IBM Tools Base for z/OS
Version 1  Release 5

Autonomics Director User's Guide

IBM
Note:
Before using this information and the product it supports, read the information in "Notices" on page 119.
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About this information

IBM® Tools Base Autonomics Director for z/OS® (Autonomics Director) is an IMS™ Tool that provides automation of ongoing IMS database monitoring and maintenance based on a detailed understanding of the current state of your IMS databases.

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

- Plan for the installation of Autonomics Director
- Install and operate Autonomics Director
- Customize your Autonomics Director environment
- Diagnose and recover from Autonomics Director problems
- Design and write applications for Autonomics Director
- Use Autonomics Director with other IMS Tools products

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

- z/OS
- ISPF
- SMP/E

Changes made since the previous edition of this book are indicated by a vertical bar (|) to the left of a change. Editorial changes that have no technical significance are not noted.

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


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.

- 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).

How to send your comments

Your feedback is important in helping to provide the most accurate and highest quality information. If you have any comments about this any other IMS Tools information, you can take one of the following actions:

• Use the online reader comment form, which is located at:
  www.ibm.com/software/data/rcf/

• Send your comments by e-mail to imspubs@us.ibm.com. Be sure to include the title, the part number of the title, the version of Autonomics Director, and, if applicable, the specific location of the text you are commenting on (for example, a page number in the PDF or a heading in the information center).
Chapter 1. Autonomics Director overview

IBM Tools Base Autonomics Director for z/OS automates recurring database monitoring and maintenance tasks for IMS, including both automatic and on-demand scheduling of database sensor data collection and evaluation.

Autonomics Director is used by IMS Database Solution Pack for z/OS and IMS Fast Path Solution Pack for z/OS to help you identify and administer the normal functions that are associated with maintaining the health and performance of IMS. Sensor data that is collected by Autonomics Director is interchangeable with sensor data that is collected by IMS Database Reorganization Expert. Sensor data is captured information that represents the state of a database, and includes information about the organization of the data in the database, system catalog, VSAM catalog, and disk Volume Table of Contents (VTOC).

Autonomics Director, along with IMS Database Solution Pack for z/OS and IMS Fast Path Solution Pack for z/OS, provides the following capabilities:

- A simple installation and customization process that is based on automatic discovery of databases and existing database groups in your environment.
- Automatic and on-demand collection and evaluation of sensor data about the state of your databases. You can define parameters that control how frequently data is collected and how frequently policies are evaluated by Autonomics Director. You can also restrict these operations so that they do not interfere with your production work.
- Database health evaluations through sensor data content by using Policy Services. You can define policies and rules in Policy Services, which Autonomics Director uses when it evaluates the most recent database sensor data. The policies are stored in IMS Tools Knowledge Base and are accessed by Autonomics Director indirectly through Policy Services.
- Automatic and on-demand analysis of the state of your databases against user-defined threshold criteria. You can request immediate or deferred data collection and policy evaluations.
- Automatic reorganization of databases based on user-defined threshold criteria.
- Generation of user-recommended actions for subject databases and database groups.
- The ability to collect sensor data through the stand-alone utilities that are provided with IMS Database Solution Pack for z/OS and IMS Fast Path Solution Pack for z/OS, or by using integrated data collectors that are provided with IMS HP Image Copy, IMS HP Pointer Checker, and IBM IMS Fast Path Solution Pack for z/OS: IMS High Performance Fast Path Utilities. For these tools, you can obtain sensor data as a by-product of running your normal procedures.
- Sysplex support and workload balancing. Autonomics Director supports a sysplex mode of operations and workload balancing. By using multiple redundant Autonomics Director servers, it is possible to provide failover support if an Autonomics Director server terminates for any reason. Autonomics Director server redundancy also provides the ability to automatically distribute IMS Tools autonomic workload throughout your sysplex. Autonomics Director automatically balances sensor and group-managed reorganization job streams throughout a sysplex to provide optimal use of system resources during the shortest period of time.
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**IBM Tools Base for z/OS overview**

IBM Tools Base for z/OS streamlines the delivery, implementation, and maintenance of common IMS Tools infrastructure components by consolidating all of these components into a single package.

Tools Base for z/OS provides a simplified and efficient delivery of common parts that are used by IMS Tools products. The components provide required infrastructure code for all IMS Tools key strategies, which include autonomic, rule-based programming, and GUI support.

Certain components, such as IMS Tools Online System Interface and IMS Tools Generic Exits, are used by some of the IMS Tools products to connect to an IMS system.

Additionally, Tools Base for z/OS includes components that are useful when they are widely deployed as part of an overall solution.
IBM Tools Base for z/OS consists of the following components:

- Autonomics Director
- Autonomics Director for DB2 for z/OS
- Distributed Access Infrastructure
- IMS Tools Common Services (includes IMS Tools Generic Exits and IMS Tools Online System Interface)
- IMS Hardware Data Compression Extended
- IMS Tools Knowledge Base
- Policy Services
- Tools Customizer

### Database administration and change management

Database administration and change management are the core responsibilities of the DBA. If not managed correctly, they can monopolize data center resources, waste valuable time, and result in the generation of unwanted errors.

During the database administration and change management process, database administrators are faced with many challenges like how do I:

- Quickly and easily navigate the IMS catalog?
- Ensure that I complete all of the necessary steps when I am making changes?
- Manage and track the changes to the definitions of my database objects?
- Propagate changes to other database environments?
- Keep IMS software versions current?
- Manage a corrupted database?
- Efficiently convert IMS full-function databases to the new high availability large database (HALDB) format?

These solutions can help reduce the negative impact data changes can have on your database.

Other IMS Tools products that can assist with performance management include:

- IMS Configuration Manager
- IMS HALDB Toolkit
- IMS Online Reorganization Facility
- IMS Sequential Randomizer Generator
- IMS Sysplex Manager

### Autonomics Director features and benefits

Autonomics Director offers several features that can increase the efficiency of your IMS environment.

**Reorganizations of IMS databases**

Based on policies that are defined by the user, Autonomics Director provides recommendations for the reorganization of databases, partitions, and areas, and automatically initiates reorganizations.

**IOVF and SDEP extensions of Fast Path DEDB areas**

Based on policies that are defined by the user, Autonomics Director provides recommendations for extending the independent overflow (IOVF)
and sequential dependent (SDEP) portions of Fast Path DEDB areas and automatically initiates these processes.

**Automatic collection of sensor data**
Sensor data is collected to capture the status of databases for a specific point in time.

**Database health evaluations through sensor data content by using Policy Services**
You can define policies and rules in Policy Services, which Autonomics Director uses when it evaluates the most recent database sensor data. The policies are stored in IMS Tools Knowledge Base and are accessed by Autonomics Director indirectly through Policy Services.

**Automatic discovery of databases in your environment**
Autonomics Director provides an automatic database discovery feature that identifies which databases are present in your IMS environment.

**Scheduling data collection and policy evaluation**
You can define parameters that control how frequently data is collected and how frequently policies are evaluated by Autonomics Director. You can also restrict these operations so that they do not interfere with your production work.

**On-demand data collection and policy evaluation**
You can request immediate or deferred data collection and policy evaluations.

**Sysplex support and workload balancing**
Autonomics Director supports a sysplex mode of operations and workload balancing. Through the use of multiple redundant Autonomics Director servers, it is possible to provide failover support if an Autonomics Director server terminates for any reason.

Autonomics Director server redundancy also provides the ability to automatically distribute IMS Tools autonomic workload throughout your sysplex. Autonomics Director will automatically balance sensor and group-managed reorganization job streams throughout a sysplex to provide optimal use of system resources during the shortest period of time.

**Autonomics Director and other IMS Tools**

Many IMS Tools provide database administration and change management features that are not available in IMS or that provide enhancements to basic IMS functionality.

Autonomics Director is one of several IMS Tools that provide enhancements to the ongoing database monitoring and maintenance tasks.

Other IMS Tools that can assist with database monitoring and maintenance tasks:
- IBM Management Console for IMS and DB2 for z/OS
- IMS Tools Knowledge Base
- Policy Services

**Autonomics Director server**

The Autonomics Director server is responsible for the control and flow of the Autonomics Director environment.
Autonomics Director has two types of servers: a master server, and active and failover servers.

**Master server**

The master server coordinates all functions of the Autonomics Director environment, communicates with the Autonomics Director user interface, and distributes requests for sensor collection and reorganization job streams to the other Autonomics Director servers within the Autonomics Director server group. Within a server group, one of the Autonomics Director servers automatically assumes the role of the master server.

When multiple Autonomics Director servers are present, the master server is dynamically selected from the group. Selection is determined by which Autonomics Director server becomes available first. If the master server terminates for any reason, the next available server assumes the role of master server.

**Active and failover servers**

An active server is one that actively participates in the Autonomics Director environment by processing requests for sensor data collection and for reorganization. Additionally, any active server can be the master server. A failover server is optimized for environments that require high-availability, but do not support the distribution of sensor collection and reorganization workload within the Autonomics Director server group. A failover Autonomics Director server serves as a standby for the master server.

Autonomics Director servers are configured as either active or failover.

The failover server is normally inactive, but assumes the role of the master server when it detects the termination of the master server. Any combination of active and failover servers within an Autonomics Director server group is supported. For example, when an Autonomics Director failover server detects other active Autonomics Director servers within the group, and the master server terminates, the failover server allows the other active servers to take over as the master server.

For more information about configuring Autonomics Director active and failover server modes, see the MODE= parameter description in the *IBM Tools Base for z/OS Configuration Guide for IMS*.

The Autonomics Director server environment contains one or more Autonomics Director server address spaces that operate with each other on a single LPAR or sysplex environment.

