMS PI facility that offers an alternative to having to explicitly specify log input files for report and extract processing. By specifying one or more IMS subsystems and the time period for which reporting is required, IMS PI will use DBRC to select the SLDS files covering that time period. For more information, see "DBRC Log Selection" on page 107.

DBRC recovery control

A subset of DBRC that assists in recovering database data sets and generates most of the JCL and control statements needed to run various database recovery utilities.

DB/DC

Database/data communication.

DCCTL

Data communications control.

DCPCB

Data communication program communication block.

deadlock

A situation in which two or more activations of asynchronous procedures are incapable of proceeding because of their mutual dependencies.

Unresolved contention for use of a resource.

An error condition in which processing cannot continue because each of two elements of the process is waiting for an action by or a response from the other.

An impasse that occurs when multiple processes are waiting for the availability of a resource that will not become available because it is being held by another process that is in a similar wait state.

DEDB Data entry database.

dependent region

The MVS virtual storage region that contains MPPs, BMPs, MDPs, or online utilities.

dependent segment

In a database, a segment that relies on a higher level segment for its full hierarchic meaning. A child is a dependent of its parent.

device input format (DIF)

The MFS control block that describes the format of the data entered on the device and presented to MFS.

device output format (DOF)

The MFS control block that describes the format of the output data to be presented to the device.

DFSMS environment

An environment that helps automate and centralize the management of storage. This is achieved through a combination of hardware, software, and policies. In the SMS environment for MVS, this function is provided by MVS/ESA SP and DFSMS/MVS, DFSORT, and RACF. See also system-managed storage.

distributed presentation management (DPM)

An MFS option that allows programs to communicate with device independence by sharing message formatting functions between MFS and a user-written remote program. The user-written remote program performs device-dependent formatting.

DL/I Data Language/I.

DL/I address space

An address space used by the online IMS control program to contain most of the DL/I code and control blocks. This option can be selected for the online IMS environment to provide an alternative virtual storage configuration.

DRRN

Disk relative record number.

DSSN Data set sequence number.

dynamic allocation/deallocation

A function that removes the requirement to allocate IMS databases, area data sets, and certain system data sets through job control language. A data set is allocated during IMS initialization or when it is first used and is deallocated when it is no longer used (that is, closed or stopped).

dynamic backout

A process that automatically cancels all activities performed by an application program that terminates abnormally.

E**emergency restart**

A restart of IMS following an IMS or MVS failure.

EMH Expedited message handling.

EMHQ

Expedited message handling queue.

EPST Extended partition specification table.

ESA Enterprise Systems Architecture.
ESAF External subsystem attach facility.
ESCD Extended system contents directory.
ETO Extended terminal option.

exclusive access

This access intent establishes the intent of an application to reserve the exclusive use of the database. If a subsystem requests and DBRC grants exclusive access to a subsystem, then no other subsystem may access the database concurrently, regardless of the share level of the database.

expedited message handling (EMH)

A Fast Path facility that processes single-segment input and output messages. It bypasses the normal IMS transaction message queuing and application scheduling.

extended checkpoint/restart

The facility that allows batch processing programs to establish database positioning and initiate user-specified areas with a DL/I call in place of an OS CHKPT macro.

extended partition specification table (EPST)

For Fast Path, an extension of the PST. It contains information for a dependent region that is unique to Fast Path.

Extended Recovery Facility (XRF)

A software function designed to minimize the impact of various failures on IMS users.

Extended system contents directory (ESCD)

An extension for Fast Path.

Extended Terminal Option (ETO)

A function of IMS TM that improves a system's availability by reducing the scheduled outages needed to add or delete ACF/VTAM terminals or message queues.

external subsystem

A subsystem that provides a set of resources to be used by IMS, but not controlled by it.

Extract data set

An IMS PI extract data set is an optionally filtered subset of one or more log files from one or more IMS subsystems. The extract data set can be processed by IMS PI in the same way as any log file. The smaller extract files make online viewing more manageable than the larger log files. For more information, see Chapter 7, "Creating reports, extracts and CSV files," on page 95.