Autonomics Director requires the use of at least one server, but supports the use of multiple servers for both workload distribution and high availability. For example, if one of the Autonomics Director servers is terminated or an LPAR becomes unavailable, Autonomics Director is still able to function without interruption.

The collection of Autonomics Director servers that work together to support a single Autonomics Director environment is referred to as an *Autonomics Director server group*. When multiple Autonomics Director servers are used within multiple LPARs in a sysplex, Autonomics Director distributes the running of sensor collection and reorganization job streams that it initiates among these LPARs.
The algorithm that Autonomics Director uses for workload distribution is based on either the MVS™ WorkLoad Manager (WLM) routing services or on a simple round-robin distribution model, which you implement as a configuration option. Autonomics Director uses recommendations from WLM to determine the best location to submit sensor collection job streams. The round-robin distribution algorithm distributes sensor collection job streams evenly among the LPARs where Autonomics Director servers are located. For more information about configuring WLM for Autonomics Director, see the WLMRPRINT= parameter description in the *IBM Tools Base for z/OS Configuration Guide for IMS*.

The following diagram illustrates the master, active, and failover servers in an Autonomics Director environment:

![Autonomics Director server environment diagram](image)

**Figure 1. Autonomics Director server environment**

**Autonomics Director scheduler**

You can use the Autonomics Director scheduler to schedule automatic sensor data collection, policy evaluations, reorganizations, IOVF extensions, and SDEP extensions that are based on user-defined time periods. Data collections, policy evaluations, and reorganizations can be performed on a database, partition, or area. IOVF and SDEP extensions can be performed on Fast Path DEDB areas.
For sensor data collection and policy evaluations, you can establish a peak period during which sensor data collection and policy evaluations cannot take place, to ensure that Autonomics Director does not administer sensor data collection or evaluation during your peak production workload.

For reorganizations and area extensions, you can establish a maintenance period, during which these processes can take place, and then assign that maintenance period to a specific user group.

Autonomics Director automated scheduling is optional. You can issue on-demand sensor data collections, policy evaluations, reorganizations, and area extensions through AD batch (IAVBATCH) directly or through your existing job scheduler. You can also use your existing job scheduler to introduce DB sensor, image copy, or pointer checker jobs into your system without involving Autonomics Director.

**Related concepts:**

"Managing the scheduler" on page 47

Use the Autonomics Director scheduler to automate ongoing IMS database monitoring and maintenance tasks. To reduce the impact to system resources, you can restrict the running of these tasks to defined time intervals.

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**Autonomics Director monitor list**

The Autonomics Director monitor list is a set of database and database partition names that are available for monitoring.

These resources might or might not be registered with DBRC or belong to any DBRC group.

The resources are added to the monitor list through the Autonomics Director automatic discovery feature.

**Restriction:** Autonomics Director automatic discovery can locate the master DBD.

The TSO user ID that is logged in when resources are added to the Autonomics Director monitor list becomes the owner ID of these resources. Autonomics Director automated jobs are submitted by using the owner ID, so this user ID must have proper RACF® authority.

Monitor lists can contain the following types of resources:

**Registered databases**

A database can be registered in the RECON as a member of the DBRC groups or without being a member of any DBRC group.

**HALDB database partitions and Fast Path DEDB areas**

Many database utilities can operate on a HALDB partition or a Fast Path DEDB area without having to operate on the entire database. For example, a HALDB partition or a Fast Path DEDB area can be reorganized independently of other partitions or areas.

**Unregistered databases**

For consistency, such independent databases are considered to belong to a group called $NONAME$.

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Populating the monitor list

To populate the monitor list, you use the Autonomics Director automatic discovery through the Autonomics Director automatic discovery ISPF dialog. You can view a list of resources and DBRC groups in your environment through the automatic discovery ISPF dialog list. From that list, you can select resources and groups, and supply monitoring parameters. The parameters include sensor data collection frequency, the job control language (JCL) member name for sensor collection, the policy name or type, and evaluation frequency. From then on, Autonomics Director automatically collects sensor data, evaluates the sensor data against the defined policy, and sends recommendations.

Autonomics Director automatic discovery obtains information about your resources from the DBD libraries that you define to the IMS Tools Knowledge Base (ITKB) RECONID configuration. Similarly, automatic discovery obtains more information about DBRC groups, HALDB partitions, and FP DEDB areas from the DBRC RECON data sets defined to ITKB.

Important: Autonomics Director automatic discovery can locate only the master DBD.

Automatic database discovery

Autonomics Director automatically collects database and group information about your IMS environment, including DBDLIB and RECON.

The following DBRC groups are supported:
- DBGRP
- DBDSGRP
- CAGRP
- RECOVGRP

User groups defined for Autonomics Director and databases that do not belong to any group are also supported.

Important: Autonomics Director auto-discovery can locate only the master DBD.

Database recommendations, reorganizations, and area extensions

Autonomics Director evaluates the most recent database sensor data against your defined policies and rules, recommends database reorganizations and area extensions as needed, and optionally performs the database reorganizations and area extensions.

Sensor data is information that is captured at a point in time that represents the condition or state of a single database. The data can be used for later analysis and policy evaluation.

Each policy consists of a set of rules that define threshold limits for specific types of database conditions. The policy service mechanism evaluates these threshold values against sensor data that an IMS Tools product collects and stores in the IMS Tools Knowledge Base Sensor Data repository.

You can view current evaluations for a database and view evaluation history by using the Autonomics Director user interface.
Autonomics Director user interface

You can use the Autonomics Director user interface to access Autonomics Director data from a TSO/ISPF environment.

You can use the Autonomics Director user interface to perform the following functions:

- Schedule automatic data collection and policy evaluations
- Initiate automatic discovery of IMS databases
- Select and customize databases and DBRC database groups to be defined to the monitoring list
- Initiate on-demand sensor data collection and policy evaluation for databases
- View recommendations and detailed reports
- Define the scheduling calendar to restrict operations to specific time periods
- Query any defined database in the monitor list by attributes such as database type, evaluation interval, policy name, and so on.
- Define and manage user groups
- Manage and view group reorganization and Fast DEDB area extension activity
- Schedule a reorganization on demand
- Schedule an SDEP or IOVF extension for Fast DEDB areas on demand
- Display and control the server environment using operator commands

You can run the Autonomics Director user interface on the same z/OS system or any z/OS system that is located within the same sysplex as the Autonomics Director server.

Autonomics Director batch client

Autonomics Director provides the batch client interface (IAVBATCH) to submit a selected subset of client commands.

You can use the batch interface to request on-demand sensor data collection, policy evaluation, and group-managed reorganization. Client commands submitted through the batch interface can also be used with customer’s external job schedules.

Autonomics Director sweep and cycle intervals

Autonomics Director uses sweep and cycle intervals to determine when to schedule and initiate work.

Sweep interval

A sweep interval is a time interval that defines how frequently Autonomics Director creates requests for work to be completed (for example, sensor data collection and policy evaluation). A sweep interval occurs when Autonomics Director scans the monitor list to determine what work must be initiated between the current and next sweep interval. During the monitor list scan, Autonomics Director considers:

- Databases requiring sensor evaluation
- Databases requiring policy evaluation
- User groups that contain databases requiring reorganization
• User groups that contain Fast Path DEDB areas requiring SDEP or IOVF extensions.

The sweep interval is controlled by the Autonomics Director Server SWEEPINT= parameter, which is contained in the Autonomics Director global parameter PROCLIB member. The value specifies the number of minutes in a SWEEP interval. The default value is 15 minutes. You can adjust this parameter as necessary, but can use the default as a starting point.

The longer the sweep interval, the more work Autonomics Director schedules between sweep intervals. Longer sweep intervals also enable Autonomics Director to better plan and stagger the initiation of workload.

**Cycle interval**

A *cycle interval* is a time interval that defines when Autonomics Director runs requests for work. Requests for work that are created in a sweep interval are distributed to be run in multiple cycle intervals. A cycle interval occurs when Autonomics Director checks for scheduled work to initiate. Work that is scheduled during a previous sweep interval can be initiated if it is time to initiate the work and the assigned period restriction allows the work to run. During the cycle interval, Autonomics Director checks the status of group-managed reorganization and Fast Path DEDB area extension jobs that began but are not yet complete. Autonomics Director can periodically check for jobs that completed abnormally, had a JCL error, or did not notify Autonomics Director of their completion.

The cycle interval is controlled by the Autonomics Director Server CYCLETIM= parameter, contained in the Autonomics Director global parameter PROCLIB member. The value specifies the number of minutes in a cycle interval. The default value is 1 minute. You can adjust this parameter as necessary, but can begin with the default.

The cycle interval is important because if it is too long, Autonomics Director appears to be late in initiating work, and if it is too short Autonomics Director uses more CPU than is necessary.

**Autonomics support**

Autonomics Director has both passive and active autonomics features to help you manage IMS databases. Passive autonomics features periodically check the state of a database and recommend actions to take. Active autonomics features check the state of a database and carry out the recommended actions.

Autonomics Director supports both passive and active autonomics for reorganizations on IMS full-function databases, HALDB partitions, and Fast Path DEDB areas. Passive and active autonomics for IOVF and SDEP extensions on Fast Path DEDB areas are also supported. You can use a combination of passive and active autonomics with different databases to achieve your specific business needs.

The following factors influence whether Autonomics Director schedules evaluations, reorganizations, or area extensions by using both passive and active autonomics features:

• Evaluation interval
• Sensor data maximum age
• Peak period definitions
For active autonamics, the reorganization interval and database maintenance period definitions are also factors. For active autonamics on Fast Path DEDB areas, the values specified for the SDEP extension and IOVF extension user group attributes are additional factors.

**Passive autonamics**

Passive autonamics features in Autonamics Director include recommendations for database reorganizations and SDEP or IOVF extensions to Fast Path DEDB areas. These recommendations can be viewed through the ISPF interface or through IBM Management Console for IMS and DB2 for z/OS.

Passive autonamics features can be activated for all or a subset of databases in your environment. You can select Database Recovery Control Facility (DBRC) groups or user-defined groups to monitor the databases in the group. You can apply a set of parameters as defaults to the entire group, and then selectively override those parameters for individual databases in the group.

**Schedules for passive autonamics**

Passive autonamics features operate on a schedule that you define for each database through the Autonamics Director ISPF interface. The Autonamics Director scheduler uses your schedule to determine when Autonamics Director runs sensor data collection and initiates policy evaluations. Sensor data collection is a read-only process, so sensor collection jobs can run concurrently with IMS system access. An exception is running High Performance Image Copy to obtain a non-concurrent image copy. In this case, the update to the database must be stopped.

You can use the Autonamics Director schedule to define peak periods during which Autonamics Director does not schedule sensor data collection. Autonamics Director schedules around the peak period to avoid contention with your IMS system.

**Attention:** Running database sensor collection during heavy production activity can create unwanted contention with your production workload.

The Autonamics Director schedule is flexible. You can both establish and interrupt a baseline schedule. For example, you can specify a peak period of 9:00 a.m. through 5:00 p.m. daily without an end date. You can then specify overrides for weekends with peak periods from 9:00 a.m. through 12:00 p.m. You can also provide more overrides for end-of-month runs, end-of-year runs, holidays, specific dates, and so on. Without customization, the Autonamics Director passive autonamics schedule provides no peak periods and sensor data collection is unrestricted.

**Active autonamics**

Active autonamics features in Autonamics Director periodically collect and evaluate sensor data, make recommendations, and send notifications. Active autonamics is similar to passive autonamics in that it uses the same facilities for monitoring the state of a database. When active autonamics features are enabled, Autonamics Director uses recommendations that are made by passive autonamics features to initiate the reorganization and Fast Path DEDB area extension processes.

Autonamics Director active autonamics is implemented through user groups. Management of multiple databases, partitions, or areas is useful when the group contains databases with external logical relationships.
Example: Automatically initiating the reorganization and DEDB area extension processes

You can use Autonomics Director active autonomies features to automatically initiate the reorganization and area extension processes.

Before you can use active autonomies features, you must configure Autonomics Director:

- Create peak periods for sensor data collection and evaluation. In this example, a peak period is Monday through Friday, 8:00 a.m. through 5:00 p.m.
- Add databases to the monitor list. In this example, the evaluation interval is seven days.
- Create database maintenance periods. In this example, a maintenance period is Saturday, 6:00 p.m. through 11:00 p.m.
- Define a user group and enable the attributes for automatic reorganizations, SDEP area extensions, and IOVF area extensions. In this example, MYGROUP contains databases DBA, DBB, and DBC, and Fast Path DEDB areas AREA1, AREA2, and AREA3. You must activate MYGROUP to enable it for group-managed reorganization, SDEP extensions, and IOVF extensions.

As a result of your definitions, Autonomics Director administers the following actions:

1. Sometime on Friday after 5:00 p.m., Autonomics Director automatically initiates a sensor data collection and evaluation for each of the databases, partitions, and areas in MYGROUP.
2. The evaluation determines that AREA1, DBA, and DBB need to be reorganized, but DBC, AREA2, and AREA3 do not.
   Autonomics Director marks its recommendation for AREA1, DBA, and DBB to Reorganization Needed.
   These recommendations are available in the Autonomics Director monitor list.
3. The evaluation also determines that AREA2 needs an IOVF extension and AREA3 needs an SDEP extension.
   Autonomics Director marks its recommendation for AREA2 to IOVF extension needed and AREA3 to SDEP extension needed.
   These recommendations are available in the Autonomics Director monitor list.
4. Sometime at or after 6:00 p.m. on Saturday, Autonomics Director determines that resources in MYGROUP require reorganization and Fast Path DEDB areas in MYGROUP require extensions.
   - Autonomics Director schedules reorganization jobs for DBA and DBB. These jobs all run in parallel. Because DBC does not require reorganization, if the SCAN job is present, no reorganization job is scheduled for DBC.
   - Autonomics Director submits the Online Space Management utility to process the reorganization of AREA1, IOVF extension of AREA2, and SDEP extension of AREA3.
5. The reorganization completes for DBA and Autonomics Director is notified. As part of the reorganization of DBA and DBB, IMS Database Reorganization Expert drives High Performance Image Copy (HPIC) to create an image copy of the reorganized database. Because HPIC contains an integrated database sensor, new sensor data is collected for the database.
6. The reorganization completes for DBB and Autonomics Director is notified. The same actions occur for DBB as occurred for DBA in step 5.
7. The reorganization of AREA1, IOVF extension of AREA2, and SDEP extension of AREA3 completes. Autonomics Director is notified. As part of the reorganization and extensions (SDEP and IOVF) of the Fast Path DEDB areas, the Online Space Management utility instructs the database sensor to collect new sensor data for the database and notifies Autonomics Director that new sensor data is available for the database. Autonomics Director evaluates the new sensor data.

8. Autonomics Director recognizes that the reorganization or extension job was submitted and ended normally for each database or Fast Path DEDB area for which either action was recommended and considers the work for the group complete.

**Autonomics Director modes**

You can use Autonomics Director in either automatic mode or on-demand mode.

**On-demand mode**

On-demand mode is used for ad hoc sensor data collection and policy evaluation. You can request immediate or delayed data collection and policy evaluations.

In on-demand mode, you request services through the Autonomics Director ISPF interface. You can also override several of the parameter specifications that were defined for the database during registration.

In on-demand mode, either conditional or unconditional reorganizations and area extensions can be selected.

- On-demand conditional reorganizations and area extensions use the most recently collected sensor data and evaluation to determine whether a reorganization or area extension is necessary for the group.
- On-demand unconditional requests are processed regardless of any sensor data or evaluation. For unconditional requests, the default values specified for the IOVF and SDEP options determine whether IOVF or SDEP extensions take place.

**Automatic mode**

When Autonomics Director runs in automatic mode, sensor data collection and policy evaluation are fully automated. You can define the peak workload schedule and the maintenance schedule.

Autonomics Director schedules sensor data collection outside of your defined peak production time periods. You can run sensor data collection in parallel with database updates. However, doing so can result in conflicts between the processes that might affect database response time and throughput.

Autonomics Director determines when to collect sensor data and perform database evaluations by using the defined parameters for the monitored database. You specify the frequency of these tasks when you register a database to Autonomics Director. The evaluation interval that you define determines the number of elapsed days, hours, and minutes between policy and database evaluations. The sensor age specification determines the maximum acceptable age of the sensor data that can be used for policy evaluation.

Before a database evaluation is scheduled, Autonomics Director examines the age of the most recent sensor data that was collected for the database. If the sensor data is older than the defined maximum age, Autonomics Director schedules a
sensor data collection job stream. Autonomics Director initiates policy evaluation periodically or after a sensor data collection is finished if AUTOEVAL=(Y) is specified on the monitored database. Autonomics Director then generates recommendations for the database.

**Important:**
- You can run an evaluation immediately following a sensor data collection run, regardless of the evaluation interval.
- If AUTOEVAL=(Y) is specified on the monitored database, the database is automatically evaluated whenever new sensor data notification is received for that database.

**Job submission and started tasks**
Autonomics Director automatically submits jobs for sensor data collection and reorganization using JCL that you create and maintain. Autonomics Director supports the use of both private JCL libraries for jobs that are submitted to the internal reader and JES Procedure Libraries (PROCLIBs) for initiation of started tasks.

You can choose between job submission or started task initiation that is based on your specification of the JCL source to Autonomics Director. If you specify a fully qualified data set and member name, Autonomics Director submits the job to the internal reader. If only a member name is specified, Autonomics Director issues an MVS Start command for that member name to initiate the work as a started task.

When you submit a job to the internal reader, Autonomics Director associates a RACF ID with the submitted job. You can use the following table to determine the RACF ID for the submitted job.

<table>
<thead>
<tr>
<th>Submitted job</th>
<th>RACF ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-demand sensor data collection or on-demand reorganization</td>
<td>The TSO user’s logon ID</td>
</tr>
<tr>
<td>On-demand batch services</td>
<td>The batch job submitter’s user ID</td>
</tr>
<tr>
<td>On-demand group-managed reorganization</td>
<td>The TSO user’s ID on the on-demand REORG issuer</td>
</tr>
<tr>
<td>On-demand SDEP or IOVF extension for Fast Path DEDB areas</td>
<td></td>
</tr>
<tr>
<td>Automatically scheduled sensor data collection</td>
<td>The ID of the owner of the database resource recognized by Autonomics Director</td>
</tr>
<tr>
<td>Automatically scheduled reorganization</td>
<td>The group owner’s ID</td>
</tr>
<tr>
<td>Automatically scheduled SDEP or IOVF extensions for Fast Path DEDB areas</td>
<td></td>
</tr>
</tbody>
</table>

The associated RACF ID must have the appropriate access to open and read the JCL library that contains the job to be submitted. The RACF ID must also have the appropriate level of access for the resources that are accessed by the submitted job.

Autonomics Director does not associate a RACF ID with any work that is initiated as a started task, because MVS does not provide this capability.
**Autonomics Director grouping**

The Autonomics Director user interface allows the creation of groups from a list of database resources that are defined in the customer's DBDLIB, DBRC, or other user groups.

Autonomics Director contains a generic user grouping facility. This facility is used by Autonomics Director and other tools to allow grouping of databases and attributes for activities that are related to the entire group.