F

Fast Path

IMS functions for applications that require good response characteristics and that may have large transaction volumes. Programs have rapid access to main-storage databases (to the field level), and to direct-access data entry databases. Message processing is grouped for load balancing and synchronized for database integrity and recovery. See also MSDB and DEDB.

Fast Path databases

Two types of databases designed to provide high data availability and fast processing for IMS applications. They can be processed by the following types of programs: MPPs, BMPs, and IFPs. See also main storage database and data entry database.

Fast Path dependent region

See IMS Fast Path region.

Fast Path exclusive transaction

A transaction type whose messages are routed to EMH for processing. See also Fast Path potential transaction.

Fast Path potential transaction

A transaction type that can be routed to either EMH or DC processing. See also Fast Path exclusive transaction.

Field In a database, a portion (as defined during DBDGEN) within a segment that is the smallest unit of the data that can be referred to. See also key field.

Filter Used in IMS PI to control which log records are selected for reporting. For example, select only type 01 and 03 log records for a particular transaction code and user ID. Filters can be applied when formatting log files online or in batch. Optionally, Forms can be specified to control the presentation of the records. For more information, see Chapter 23, "Defining filters," on page 281.

Filtering Criteria

In IMS PI, the criteria specified in a Filter to control which log records are selected for online viewing or batch report, extract or CSV processing.

Form Used in IMS PI to tailor the formatting of log records so that only the fields of interest are reported. For more information, see Chapter 25, "Defining forms," on page 313.

full function databases

Hierarchic databases that are accessed through Data Language I (DL/I) call language and can be processed by all four types of application programs: IFP, MPPs, BMPs, and batch. Full function databases include HDAM, HIDAM, HSAM, HISAM, SHSAM, and SHISAM.

G**global criteria**

In IMS PI, you can specify filtering criteria applicable to "all" log records. This is done by specifying Conditions for the special log code ALL. The Condition statements can specify record offsets or any of the global fields. For more information, see "Specifying global fields for the ALL log code" on page 296.

global fields

In IMS PI, the global fields are pieces of information in a log record that identify the IMS resources affected by the event, or that allow you to quickly identify the source of the log record. They are displayed when browsing a log file in formatted mode and can be specified in Filter Condition statements for log code ALL ("global criteria"). The global fields are:

ABEND

Abend code of pseudo abend or system abend.

ClientID
IMS Connect client ID.

Code Log record code. Identifies the type of log record.

Database
Database name.

IMSID
IMS Subsystem ID.

IMSRel
IMS Release.

ITASK
ITASK number.

LogToken
OTMA logon token. For IMS Connect, the event key.

LongLock
Deadlock cycle number of IRLM Long Lock.

LSN IMS log record sequence number, from the log record suffix. A hexadecimal number representing the position of the record in the file; prefixed by the position of the file in the merge sequence. For example, record 154 (9A in decimal) in the second file that you selected for processing, is shown as:
2-0000000000009A

For DB2 and MQ log records, the LSN field contains the RBA.

LTerm IMS LTERM.

LUWID
Logical unit of work ID. For example, the DB2 LUWID is a composite correlation token that uniquely identifies the transaction (along with the URID).

OrgUOWID
Transaction Originating Tracking Unit-of-Work ID.

Incoming messages (transactions) are assigned a unique originating tracking unit-of-work ID. The token is contained in all message related log records associated with the transaction.

Port IMS Connect TCP/IP port.

Program
Program or PSB name.

RBA VSAM RBA or OSAM RBN of the updated database record.

RecToken
Recovery Token assigned to recoverable units of work.

Recoverable units of work are assigned a unique recovery token. The token is contained in every log record for the transaction that can be used for recovery purposes.

Region
Region PST ID.

ResumeTP
IMS OTMA logon token for Resume Tpipe.

SSN IMS Connect Send Sequence Number.

Terminal

VTAM Node name, BTAM line/terminal number, Line/PTerm, APPC Net ID or OTMA Tpipe.

TranCode

Transaction Code.

URID Unit of Recovery ID. Applicable to DB2 and WebSphere MQ.

Userid

RACF User ID.

UTC The Coordinated Universal Time (UTC) time stamp shows when the event for which the log record was generated occurred rather than the time when the log record was created. The time displayed in the Time column (referred to as the STCK) is the time when the log record was created and is therefore different from the UTC. Not all records have a UTC field.