**Group-managed reorganizations and area extensions**

Group-managed reorganizations and area extensions enable automatic reorganizations of one or more databases and automatic SDEP or IOVF extensions of Fast Path DEDB areas. Managing your databases, partitions, and areas at a group level can help minimize the amount of time and manual intervention that is required to maintain and optimize your resources. Group-managed reorganizations and area extensions work in addition to Autonomics Director user grouping capabilities and enable you to create groups of one or more databases that are defined in their DBDLIBs. The ability to initiate and control reorganizations and area extensions by group adds efficiency and enables these activities to be processed in parallel for multiple databases, partitions, and areas.

You can define database groups to be reorganized and Fast Path DEDB areas to be extended as a single unit. The use of group-managed reorganizations and area extensions extends the power of Autonomics Director grouping support into the operational environment.

Group-managed reorganizations and area extensions can help reduce time and resource consumption for database reorganizations and IOVF and SDEP extensions. The facility allows for automatic or on-demand conditional evaluation of all database statuses in the group and, if necessary, schedules an automatic reorganization and area extension as well. Reorganizations and area extensions are scheduled only if the resources in the group require it. For example, if only an SDEP extension is required, Autonomics Director schedules only an SDEP extension for the Fast Path DEDB areas in the group. The databases, areas, and partitions in the entire group can be processed together, but only minimal resources are used.

Other features of group-managed reorganizations and area extensions include:

- Including databases in more than one group.
- Consolidating management of database reorganizations and area extensions: tracking, identifying, and managing.
- Running reorganization and database scan processes for multiple databases, areas, and partitions in parallel. Running these processes in parallel helps shorten the database maintenance window, ultimately achieving higher availability. Parallel reorganization can also be distributed to multiple LPARs in a sysplex environment.
- Running SDEP or IOVF extensions for multiple Fast Path DEDB areas in parallel.
- Running parallel post-reorganization database job streams for prefix resolution and prefix update for logically related databases.
- Tracking the status of each submitted job and notifying users when there is a failure occurs within the group jobs.
- Initiating database reorganizations and area extensions by using the Autonomics Director scheduler, on demand through the Autonomics Director interface, or through an external job scheduling system.

**Database maintenance periods**

To use group-managed reorganization and area extension, you must define one or more database maintenance periods in your schedule. A database maintenance period defines a time period when you want Autonomics Director to schedule (or not to schedule) a reorganization or area extension for one or more groups. You assign a defined maintenance period to the group. A database reorganization is scheduled in the assigned maintenance period if it is necessary. You can define as many maintenance periods as necessary to accommodate your business needs.

When you define the maintenance periods, you can specify whether the work runs within or outside the time period. You can also specify a reorganization interval for the group, which determines how frequently database reorganizations and area extensions can be initiated.

**User IDs**

When a group-managed reorganization or area extension job is submitted, the TSO, RACF, or SAF user ID that is used depends on whether the job was scheduled with on-demand or automatic autonomies.

- If the group-managed reorganization or area extension was scheduled on demand, the TSO user ID on the on-demand REORG issuer is used on all JOB submissions.
- If the group-managed reorganization or area extension was automatically scheduled by Autonomics Director, the TSO user ID of the group owner is used on all job submissions.

**Job scheduling structure**

Autonomics Director provides a user-defined job scheduling structure for active autonomies and group-managed reorganization.

The structure includes four separate phases of scheduling:

- Pre-group-managed reorganization (optional)
- Reorganization and scan (required)
- Post reorganization (optional)
- Post-group-managed reorganization (optional)

Only the reorganization and scan phase is required. The other phases are offered primarily to support the use of logical relationships.

The JCL required for jobs or started tasks is defined by the user and depends on whether there are IMS external logical relationships in your databases.

**Pre-group-managed reorganization**

These steps pre-allocate data sets, de-allocate databases from online systems, run pre-reorganization utilities, or perform other functions. The phase contains a single job and is run serially before any other jobs in the stream.

**Reorganization and scan**

Databases are reorganized in the reorganization and scan phase. During
conditional reorganization, only the databases that Autonomics Director determines to require reorganization are reorganized. During unconditional reorganization, which you initiate through the Autonomics Director interface, all databases are reorganized.

Autonomics Director schedules multiple jobs in parallel during this phase. Each job reorganizes a single IMS full function database, DEDB area, or HALDB partition. Each reorganization job contains a single job step that runs reorganization expert in unconditional mode.

For databases that participate in logical relationships, a scan job can be defined in addition to a reorganization job. The scan job runs instead of the reorganization job for databases that are participating in logical relationships and do not require reorganization. If present, the scan job is scheduled for databases that are not participating in logical relationships and do not require reorganization. The IPR Database Scan utility produces the necessary prefix information to resolve external logical relationships.

**Important:** HALDB logical relationships are maintained and resolved when partitions are reorganized. DEDBs do not support logical relationships.

**Post-reorganization**

The post reorganization phase is initiated after all jobs in the reorganization and scan phase complete successfully.

**Post-group-managed reorganization**

The post-group-managed reorganization phase is the final phase of group-managed reorganization. Post-group-managed reorganization provides an opportunity to conclude the reorganization process. Functions such as work file deletion, DBRC authorization changes, and a utility execution that issues IMS/START DB commands can be initiated.

Two jobs are defined for the post-group-managed reorganization phase. The first job executes when the group-managed reorganization process runs successfully. The second job executes when the group-managed reorganization process fails. Autonomics Director selects which job to run based on the final status of the reorganization, which is either failed or succeeded.

---

**Sensor data collection**

Autonomics Director collects and makes recommendations or initiates database reorganizations and area extensions based on sensor data. Sensor data is a point-in-time snapshot of statistical data that pertains to an individual database, partition, or area. Sensor data contains information about database space usage, fragmentation, segment geography, database organization, the system catalog, the VSAM catalog, and the disk Volume Table Of Contents (VTOC).

Autonomics Director can initiate sensor data collection either automatically or manually by using a stand-alone database sensor. A stand-alone database sensor is a sensor that exists for the sole purpose of gathering information about a database. IBM IMS Database Solution Pack for z/OS and IBM IMS Fast Path Solution Pack for z/OS both provide the Stand-alone DB Sensor component.

Sensor data can also be collected by using an integrated database sensor. Integrated sensors are efficient because they collect sensor data as a by-product of main utility processes such as pointer checking and image copy. The following IMS Tools
products provide an integrated database sensor that can collect sensor data with minor modifications to the standard JCL statements for these products:

- IBM IMS Database Solution Pack for z/OS: IMS High Performance Pointer Checker for z/OS
- IBM IMS Database Solution Pack for z/OS: IMS High Performance Image Copy for z/OS
- IBM IMS Fast Path Solution Pack for z/OS: IMS High Performance Fast Path Utilities

Both stand-alone and integrated database sensors store data in the IMS Tools Knowledge Base sensor data repository. The amount of data that is stored is limited to approximately 1 KB of data per sensor collection.

**Sensor data collection notification**

After sensor data is collected for a database, the sensor program notifies Autonomics Director of the availability of new sensor data. This notification allows Autonomics Director to then analyze the data and generate recommendations for the database. You must enable the notifications from both integrated sensors and stand-alone sensors by adding a utility parameter that identifies the target Autonomics Director server to be notified of new sensor data.

**Important:** You must configure the sensor job streams to enable Autonomics Director notifications. For details, see the description of the ADXCFGRP parameter for the product that collects the sensor data.

**Sensor data collection initiated by Autonomics Director**

Autonomics Director provides automated sensor data collection. You can choose automatic sensor data collection when you register a database with Autonomics Director by specifying an acceptable sensor data age for autonomic analysis. Additionally, you specify the name of the data set that contains the sensor data collection job stream to be submitted to the internal reader by Autonomics Director.

**Restriction:** The JCL in the job stream must be for a stand-alone sensor. Autonomics Director does not initiate sensor data collection through integrated database sensors.

**Table 2. Symbolic variables for sensor data collection job streams**

<table>
<thead>
<tr>
<th>Symbolic variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$DBNAME$</td>
<td>The name of the database that data is being collected for.</td>
</tr>
<tr>
<td>$PANAME$</td>
<td>The HALDB partition or DEDB area name that data is being collected for.</td>
</tr>
<tr>
<td>$ARNAME$</td>
<td>The alias for $PANAME$.</td>
</tr>
<tr>
<td>$USNAME$</td>
<td>The user ID of the owner of the DB resource or group resource for scheduled requests. The user ID of the requestor for on-demand requests. This variable can also be used for reorganization job streams.</td>
</tr>
</tbody>
</table>

By using substitutions, you can reuse the same JCL or JCL member for multiple databases. Autonomics Director does not validate the JCL content or syntax.
When Autonomics Director opens the data set that contains the user-identified data collection or reorganization and area extension job stream, it uses the TSO, RACF, or SAF user ID that was used during the database registration with Autonomics Director. This ID is also referred to as the owner ID. This user ID must have the correct RACF or SAF authorization to read this data set.

When Autonomics Director opens the internal reader to submit the data collection or reorganization job stream, it uses the same TSO, RACF, or SAF user ID that was used during the database registration with Autonomics Director. This user ID must have the correct RACF or SAF authorization to access the resources that are defined in the job stream.

When a data collection or a reorganization and area extension job stream is submitted to the internal reader, Autonomics Director extracts the job name and JES job number for display on the user interface.

**On-demand sensor data collection**

You can use other job schedulers, existing automated and manual processes, or the TSO/ISPF client interface to initiate sensor data collection. Additionally, any combination of automated and user-initiated sensor data collection is supported. You can also initiate on-demand reorganizations and area extensions by using the same process.

**Autonomics Director architecture and process flow**

The Tools Base Autonomics Director environment is composed of several IMS Tools components.