You can display the UTC in local or GMT format.

global lock

An IRLM lock that interests two IRLMs; both must coordinate to grant it.

global lock management

Lock management that controls access to resources shared among IMS systems participating in block level sharing.

global service group

The collection of all IMS subsystems that can access a particular set of databases. A global service group can span several MVS systems at more than one geographical location.

GMT Greenwich Mean Time.

GSG Global service group.

H

hierarchic direct (HD) organization

The physical storage organization in which database segments that represent a physical database record are related by direct address pointers in the segment's prefix.

Hierarchical Direct Access Method (HDAM)

A database access method using algorithmic addressability to records in a hierarchic direct organization. A choice of OSAM or VSAM ESDS is available as a base for HDAM.

Hierarchical Indexed Direct Access Method (HIDAM)

A database access method used for indexed access to records in a hierarchic direct organization. It provides indexed access to the root segments and pointer access to subordinate segments. A HIDAM index can be constructed with ISAM and OSAM or VSAM.

Hierarchical Indexed Sequential Access Method (HISAM)

A database access method used for indexed access to records in a hierarchic sequential organization. A HISAM database can be constructed with ISAM or VSAM.

hierarchical sequence

In a database, the sequence of segment occurrences in a database record defined by traversing the tree top to bottom, front to back, and left to right.

hierarchical sequential (HS) organization

The physical storage organization in which database segments that represent a physical database record are related by adjacency.

Hierarchical Sequential Access Method (HSAM)

An IMS HS organization. A database access method used for sequential storage and access of segments on tape or direct access storage. BSAM and QSAM are used as the basis for HSAM.

hierarchy

The tree-like arrangement of segments in a database, beginning with the root segment and proceeding down to dependent segments.

high-speed sequential processing (HSSP)

An option, available only to batch message programs, for optimizing the sequential processing of DEDB areas. A simultaneous image copy can also be created.

HSSP High-speed sequential processing.

I

IC Image copy.

IFP IMS Fast Path program, a type of program designed to operate with expedited message handling (EMH) in a Fast Path region.

ILS Isolated log sender.

image copy

The process of creating a backup of a DBDS. Also, the backup data set created by the process.

immediate checkpoint

The facility that writes simple checkpoint information without requiring termination of MPPs.

IMS DB

The IMS Database Manager licensed program, a database system that processes concurrent database calls and offers high performance for a variety of applications, ranging from those with moderate volume and complex data structures to those with extremely high volumes and simple data structures.

IMS Open Transaction Manager Access (OTMA)

Transaction-based, connectionless client/server protocol.

IMS Fast Path region

An online environment in which message-driven programs and DEDB online utilities operate.

IMS instance

A particular, unique IMS subsystem within an MVS system. Examples of IMS instances could be a particular DBCTL subsystem, a DB/TM subsystem, a DCCTL subsystem, a batch DL/I job, or batch utility job.

IMS monitor

An optional facility that records the activity within the IMS control region and dependent regions.

IMS subsystem

An individual batch or online IMS control program executing in an MVS address space.

IMS system log

Logically, a single log made up of online data sets (OLDSs) and write-ahead data sets (WADSs).

IMS TM

The IMS Transaction Manager licensed program, a data communication system that provides high volume, high performance, high capacity, low cost transaction processing for both IMS DB and DB2 databases.

Internal Resource Lock Manager (IRLM)

An IMS component that provides lock management for use by IMS subsystems that share data in an MVS environment.

input message

Valid commands, transactions, and message switches.

input/output program communication block (I/O PCB)

A DC-PCB provided automatically by IMS to an application program that executes in a communication system with the DC feature. The I/O PCB is the mechanism by which a program obtains an input message from a terminal and returns a reply to the terminal that originated the input message.

input system

In an IMS multisystem environment, the system to which the input terminal is attached.

input terminal

In an IMS multisystem environment, the terminal from which a primary request originated.

intelligent remote station support (IRSS)

The IMS facility that supports the IBM System/3 and IBM System/7.

Intermediate system

In an IMS multisystem environment, a system through which a message passes on its way from the input system to the destination system, or vice-versa, in which no processing other than routing is performed.

Interactive System Productivity Facility (ISPF)

An IBM licensed program that serves as a full-screen editor and dialog manager. Used for writing programs, it provides a means of generating standard screen panels and interactive dialogs between the application programmer and terminal user.

Intersystem Communication (ISC)

An extension of IMS Multiple Systems Coupling that permits the connection of IMS to another IMS subsystem, to CICS/MVS, or to a user-written subsystem, provided both subsystems use ISC.

I/O PCB

Input/output program communication block.

I/O toleration

The IMS process that, during a takeover, allows transaction processing after a takeover before I/O prevention has completed.

IRLM Internal resource lock manager.

IRLM session

An IRLM may have two kinds of VTAM sessions with another IRLM: a primary session and a secondary session (also called an alternate session).

IRSS Intelligent remote station support.

ISC Intersystem Communication.

ISPF Interactive System Productivity Facility.

K**key field**

The field in a database segment used to store segment occurrences in sequential ascending order. A key field is also a search field. Synonymous with sequence field.

Knowledge Modules

IMS PI executable load modules that know the contents of every log record type and understand the relationship between the various log record types.

L

latch A programming device that provides short-term serialization for IMS tasks running in the online IMS system. Similar in function to an MVS lock.

LCB Link Control Block.

LOCAL

The default Zone option. IMS PI converts the STCK time stamp in the log record suffix to the time zone of the system IMS PI is running on. This is applicable when the log files are created in the same time zone as the local system. For more information, see "ZONE command" on page 407.

local destination

In an IMS multisystem environment, a destination that resides in the local system. See also remote destination.

local lock

An IRLM lock that interests the IRLM that grants it only.

local lock management

Lock management that controls access to database records used by application programs in the same online IMS system.

local system

In an IMS multisystem environment, a specific system in the multiple configuration. See also remote system.

local transaction

In an IMS multisystem environment, a transaction that is processed totally by the system in which it is defined. (Contrast with remote transaction.)

lock management

The reservation of a segment by a program. Other programs are kept from using the segment until the program using it is done.

log sequence number (LSN)

The log record sequence number contained in the last 8 bytes of the 16-byte log record suffix. IMS PI reports the hexadecimal LSN for every log record.

log initiated checkpoint

See simple checkpoint and *system scheduled checkpoint*.

log write-ahead (LWA)

The process of logging records of completed operations to the write-ahead data set before entering them in the online log data set.

logical logging

The process of moving log records into the log buffers. (Contrast with physical logging.)

logical terminal (LTERM)

A destination. Each logical terminal has a name that is related to one or more physical terminal(s). See also remote logical terminal.

logical unit of work

The processing a program performs from one sync point to the next.

LSN Log sequence number.

LTERM

Logical terminal.

LU 6.2 destination

An LU 6.2 application program defined by an LU (logical unit) name and a TP (transaction program) name.

M**main storage database (MSDB)**

A root-segment database, residing in main storage, which can be accessed to a field level.

MDA MVS dynamic allocation.

message

Data transmitted between any two terminals, application programs, and IMS systems. Each message has one or more segments.

message class

The class the user assigns to a transaction code that determines within which message region an application program is to process that transaction. See also region class.

message delete option

An option that may be defined to prevent nonessential messages from being sent to a specific terminal. This option is helpful in protecting printers that use special forms or depend on forms alignment.

message editing

The process by which messages are formatted for presentation to an application program or terminal. Additional message editing routines may be written by the user. See also Message Format Service.

Message Format Service (MFS)

An editing facility that allows application programs to deal with simple logical messages instead of device-dependent data, thus simplifying the application development process.

Message Format Service (MFS) control block

In MFS, the representation of a message or format that is stored in the IMS.FORMAT library and called into the MFS buffer pool as needed for online execution. Contrast with intermediate text block. See also message input descriptor, message output descriptor, device input format, and device output format.

message input descriptor (MID)

The MFS control block that describes the format of the data presented to the application program.

message mode

A transaction attribute that describes how the transaction is handled by the application program. See also single message mode and multiple message mode.

message output descriptor (MOD)

The MFS control block that describes the format of the output data produced by the application program.

message processing program (MPP)

An IMS application program that is driven by transactions and has access to online IMS databases and message queues. See also batch message processing program and batch processing program.

message queue

The data set on which messages are queued before being processed by an application program or sent to a terminal.

message recovery point

The last inbound message for which IMS returned a definite response or the last outbound message for which IMS requested a definite response.