A typical environment for running Autonomics Director requires the following components:

- Policy Services
- IMS Tools Knowledge Base
- IMS Solution Packs Database Sensor

The following figure illustrates the environment and the process flow for using Autonomics Director.
The following process flow steps match the numbers in the figure:

1. The user customizes the Autonomics Director environment by using the Autonomics Director ISPF interface and server startup parameters.
2. Autonomics Director collects database and group information from the DBD libraries and the RECON data sets.
3. The user creates a monitor list of group and database names with attributes that are saved in the Autonomics Director repository and are available for monitoring.
4. The user defines parameters that control how frequently data is collected and policies are evaluated by Autonomics Director. The user can also schedule immediate and deferred data collection and policy evaluations.
5. Sensor data is collected to capture the status of databases at a specific point in time. The user can also request that Autonomics Director submit a batch job to collect the most up-to-date sensor data.
6. Policies and rules that are defined by Policy Services are stored in the IMS Tools Knowledge Base and are accessed by Autonomics Director. Results from the database evaluations are stored in the Autonomics Director repository and are accessed during inquiries from the client.
7. Autonomics Director uses policies and rules that are defined in Policy Services to evaluate against the most recent database sensor data.
8. Autonomics Director automatically initiates reorganization when the reorganization interval specified for a user group passes and the resources in the user group need reorganization. Optionally, Autonomics Director also initiates the recommended IOVF extensions or SDEP extensions on the Fast Path DEDB areas in the user group at that time.

Accessibility features for Autonomics Director

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 Autonomics Director enable users to:
• Use assistive technologies such as screen readers and screen magnifier software. Consult the assistive technology documentation for specific information 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. Refer to 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

The guides that are listed describe how to use ISPF, including the use of keyboard shortcuts or function keys (PF keys), the default settings for the PF keys, and how to modify their functions.

### Hardware and software prerequisites

Autonomics Director operates on any hardware that supports IMS, z/OS V1.10 or later and IMS Version 11 or later.

#### Hardware prerequisites

Autonomics Director (5655-V93) operates on any hardware configuration that supports the required version of IMS.

#### Software prerequisites

The installation and operation of Autonomics Director requires the following software:

**Operating system:**

• z/OS, V1.10 (5694-A01) or later

**IMS:**

• IMS V11.1 (5635-A02)
• IMS V12.1 (5635-A03)
• IMS V13.1 (5635-A04)

**Requirement:** IMS Version 11 and IMS Version 12 must have certain APARs installed to coexist with IMS Version 13. For information about coexistence APARs, see the IMS Version 13 Release Planning User’s Guide.

### Installing Autonomics Director

Autonomics Director is installed as a component of IBM Tools Base for z/OS.

Install Autonomics Director by using the SMP/E RECEIVE, APPLY, and ACCEPT commands. Complete information about installation requirements, prerequisites, and procedures for Autonomics Director is in the Program Directory for Tools Base for z/OS, GI10-8819.

After the SMP/E installation completes successfully, the following execution libraries are cataloged on your machine:

• smqhlq.SHKTSAMP
Verifying the installation

You can verify that Autonomics Director is properly installed on your system.

Procedure

Start the client CLIST and issue an Autonomics Director DISPLAY command.

What to do next

After you verify that Autonomics Director is installed successfully, you can configure Autonomics Director by using the using the Autonomics Director ISPF client.

Service updates and support information

Service updates and support information for this product, including software fix packs, PTFs, Frequently Asked Question (FAQs), technical notes, troubleshooting information, and downloads, are available from the Web.

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


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

Search for a specific IMS Tool product or browse the Information Management > IMS family.
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:


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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.

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Chapter 2. Business and usage scenarios

Use Autonomics Director to address many of your day-to-day business problems.

These scenarios illustrate how you can use Autonomics Director to address typical business problems.

In this chapter:

- “Scenario: Creating a scheduling calendar that includes exceptions for the major US holidays”
- “Scenario: Creating and activating a monitoring list” on page 27
- “Scenario: Viewing exceptions by using Management Console” on page 28

Scenario: Creating a scheduling calendar that includes exceptions for the major US holidays

In this scenario, a DBA at an automobile manufacturing plant creates a scheduling calendar that includes exceptions for major US holidays.

About this task

The heaviest workload on the automobile manufacturing computer systems occurs daily between 8:00 a.m. and 9:00 p.m. To accommodate this workload, the DBA defined the Autonomics Director base period as Monday - Friday, 8:00 a.m. - 9:00 p.m., which means that Autonomics Director does not run sensor and evaluation jobs during this time.

The automobile manufacturing plant is closed on all major US holidays. Because the plant is closed, the DBA wants Autonomics Director to run all day when necessary during these holidays. To have Autonomics Director run jobs during these times, the DBA must create overrides to the Autonomics Director base period for the selected dates.

The automobile manufacturing plant is closed on the following holidays:

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday, January 2</td>
<td>New Year’s Day</td>
</tr>
<tr>
<td>Monday, January 16</td>
<td>Birthday of Martin Luther King, Jr.</td>
</tr>
<tr>
<td>Monday, February 20</td>
<td>Washington’s Birthday</td>
</tr>
<tr>
<td>Monday, May 28</td>
<td>Memorial Day</td>
</tr>
<tr>
<td>Wednesday, July 4</td>
<td>Independence Day</td>
</tr>
<tr>
<td>Monday, September 3</td>
<td>Labor Day</td>
</tr>
<tr>
<td>Monday, October 8</td>
<td>Columbus Day</td>
</tr>
<tr>
<td>Monday, November 12</td>
<td>Veterans Day</td>
</tr>
<tr>
<td>Thursday, November 22</td>
<td>Thanksgiving Day</td>
</tr>
<tr>
<td>Tuesday, December 25</td>
<td>Christmas Day</td>
</tr>
</tbody>
</table>

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Procedure

To create a scheduling calendar:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option 1 **System administration** and press Enter.
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.

2. Select option 1 **Manage scheduling calendar**, and press Enter.
   The Autonomics Director Scheduler: Period Management panel (IAVPCLN) is displayed.

3. Select option 2 **Edit schedules** and press Enter. The Edit Periods Filter panel (IAVPEOP) is displayed.

4. Apply a filter to narrow your search of period names or press Enter to indicate no filtering.
   The Autonomics Director Maintenance Period Name List panel (IAVPEPD) is displayed.

5. Type A in the Act column of a period name to define base periods and new overrides for that period and press Enter.
   The Autonomics Director Scheduler: Define Periods panel (IAVPCOM) is displayed.

6. Select option 4 **Specify base period overrides by using specific dates** and press Enter. The Specify Base Period Overrides by Using Specific Dates In A Month panel (IAVPBDT) is displayed. The overrides that you define are used for the selected dates instead of the base period.
   a. Specify 01 for the month and 12 for the year and press Enter.
   b. Enter Y for 2 and 16 and press Enter.
   c. Leave the start time and end time blank and press Enter.
   d. Repeat steps a-c for each US holiday in the year.
   e. Type SAVE and press Enter.

7. Verify that you entered the correct overrides.
   a. From the Autonomics Director System Administration Options Menu panel (IAVPSAM), select option 1 **System administration** and press Enter.
   b. Select option 1 **Manage scheduling calendar** and press Enter.
   c. Select option 3 **View scheduling calendar** and press Enter.
   d. Apply a filter to narrow your search of period names or press Enter to indicate no filtering.
   e. Type an S in the Act column of a period name to select for viewing and press Enter.
   f. Enter 01 for the month, 02 for the day, 12 for the year, and press Enter. The base period for that day is shown in the View Scheduling Calendar by Day (IAVPVBD) panel.
   g. Repeat step 7f for each override that you defined.

Related concepts:

“Managing the scheduler” on page 47

Use the Autonomics Director scheduler to automate ongoing IMS database monitoring and maintenance tasks. To reduce the impact to system resources, you can restrict the running of these tasks to defined time intervals.
Scenario: Creating and activating a monitoring list

In this scenario, a customer automates their daily monitoring and maintenance tasks for their mission-critical high-volume IMS HDAM database.

About this task

The customer currently monitors their IMS HDAM database daily by using IMS HP Pointer Checker. Additionally, once a day the DBA submits an IMS HP Pointer Checker job stream and manually reviews the space management reports to determine if a database reorganization is required.

The following scenario shows how the customer can automate all of these tasks by using Autonomics Director.

Procedure

To create and activate a monitoring list:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option **1 System administration** and press Enter.
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.
2. Select option **3 Manage monitor list**, and press Enter.
   The Autonomics Director Resource Filter panel (IAVPRSC) is displayed.
3. Select resource group type **1 DATABASE** and press Enter.
   The Autonomics Director Resource List panel (IAVPXIR) is displayed.
4. From the list of available databases, select database APS003ZD by placing an A in the action column and press Enter.
   The Add or Update the Group and Database Attributes panel (IAVPATT) is displayed.
5. Specify the following monitoring options and press Enter:
   - Indicate that you want to accept the attributes and add the remaining members to this group.
   - Policy evaluations are run once every 24 hours.
   - Maximum age of sensor data is 24 hours.
   - Policy Services determines the name of the policy when the database, partition, or area is evaluated by using the database organization form.
   - Priority of database evaluation is 2.
   - The sensor JCL member name is VN09.
   The Add or Update the Group and Database Attributes panel (IAVPATT) is displayed.

Results

The Add successful message is displayed on the Resource List panel (IAVPXIR).

What to do next

- Activate Sensor Data collection in the IMS HP Pointer Checker job stream.
- Set up Policy Services to receive automatic recommendations and (optional) text messages when a reorganization is required.

Related concepts:
The Autonomics Director monitor list is a set of databases, partitions, and areas that are available for monitoring. You can add, update, delete, or change the owner of monitor list entries. The list of available Autonomics Director monitor list entries is populated automatically.

Scenario: Viewing exceptions by using Management Console

The Management Console for IMS and DB2 Exceptions widget displays any exceptions that are reported by Autonomics Director.

About this task

The IBM Management Console for IMS and DB2 for z/OS displays exceptions and statistical information in a graphical web interface. Because the Management Console for IMS and DB2 provides access to database reports, historical trends, and displays exception messages, you can easily manage the overall health of your resources on a z/OS system. This scenario focuses on how to troubleshoot a problem when one of those databases has an exception.

To help you manage a large number of databases, Management Console for IMS and DB2 provides a summary table of your databases. When you group databases, Management Console for IMS and DB2 generates a summary table for that group, where you can view the overall health of those databases.

This information is an excerpt from this developerWorks® scenario:

Procedure

To view exceptions:

1. On the Management Console for IMS and DB2 login page, select the environment you want to manage and log in.

   The user ID and password you enter are the RACF credentials for the environment, so users have the same authorizations in Management Console for IMS and DB2 as they do on their z/OS systems. To manage authentication and authorization, see the security information for Tools Base Distributed Access Infrastructure.

   In addition to authentication and authorization, the Management Console for IMS and DB2 and Distributed Access Infrastructure provide SSL encryption that secures your TCP/IP communication.

2. View the Exceptions widget from the informational dashboard. Numbers next to the Exception widget title and next to the severity name indicate the number of exceptions for the database or for that severity group.

   The following example shows four exceptions for this database. Two are critical exceptions, one is severe, and one is a warning.
3. In the Exceptions widget, click on a severity group name to expand it and to see all the exceptions within that group. Exceptions prefixed with a Recommendation icon have recommended actions provided by the Autonomics Director. If completed, the actions will resolve the exception in most cases. Exceptions without an automated recommendation will likely require further analysis by viewing help information and the sensor data charts.

4. To view more information about an exception, click it.

The exception help information provides the rule conditions that triggered this exception, the related data elements, the related sensor data charts, and possible resolutions. You can use all of this information to troubleshoot and diagnose an exception more completely.

**Tip:** You can hover over an exception to view the name of the rule that generated the exception.
Chapter 3. Configuring Autonomics Director

Information about configuring IMS Policy Services and other Tools Base components for IMS is provided in IBM Tools Base for z/OS Configuration for IMS.

You can also download a PDF version of this information from the IMS Tools Product Documentation page.

Related concepts:
“Installing Autonomics Director” on page 21

Autonomics Director is installed as a component of IBM Tools Base for z/OS.
Chapter 4. Automating monitoring and maintenance tasks through Autonomics Director

You can automate sensor data collections, policy evaluations, and database maintenance tasks (reorganizations and DEDB area extensions) through Autonomics Director.

Before you begin

Complete the following prerequisite tasks:
- Prepare the necessary skeleton JCL for Autonomics Director.
- Configure the Autonomics Director server.
- Create or customize your policies by using the Policy Services interface.

Procedure

Complete one of the following tasks, depending whether you want to automate database maintenance tasks in addition to sensor data collections and policy evaluations.
- To automate sensor data collections and policy evaluations only:
  1. Create a peak schedule that defines when Autonomics Director collects sensor data and conducts evaluations.
     a. Define the default time intervals (base period) for a regular day. For more information, see "Defining the base period" on page 48.
        The base period is in effect every day, except on days that have overrides. The base period must be called PEAK.
     b. Define overrides to the base period. For more information, see "Defining overrides to the base period" on page 50.
  2. Add your databases and areas to the monitor list to activate them for sensor data collections and evaluations. For more information, see "Adding or updating monitor list entries" on page 60.
     The monitor list is a set of databases, partitions, and areas that are eligible for monitoring in Autonomics Director. When you add resources to the monitor list, you associate each resource with a maintenance period and specify how often each resource is monitored.
  3. View any recommendations that are issued by the policy evaluation and decide whether to initiate a database maintenance task through Autonomics Director. Recommendations are generated based on the results of policy evaluations. For more information, see "Viewing recommendations" on page 78.
  4. Optional: You can issue on-demand reorganizations and DEDB area extensions through Autonomics Director at your discretion. However, before you initiate a reorganization or area extension, complete the following prerequisite tasks:
     a. Create one or more user groups and add the activated databases to those user groups. For more information, see "Creating a user group" on page 63.
To automate sensor data collections, policy evaluations, and database maintenance tasks (reorganizations and DEDB area extensions):

1. Create schedules that define when Autonomics Director collects sensor data, conducts evaluations, and administers maintenance tasks (such as reorganizations).
   a. Define the default time intervals (base period) for a regular day. The base period is in effect every day, except on days that have overrides. For more information, see “Defining the base period” on page 48.
      A peak period defines time intervals during which no sensor data collection or policy evaluations are scheduled. The name of the peak period must be PEAK. A maintenance period defines time intervals during which maintenance tasks (such as reorganizations) can take place.
   b. Define overrides to the base period. For more information, see “Defining overrides to the base period” on page 50.

2. Add your databases and areas to the monitor list to activate them for sensor data collections and evaluations. For more information, see “Adding or updating monitor list entries” on page 60.
   The monitor list is a set of databases, partitions, and areas that are eligible for monitoring in Autonomics Director. When you add resources to the monitor list, you associate each resource with a maintenance period and specify how often each resource is monitored.

3. Create one or more user groups and add your activated databases to those user groups. For more information, see “Creating a user group” on page 63.
   Reorganizations and DEDB area extensions are scheduled at the user group level.

4. Activate the resources in the user groups for automatic database maintenance tasks. For more information, see “Activating or deactivating user groups for reorganizations and area extensions” on page 68. This task involves adding your new user groups to the monitor list and enabling the parameters related to the tasks that you would like to automate.
   After a user group is activated for one or more automated tasks (reorganizations, SDEP extensions, or IOVF extensions), Autonomics Director schedules those tasks on an as-needed basis, during the specified maintenance period. Autonomics Director determines whether a task is necessary by monitoring the results of policy evaluations.

---

Starting Autonomics Director

After you complete the required configuration procedures, start the Autonomics Director server and client. From the client, select an Autonomics Director server group.

In this topic:

- “Starting the Autonomics Director client interface” on page 35
- “Selecting an Autonomics Director server” on page 36
- “Selecting a RECON ID” on page 36
Starting the Autonomics Director client interface

After you complete the required configuration procedures, you can start Autonomics Director and select an Autonomics Director server.

Procedure

To start the Autonomics Director client interface:

1. Log on to TSO and specify a minimum REGION (KB) value of 6144.
2. From the ISPF Primary Option Menu panel, select option 6 (Command). The ISPF Command Shell is displayed.
3. Invoke the Autonomics Director client interface by choosing one of the following methods:
   - To access Autonomics Director from the Tools Base for z/OS main menu with the default XCF group, enter the following command:
     \[ \text{EX} \ 'hlq.SHKTCEXE(HKTAPPL)' \ 'HLQ(hlq)' \]
     The Tools Base for z/OS main menu appears. Select option 3 Autonomics Director and press Enter.
   - To access Autonomics Director from the Tools Base for z/OS main menu with a specific XCF group, enter the following command:
     \[ \text{EX} \ 'hlq.SHKTCEXE(HKTAPPL)' \ 'HLQ(hlq) XCFGRPID(xcfgrp1d) MAXGRPS(10)' \]
     The Tools Base for z/OS main menu appears. Select option 3 Autonomics Director and press Enter.
   - To access Autonomics Director directly, enter the following command:
     \[ \text{EX} \ 'hlq.SHKTCEXE(IAVZPRIM)' \ 'HLQ(hlq) XCFGRPID(xcfgrp1d) MAXGRPS(10)' \]
     The Autonomics Director main menu appears.

The variables and keywords in the previous examples have the following values:

- \( hlq \) Indicates the high-level qualifier of your installation data set.
- \( XCFGRPID(xcfgrp1d) \)
  (Optional) Indicates an XCF group name. For proper syntax, the closing quotation mark must follow the last specified parameters to the command.

The XCFGRPID value is a 3-character string that matches the first three characters of the XCF group name that is specified as the XCFGROUP parameter in the Autonomics Director server common PROCLIB member. For more information, see the IBM Tools Base for z/OS Configuration Guide for IMS.

The default is ADM.

In a Autonomics Director environment, the XCF group names must conform to a specific naming convention. The XCF group name is built by adding a prefix of IAV to the 3-character XCF group ID and adding a suffix with a number in the range 00 to the value that is specified in the MAXGRPS parameter.

- \( \text{MAXGRPS} \)
  (Optional) Determines the range of XCFGROUP names. For proper syntax, the closing quotation mark must follow the last specified parameters to the command.
The MAXGRPS value is a number 1 - 99. The default value is 10.

**Selecting an Autonomics Director server**

When you start Autonomics Director, you must select a Autonomics Director group so that you can display the Autonomics Director panels.

**Before you begin**

Autonomics Director uses RECON environments. The IMS Tools Knowledge Base repository must be configured with one or more RECONs defined. At least one RECON ID is required. Minimally, the RECON ID must include one DBDLIB data set for use in the automatic discovery of databases and DBRC groups. For detailed IMS Tools KB configuration information, see the IBM Tools Base IMS Tools Knowledge Base for z/OS User’s Guide.

**Procedure**

To select a server:

1. Start the Autonomics Director client interface.
   
   The Autonomics Director Settings panel (IAVPSET) is displayed. Use this panel to specify the settings for your Autonomics Director sessions. These values are saved in your ISPF profile and remain in effect across your Autonomics Director sessions.

2. Specify the Autonomics Director Settings and press Enter.
   
   The Autonomics Director XCF Group Name List panel (IAVPGRP) is displayed. This panel displays the master servers in each XCF group, the job or started task name, the XCF group, and the MVS system where the server is started. The number of entries in this list is determined by the MAXGRPS parameter set during startup.