Message Requeuer (MRQ)

A program product that will reinsert messages to the IMS message queues when messages have been lost from the queues because of an IMS cold start, or when messages that have been processed must be reprocessed.

message segment

The unit of access when referring to a message to or from a terminal.

message switch

A terminal input message directed to another terminal without being processed by a message processing program. See also program-to-program message switch.

MFS Message format service.

MFSTEST

An optional MFS facility that allows MFS control blocks to be created and tested online without disrupting production activity.

MID Message input descriptor.

MOD Message output descriptor.

MPP Message processing program.

MRQ Message requeuer.

MSC Multiple Systems Coupling.

MSC descriptor

Descriptors used by ETO to relate LTERMs to statically defined MSC links.

MSC/ISC

Multiple System Coupling/Intersystem Communications.

MSDB

Main storage database.

multiple message mode

A processing mode in which synchronization points occur only at DL/I CHKP calls or application termination. See also single message mode and *synchronization point*.

Multiple Systems Coupling (MSC)

An IMS facility that permits geographically dispersed IMS systems to communicate with each other.

multisystem environment

Two or more (up to 255) IMS systems that run on any supported systems in one or more processors; the environment in which Multiple System Coupling runs.

MVS subsystem

A subsystem such as JES2, JES3, or IRLM.

N**Navigate**

An IMS PI dialog facility that allows you to traverse a formatted browse of the log file by a specified time interval, forwards or backwards, or to skip directly to a particular time of day in the log file. For more information, see "Navigation" on page 85.

NBA Normal Buffer Allocation. The Fast Path buffers used first for transaction requirements.

normal restart

The restart of IMS after a termination initiated by a /CHECKPOINT command.

O**Object List**

An Object List is a list of character values, typically names, that can be specified in Condition statements for character fields. A typical use might be to define all the transaction codes that belong to a particular application system. Object Lists enable you to define a group of related values once, then use it in many Condition statements in many Filters by simply specifying the Object List name, prefixed by & (ampersand), in the Value field of the Condition statement.

OFR Online forward recovery.

OLDS Online log data set.

OLIC Online image copy.

online change

The process of adding, deleting, or replacing various IMS resources without stopping the system to redefine them.

online image copy

The process of creating an image copy while the DBDS is online. Also, the image copy created by the process.

online log data set (OLDS)

A data set on direct access storage that contains the log records written by an online IMS system.

Open Transaction Manager Access

See IMS Open Transaction Manager Access (OTMA).

origin system

Synonym for input system.

OSAM

Overflow sequential access method.

OTMA

IMS Open Transaction Manager Access.

output message

Valid response mode and/or conversational messages, exclusive mode messages, IMS system messages, and application program messages and/or message switches.

Overflow Sequential Access Method (OSAM)

An IMS data management access method that combines selected characteristics of BSAM and BDAM for handling data overflow from ISAM. OSAM is used by the following IMS database access methods: HISAM, HIDAM, and HDAM if VSAM is not used. OSAM is also used by some of the online pool management routines.

P**partition specification table (PST)**

An IMS control block that contains dependent-region information.

partitioned data set (PDS)

A data set in direct access storage that is divided into partitions, called members, each of which can contain a program, part of a program, or data. Synonymous with program library.

PCB Program communication block.

PCB mask

A data structure in an application program in which IMS puts the status of the application program's DL/I calls. See also status codes.

PD Partition descriptor.

PDB Partition descriptor block.

PDS Partitioned data set.

physical terminal (PTERM)

A hardware device attached to the computer and supported by the DC feature as a terminal. A physical terminal usually has one or more logical terminals associated with it.