3. Type an S in the Act column of an XCF group row to select a controlling server and press Enter.
   
   The IMS Tools Knowledge Base Recon Information panel (HKTAPLSR) is displayed.

4. Type an S in the Act column to select a RECON and press Enter.

**Results**

After you make a selection, the Autonomics Director main menu is displayed.

**Selecting a RECON ID**

You can choose any active RECON ID for Autonomics Director to use.

**About this task**

After you select the Autonomics Director server, a list of valid RECON IDs is retrieved from IMS Tools KB. Your RECON environment is established by selecting one of these available RECON IDs from the list. The RECON ID determines which databases you can monitor with Autonomics Director. For more information, see "Selecting an Autonomics Director server."

**Important:** When a RECON ID is added or changed in the IMS Tools KB repository, the Autonomics Director environment is not automatically...
updated. For information on how to update your Autonomics Director server RECON environment, see “Refreshing the Autonomics Director server resources” on page 43.

**Procedure**

To select a RECON ID:

1. Navigate to the Autonomics Director Primary Option Menu panel (IAVPRIM).
2. In the **Locale** field, type a RECON ID value or enter a question mark (?) to generate a list of available RECONs and press Enter.
   - If you entered a RECON ID value, the Locale field displays the currently selected RECON.
   - If you entered a question mark (?), the IMS Tools Knowledge Base Recon Information panel (HKTAPLSR) is displayed. Type an S in the Act column to select a RECON and press Enter. The Locale field displays the currently selected RECON.

**Managing the Autonomics Director server**

You can use commands or the Autonomics Director ISPF interface to manage the Autonomics Director server. The commands are issued by using the z/OS console interface to the Autonomics Director server address space.

In this topic:

- ”Stopping the Autonomics Director server”
- ”Displaying the Autonomics Director server resources” on page 40
- ”Refreshing the Autonomics Director server resources” on page 43
- ”Suspending the Autonomics Director scheduler” on page 56
- ”Resuming the Autonomics Director scheduler” on page 58

**Stopping the Autonomics Director server**

You can stop the Autonomics Director server by using commands or the Autonomics Director ISPF interface.

In this topic:

- ”Stopping Autonomics Director by using the ISPF interface”
- ”Stopping the Autonomics Director server by using commands”

**Stopping Autonomics Director by using the ISPF interface**

You can stop the Autonomics Director server by using the ISPF interface.

**Procedure**

To stop Autonomics Director:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), select option 6 Operations.
   - The Autonomics Director XCF Group Name List panel (IAVPSRV) is displayed.
2. Enter row action P or PI and press Enter.

**Stopping the Autonomics Director server by using commands**

Several commands are available to stop the Autonomics Director server: STOP, MODIFY STOP, and MODIFY STOPI.
This section describes the benefits and restrictions for using each of these commands.

In this section:
- "Format"
- "Usage"
- "Syntax"
- "Considerations" on page 39
- "Output" on page 39

**Format**

**STOP (P) command**

```
F server_jobtask,..............................
```

**MODIFY STOP command**

```
F server_jobtask,STOP SERVER
```

```
NAME(server_name)
```

```
SYSTEM(system_name)
```

**MODIFY STOPI command**

```
F server_jobtask,STOPI SERVER
```

```
NAME(server_name)
```

```
SYSTEM(system_name)
```

**Usage**

The various forms of the STOP command are used to stop an Autonomics Director server or servers. Use the appropriate form of the command for your needs.

**STOP (P) command**

Requests that the local server stops after all outstanding user requests have completed. If the server is the master server, any other active or failover server is eligible to take over as the master.

**MODIFY STOP command**

Requests that a single server or multiple servers stop after all outstanding user requests have completed. Use the MODIFY STOP command for normal shutdowns.

**MODIFY STOPI command**

Requests that a single server or multiple servers stop immediately. Any outstanding user requests are not processed, and any active user sessions might hang as a result of an outstanding response.

**Syntax**

F The MVS MODIFY (F) command that is used to issue commands on z/OS.
The MVS command STOP (P) that is used to stop a server component.

**server_jobtask**

The Autonomics Director server job or started task name to which the command is submitted.

**STOP**

Requests that the servers stop after all outstanding user requests have completed. Use the STOP command for normal shutdowns.

**STOPI**

Requests that the servers stop immediately. Any outstanding user requests are not processed, and any active user sessions might hang as a result of an outstanding response.

**SERVER**

Required positional parameter.

**NAME (server_name)**

Specifies the name of the server to stop. The server name is the job or started task name of the server. It can also be specified as NAME (ALL) or NAME(*) to indicate all servers. When this parameter is omitted, the default for server_name is the same value as what is specified for server_jobtask.

**SYSTEM (system_name)**

The system_name further qualifies the MVS system on which the processing server executes. The system_name parameter can be specified only when the NAME server_name is also specified. When this parameter is omitted, no system qualification is used.

**Considerations**

To avoid automatic takeovers, stop subordinate servers (active and failover) before the master server.

- The use of NAME(ALL) or NAME(*) is limited to commands that are entered through the z/OS console.
- To use NAME(ALL) or NAME(*), the master server must be available. The master server coordinates the activities of all servers in the Autonomics Director group. The master server requests subordinate server termination and monitors the activity of all servers in the Autonomics Director group for approximately 3 minutes of elapsed time. When all subordinate servers are terminated, the master server itself terminates as well. If subordinate servers do not terminate within the 3-minute period, the master server cancels the coordinated shutdown and remains active.

**Output**

The following example shows the output from the P server_jobtask, F server_jobtask,STOP, and F server_jobtask,STOPI commands:

IAV0900I - SHUTDOWN SCHEDULED - ADSRV
BPE0007I ADAS BEGINNING PHASE 1 OF SHUTDOWN
IAV0003I - TDCM TCB TERMINATION COMPLETE
IAV0003I - TUI TCB TERMINATION COMPLETE
IAV0003I - TCSV TCB TERMINATION COMPLETE
IAV0003I - TITK TCB TERMINATION COMPLETE
IAV0003I - TTIM TCB TERMINATION COMPLETE
IAV0003I - TSEN TCB TERMINATION COMPLETE
IAV0003I - TSAF TCB TERMINATION COMPLETE
IAV0003I - TPOL TCB TERMINATION COMPLETE
IAV0003I - TDSC TCB TERMINATION COMPLETE
Displaying the Autonomics Director server resources

You can display the Autonomics Director server resources by using a command or the Autonomics Director ISPF interface.

In this topic:

- "Displaying the Autonomics Director server resources by using the ISPF interface"
- "Displaying the Autonomics Director server resources by using the DISPLAY command" on page 41

Displaying the Autonomics Director server resources by using the ISPF interface

You can display the Autonomics Director server resources by using the ISPF interface.

**Procedure**

To display the server resources:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), select option 6 Operations.
   - The Autonomics Director XCF Group Name List panel (IAVPSRV) is displayed.
2. Enter row action D and press Enter.
   - The Autonomics Director Display Command Parameters panel (IAVPDSP) is shown.
3. Select a display option and press Enter.

**Examples**

In the following example, display option 1 REGION is selected:

```
ISRBROBA USRT001.ECDBT13.IMSAD.CMDOUT1
Command ===>  
**************************************************************************
IAV0087I - JOBNAME SYSTEM MODE XCF-MEMBER WGT PERIOD TO 
IAV0087I - ADSRV ECDBT13 MASTER ADSERVER 000 00013 00  
**************************************************************************
```

*Figure 4. Example: Region information panel*

In the following example, display option 2 PARMS is selected:
Displaying the Autonomics Director server resources by using the DISPLAY command

You can display Autonomics Director server resources for servers in the Autonomics Director group by issuing the DISPLAY command.

In this section:
- “Format”
- “Usage”
- “Syntax”
- “Considerations” on page 42
- “Output from the DISPLAY command” on page 42

Format

```plaintext
F server_jobtask, DISPLAY SERVER NAME(server_name) SYSTEM(system_name) TYPE(REGION) PARMS STATUS
```

Usage

Use the DISPLAY command to display information about Autonomics Director server regions or initialization parameters.

Syntax

F The MVS MODIFY (F) command that is used to issue commands on z/OS.

server_jobtask The Autonomics Director server job or started task name to which the command is submitted.
DISPLAY
  Requests that server information is displayed.

SERVER
  Required positional parameter.

NAME (server_name)
  Specifies the name of the server that processes the DISPLAY command.
  The server name is the job or started task name of the server. It can also be
  specified as NAME (ALL) or NAME(*) to indicate all servers.
  The default for server_name is the same value that is specified for
  server_jobtask.

SYSTEM (system_name)
  The system_name further qualifies the MVS system on which the processing
  server executes. The system_name parameter can be specified only when the
  NAME server_name is also specified.
  When this parameter is omitted, no system qualification is used.

TYPE(REGION|PARMS)
  Specifies the type of display:

    REGION
      Displays information that is related to all server regions in the
      Autonomics Director group.
    PARMS
      Displays the initialization parameters that are used by the server.
    STATUS
      Displays the status of the Autonomics Director server components.

  The default is TYPE(REGION).

Considerations
  • You can use the NAME(ALL) or NAME(*) parameters only with commands that
    are entered through the z/OS console.
  • You can use the NAME(ALL) or NAME(*) parameter with the TYPE(REGION)
    parameter produces redundant output for each servers' view of the
    environment.

  Tip: Use a specific NAME or omit the NAME parameter when displaying
  Autonomics Director server regions.

Output from the DISPLAY command

The following example shows the output from the DISPLAY SERVER command:

IAV0087I - JOBNAME SYSTEM MODE XCF-MEMBER WGT PERIOD TOTAL
IAV0087I - ADSRV ECDBT09 MASTER ADSERVER@ECDBT09 032 00001 00001
IAV0087I - ADSRV2 ECDBT09 ACTIVE ADSERVER2@ECDBT09 032 00000 00000

where:

  JOBNAME
    Is the name of the Autonomics Director server.