PI Program isolation.

program communication block (PCB)

An IMS control block that describes an application program's interface to and view of an IMS database or, additionally for message processing and batch message processing programs, to the source and destinations of messages. PCBs are defined by the user during PSB generation. See also database program communication block and data communication program communication block.

program isolation (PI)

An IMS facility that separates all the activity of an application program from any other active application program until that application program indicates, via a synchronization point, that the data it has modified or created is consistent and complete.

program isolation (PI) lock manager

The facility that was formerly known as PI enqueue-dequeue. The PI lock manager is used for local locking in systems for which no IRLM has been defined. Otherwise, the IRLM is used for all lock management, including local.

program specification block (PSB)

The control block that describes databases and logical message destinations used by an application program. A PSB consists of one or more PCBs.

program specification block generation (PSBGEN)

The process by which a PSB is created.

program-to-program message switch

An IMS output message sent by one application program to another application program.

PSB Program specification block.

PSBGEN

Program specification block generation.

PST Partition specification table.

PTERM

Physical terminal.

Q

QCF Queue Control Facility.

Queue Control Facility (QCF)

Reinserts unprocessed messages into the IMS message queues after an IMS cold start.

R

RDS Restart data set.

RECON data sets

Recovery control data sets.

recoverable service element (RSE)

A service element (IMS) that is backed up and that can initiate a takeover.

recoverable transaction

An IMS transaction that is recovered in the event of a failure.

recovery control (RECON) data sets

Data sets in which Data Base Recovery Control stores information about logging activity and events that might affect the recovery of databases.

region class

The class IMS assigns to a message region that indicates the message classes that can be processed within the region. See also message class.

remote destination

In an IMS multisystem environment, a destination that resides in a remote system. See also local destination.

remote logical terminal

In an IMS multisystem environment, a logical terminal that resides in a remote system.

Remote Site Recovery (RSR)

A feature of IMS that allows a geographically remote IMS subsystem to track active IMS subsystems, and to take over the workload of an active IMS subsystem if one fails.

remote system

In an IMS multisystem environment, a system that is not the local system.

remote terminal

A terminal that is not attached to the host system through an I/O channel.

remote transaction

In an IMS multisystem environment, a transaction whose total processing is shared between two or more systems. (Contrast with local transaction.)

resource access security

The use of system definition macros and security maintenance utility control statements to limit the IMS resources that can be used by application programs and utilities executing in dependent regions.

resource recovery services (RRS)

The z/OS system component that provides the services that a resource manager calls to protect resources. RRS is the z/OS system level syncpoint manager.

response

A message inserted to a logical terminal destination specified by an I/O PCB or an alternate response PCB. When VTAM is used, the term reply is substituted for response because response has a separate meaning in VTAM communications.

response alternate PCB

Synonym for alternate response PCB.

restart See emergency restart and normal restart.

restart data set

The direct-access data set used to contain the information necessary to restart IMS.

3614 retention area

An IMS save area for each 3614 Consumer Transaction Facility in the IMS 3600 system.

RLDS Recovery log data set.

root segment

In a database, the highest segment in the hierarchy. The database is normally sequenced on the key of this segment. All other segments depend upon the root segment and reference it as part of their complete identity.

routing code

For EMH, a user-defined code that allows transactions to be routed to programs within a load balancing group.

routing path

In an IMS multisystem environment, the route through which IMS passes a message from its origination through processing. One or more systems may be included in a routing path.

RSEname

The name that an installation gives to the two IMS subsystems that form a recoverable service element (RSE).

RSR Remote site recovery.

S

SB Sequential buffering.

SCD System contents directory.

scheduling intent

An application program attribute defined in the PSB that specifies how the program should be scheduled if multiple programs are contending for scheduling.

scheduling priority

A transaction attribute that is used in calculating which transaction is selected for scheduling. Synonymous with selection priority.

scratchpad area (SPA)

A work area used in conversational processing to retain information from an application program across executions of the program.

scrub Sanitize log record dialog and batch reporting to prevent disclosure of sensitive or confidential information.

SCS SNA character string.

SDUMP

An MVS macro instruction that can be invoked by authorized programs to take a fast unformatted dump of virtual storage to a data set.

secondary index

See secondary index database.

secondary index database

An index used to establish accessibility to a physical or logical database by a path different from the one provided by the database definition. It contains an index pointer segment type defined in a secondary index database.

segment

The unit of access; for the DB system, the smallest amount of data that can be transferred by one IMS operation. For input terminal operations using IMS TM, a segment is defined by the particular terminal type and is obtained by an application program with one call.

segment search argument (SSA)

The portion of a DL/I call that identifies a segment or group of segments to be processed. Each SSA contains a segment name and, optionally, one or more command codes, and one or more qualification statements. Multiple SSAs may be required to identify the desired segment.

segment type

In a database, a user-defined category of data.

sequence field

Synonym for key field.

sequential buffering (SB)

Efficient sequential input buffering techniques that reduce the elapsed time required to sequentially process large IMS OSAM databases.

sequential read

A set of several consecutive blocks that are read with a single read I/O operation. Sequential reads are issued by the Sequential Buffering (SB) component of IMS in order to reduce the elapsed time required to sequentially process large IMS OSAM databases.

SG Service group.

share levels

When you register a database to the Data Base Recovery Control (DBRC), you assign to the database one of four share levels: level zero, level one, level two, or level three.

shared EMHQ

Shared Expedited Message Handling queue.

shared index database

A secondary index database containing more than one secondary index in the same physical operating system data set.

shared queue

A collection of messages that are associated by the same queue name. A shared queue is managed by a Common Queue Server (CQS), and can be shared by multiple clients (IMS subsystems). A message placed on a shared queue can be processed by any IMS subsystem that has access to the shared queue and is capable of processing the message.

SHISAM

Simple HISAM.

SHSAM

Simple Hierarchic Sequential Access Method.

simple checkpoint

The periodic recording of control information and system status on the system log at user-specified intervals.

single message mode

A processing mode in which synchronization points occur as each message is read from the queue, as well as at application termination. See also multiple message mode and synchronization point.

SLDS System log data set.

SLU Secondary logical unit.

SMB Scheduler message block.

SMF System Management Facilities, a component of z/OS. Collects and records system and job-related information. System-related SMF records include information about the configuration, paging activity, and workload. Job-related SMF records include information on the CPU time, SYSOUT activity, and data set activity of each job step, job, APPC/MVS transaction program, and TSO/E session.

SMP/E

System Modification Program Extended.

SMS Storage Management Subsystem or System Managed Storage.

SMU Space management utility.

SNA character string (SCS)

A string of control codes (X'00' to X'3F' and X'FF') and graphic characters (X'40' to X'FE').

SPA Scratchpad area.

SSA Segment search argument.

standard DL/I application program

An application program that uses the existing DL/I call interface. It does not issue any CPI communications calls, nor does it allocate any LU 6.2 conversations.

status code

A 2-character code in the PCB mask that indicates the results of a DL/I call. See also *PCB mask*.

STCK time stamp

The Store Clock (STCK) time stamp represents when the record was cut. It is present in the log record suffix of all log records. STCK consists of a GMT time stamp but has no time zone offset in the record. If the log data was created in a different time zone from the system you are running on and you want IMS PI to convert the STCK to local time, you will need to specify a time zone offset. The Zone input field in Process Log Files is used for this purpose. For more information, see “ZONE command” on page 407.

Storage Management Subsystem (SMS)

A DFSMS/MVS facility used to automate and centralize the management of storage. Using SMS, a storage administrator describes data allocation characteristics, performance and availability goals, backup and retention requirements, and storage requirements to the system through data class, storage class, management class, storage group, and ACS routine definitions.

subpool

A collection of logical terminals (LTERMs) that can be allocated to an ISC node and can be used with parallel sessions.

subsystem

See *IMS subsystem*.

sync point

Synonymous with synchronization point.

synchronization point

A point in time from which IMS or an application program can start over if a failure makes recovery necessary. The two types of synchronization points are system checkpoints done by IMS itself, and application program synchronization points (also known as commit points) done on behalf of individual application programs. See also commit point and system checkpoint.

sysplex

System complex. A set of MVS systems communicating and cooperating with each other through certain multi-system components and software services to process workloads.

sysplex data sharing

The ability of multiple IMS subsystems to share data across multiple MVS images. Sysplex data sharing differs from two-way data sharing in that the latter allows sharing across only two MVS images.

system checkpoint

A point at which IMS records its internal status (control information, and a unique checkpoint ID) and writes the checkpoint table to the restart data set (RDS). This information allows IMS to reconstruct its condition if recovery is later necessary. System checkpointing is done automatically each time a user-selected number of records is written to the log.

system definition

An IMS process, similar to MVS system generation, by which the IMS user describes items such as databases, application programs, and terminals that make up the IMS system.

system log data set (SLDS)

The permanent destination data set for IMS log records. The SLDS is usually on tape or MSS. In an IMS batch region, the SLDS is created at execution time. In an IMS online region, the SLDS is created by copying the online log data set to it by means of the Log Archive utility.

system-managed storage (SMS)

Storage managed by the Storage Management Subsystem. SMS attempts to deliver required services for availability, performance, and space to applications. See also DFSMS environment.

T

TCB Task control block.

telecommunication program PCB (TPPCB)

See data communication program communication block (DCPCB).

terminal-related MSDB

A type of MSDB in which: (1) each segment is assigned to and owned by one logical terminal (LTERM); (2) the owner with terminal security may alter or update that segment; and, (3) a segment may be referenced by other than the owner. Terminal-related MSDBs are: (1) fixed, which allows changes, or (2) dynamic, which permits segment insertion and deletion.

thread A link between an IMS subsystem and a DB2 subsystem. Resources in the external DB2 subsystem are allocated to that link or thread.

time zone offset

The number of hours (and optionally minutes) east (+) or west (-) of GMT. For example, specify -08 for US Pacific time and +10 for Sydney Australia time. In IMS PI, you should specify an explicit time zone offset when the log file was created in a different time zone to your current system. For more information, see "ZONE command" on page 407.

TM The IMS Transaction Manager.

TMS Transport manager subsystem.

Tpipe Transaction pipe.

TPPCB

See data communication program communication block.

Track An IMS PI dialog facility that allows you to follow the trail of log records associated with a single transaction.

transaction

A specific set of input data that triggers the execution of a specific process or job. A transaction is a message destined for an application program.

transaction code

A 1- to 8-character alphanumeric code that invokes an IMS message processing program.

transaction pipe

A named IMS process management resource. An OTMA client must specify this resource when submitting a transaction to IMS. A Tpipe is analogous to an LTERM.

transaction-oriented BMP

A BMP that performs transaction-type processing in a batch environment. A transaction-oriented BMP gets its input from the IMS message queues and may also use the message queues for output. Contrast with batch-oriented BMP.

transaction processing system

An IMS system in a multisystem environment that accepts transactions from the front-end system, calls application programs for transaction processing, and routes all replies back to the front-end system for response to the terminal.

U**unit of recovery (UOR)**

Work done on a protected resource between one sync point and the next.

unit of work (UOW)

A number of contiguous control intervals in the root-addressable part of a DEDB area.

Universal Time Coordinated

See UTC.

user Either a person signed onto a terminal or an ISC subpool.

UTC The Coordinated Universal Time is a time stamp field in the log record that represents the time of the event that caused the record to be written (in contrast to the STCK time which is when the record was cut). The UTC is an IMS PI global field but is not present in all log records. For more information, see "Time settings" on page 87.

V**Virtual Storage Option**

An option for DEDB areas that maps an area into an MVS data space when the area is opened. Any VSO area control interval that has been loaded into a data space is subsequently read from the data space rather than from DASD.

VSO Virtual Storage Option.

VTAM application name

The name an installation gives to an IMS subsystem to identify the subsystem to VTAM.

W

WADS

Write-ahead data set.

warm start

Synonymous with normal restart.

write-ahead data set (WADS)

A data set containing log records that reflect completed operations and are not yet written to an online log data set.

X

XRF Extended recovery facility.

XRF-capable IMS subsystem

An IMS subsystem defined so that it can work with an alternate subsystem.

Z

Zone Used by IMS PI to convert the STCK time stamp in the log record suffix to the required time zone. Zone is normally specified if the log file was created by an IMS system in a different time zone to the one that IMS PI is running on. The options are **LOCAL**, **GMT**, **+hhmm** or **-hhmm**. For more information, see “ZONE command” on page 407.

Part 8. Appendixes

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