  SYSTEM
    Is the MVS system name where the Autonomics Director server is running.
MODE
Is the mode of the server.

XCF-MEMBER
Is the Autonomics Director server XCF member name.

WGHT
Is the routing weight for this server.
For WLM routing, a higher number indicates that more work is routed to the server. A value of zero indicates that WLM routing is not used.

PERIOD
Is the number of work requests that were sent to the server during the period defined for the WLM routing interval (WLMRINT). The value is reset to zero for each new period or interval.

TOTAL
Is the total number of work requests that were sent to the server during the life of the local server.

The following example shows the output from the DISPLAY SERVER TYPE(PARMS) command:

IAV0087I - PARAMETER VALUE TYPE
IAV0087I - CYCLETIM 00060 GLOBAL
IAV0087I - SLEEPINT 00060 GLOBAL
IAV0087I - WLMRINT 00001 GLOBAL
IAV0087I - SENSAGE 00000 GLOBAL
IAV0087I - EVALINT 00000 GLOBAL
IAV0087I - XCFGROUP IAVADM00 GLOBAL
IAV0087I - ITKBGROUP FPQSRVT3 GLOBAL
IAV0087I - RACFAPPL NONE GLOBAL
IAV0087I - JCLLIB IMSTESTS.RGE410..FPQ1 GLOBAL
IAV0087I - ADREPOS IAV_AUT01R GLOBAL
IAV0087I - POLCACHE 008 GLOBAL
IAV0087I - MODE ACTIVE GLOBAL
IAV0087I - IAVPARMS IAVCOMON LOCAL
IAV0087I - XCFMEMB ADSERVER@ECDBT09 LOCAL
IAV0087I - RACFAGE 00010 LOCAL

where:

PARAMETER
Is the keyword parameter name.

VALUE
Is the value for the parameter.

TYPE Indicates the type, either GLOBAL or LOCAL:
• GLOBAL indicates that a parameter is specified in the PROCLIB member shared by all servers.
• LOCAL indicates that a parameter is specific to a particular server.

Refreshing the Autonomics Director server resources
You can refresh the Autonomics Director server resources by using the REFRESH command or the Autonomics Director ISPF interface.

In this topic:
• "Refreshing the Autonomics Director server resources by using the ISPF interface" on page 44
“Refreshing the Autonomics Director server resources by using the REFRESH command”

Refreshing the Autonomics Director server resources by using the ISPF interface

You can refresh the Autonomics Director server resources by using the ISPF interface.

About this task

When a RECON ID is added or changed in the IMS Tools KB repository, the Autonomics Director environment is not automatically updated. You must update your Autonomics Director server RECON environment by using the refresh RECON option to pick up the changes.

Procedure

To refresh the server resources:
1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), select option 6 Operations.
   The Autonomics Director XCF Group Name List panel (IAVPSRV) is displayed.
2. Enter row action R and press Enter.
   The Autonomics Director Refresh Command Parameters panel (IAVPRFR) is shown.
3. Select a server environment component to refresh and press Enter. Message IAV6001I is issued to indicate a successful refresh.
4. Press F3 to return to the main panel and repeat for each server environment component.

Refreshing the Autonomics Director server resources by using the REFRESH command

You can refresh server resources for servers in the Autonomics Director group by using the REFRESH command.

Important: When a RECON ID is added or changed in the IMS Tools KB repository, the Autonomics Director environment is not automatically updated. You must update your Autonomics Director server RECON environment by using the TYPE(RECON) parameter to pick up the changes.

In this section:
• “Format” on page 45
• “Usage” on page 45
• “Syntax” on page 45
• “Considerations” on page 45
• “Output from the REFRESH command” on page 46

Format

```
F_server_jobtask,REFRESH,SERVER_NAME(server_name),SYSTEM(system_name)
```
Usage

Use the REFRESH command to refresh various Autonomics Director server environment components without having to stop and restart a server.

Syntax

F

The MVS MODIFY (F) command that is used to issue commands on z/OS.

server_jobtask

The Autonomics Director server job or started task name to which the command is submitted.

REFRESH

Requests that the servers refresh the component that is specified by the TYPE parameter.

SERVER

Required positional parameter.

NAME (server_name)

Specifies the name of the server to refresh. The server name is the job or started task name of the server. It can also be specified as NAME (ALL) or NAME(*) to indicate all servers. When this parameter is omitted, the default for server_name is the same value that is specified for server_jobtask.

SYSTEM (system_name)

The system_name further qualifies the MVS system on which the processing server executes. The system_name can be specified only when the NAME server_name parameter is also specified. When this parameter is omitted, no system qualification is used.

TYPE

Specifies the type of display. Valid types are:

RACF

RACF or SAF in-storage profiles and cached RACF user ACEEs are refreshed.

POLICY

Policy services in-storage policies are refreshed.

SCHEDULE

The Autonomics Director scheduler data is refreshed.

RECON

The data from the IMS Tools KB RECON ID record is refreshed.

Refresh the monitor list after you refresh the RECON environment. Refreshing the RECON environment releases the previous environment and builds a new environment. When you refresh the monitor list, the new environment is populated with all previously defined user groups, scheduling periods, and monitor list data.

MONLIST

Data from the monitor list is refreshed.

Considerations

You can use the NAME(ALL) or NAME(*) parameters only with commands that are entered through the z/OS console.
Output from the REFRESH command

The following example shows the output from the F server_jobtask,REFRESH command:

IAV6001I - REFRESH SERVER COMMAND EXECUTED

Establishing Autonomics Director system settings in the client

You can establish Autonomics Director settings before completing other tasks with the tool.

About this task

These settings for your Autonomics Director specify time format options, when to run policy evaluations, IMS Tools KB high-level qualifier, and data set allocations. These values are saved in your ISPF profile and remain in effect across your Autonomics Director sessions.

Procedure

To establish system settings in the client:

From the Autonomics Director Primary Options Menu panel (IAVPRIM), select option 0 Settings, and press Enter.

The Autonomics Director Settings panel (IAVPSET) is displayed.

Specify the Autonomics Director settings for the following options:

Time format

Specify which time format to use:

1 The time periods are entered and displayed in the 12-hour clock (00:00 a.m. to 11:59 p.m.).

2 The time periods are entered and displayed in the 24-hour clock (00:00 to 23:59).

Evaluate after sensor run

Specify whether to schedule a policy evaluation run after sensor data collection run. This sets the default for databases, partitions, or areas added to the monitor list. You can override this value when you add a database to the monitor list.

IMS Tools KB services startup parameters High Level Qualifier

Specify the high-level qualifier for the IMS Tools KB services libraries.

Note: This input field is not displayed on the Autonomics Director Settings panel (IAVPSET) if you invoked the client by using the integrated startup panel.

Primary CYLS

Specify the primary number of cylinders used for the allocation of a temporary work data set. This setting is used for certain outputs, for example recommendations or command output. The default is 10.

Secondary CYLS

Specify the secondary number of cylinders that are used for the allocation of a temporary work data set. The default is 10.

UNIT

Specify the device unit where the temporary work data set is allocated. The default is SYSALLDA.
Volume serial number
Specify the volume serial number of the device where the work data set is allocated. If no volume serial number is specified, the default value is set by the system.

Managing the scheduler

Use the Autonomics Director scheduler to automate ongoing IMS database monitoring and maintenance tasks. To reduce the impact to system resources, you can restrict the running of these tasks to defined time intervals.

You can schedule the following tasks:

- Reorganization of a user-defined database group
- Sensor data collection services
- Policy evaluation for one or more databases

You can ensure that sensor data collection services and policy evaluations are scheduled around your peak production workload by defining a peak period (a period during which no sensor data collection or policy evaluations are scheduled). Automatic reorganizations for user groups are scheduled according to the maintenance period (the time intervals during which reorganizations can take place) that you define and assign to the user group. Each peak period and maintenance period is composed of a base period (the default time intervals in a day) and overrides (a time interval that is a deviation to the base period for a specific day or days).

In this topic:

- “Defining the base period” on page 48
- “Defining overrides to the base period” on page 50
- “Viewing the scheduling calendar” on page 54
- “Scheduler terminology”

Related concepts:

“Autonomics Director scheduler” on page 6
You can use the Autonomics Director scheduler to schedule automatic sensor data collection, policy evaluations, reorganizations, IOVF extensions, and SDEP extensions that are based on user-defined time periods. Data collections, policy evaluations, and reorganizations can be performed on a database, partition, or area. IOVF and SDEP extensions can be performed on Fast Path DEDB areas.

Related tasks:

“Scenario: Creating a scheduling calendar that includes exceptions for the major US holidays” on page 25
In this scenario, a DBA at an automobile manufacturing plant creates a scheduling calendar that includes exceptions for major US holidays.

Scheduler terminology
Specific terminology is used throughout the Autonomics Director scheduling process to refer to the different types of time periods, lists, and other elements that are involved with this process.

Period A set of scheduling restrictions that consist of one base period and all the overrides specified for that base period.
**Base period**
The default time intervals in a day. These intervals remain in effect for all days of all months and years.

You can define overrides to the base period for specific dates and times. For example, if your base period is defined as the time interval from 8:00 a.m. - 5:00 p.m., but on weekends you want your time interval to be from 1:00 p.m. - 2:00 p.m., you can define this exception as an override.

**Override**
A time interval that is a deviation to the base period for a specific day or days. An override is in effect only for the specific day or days that it is defined for.

**Evaluation interval**
The defined time interval that specifies how much time must elapse before a resource is reevaluated.

**Monitor list**
A set of database and database partition names with attributes that are saved in the Autonomics Director repository and are available for monitoring. The monitor list is created from the following types of resources:
- Databases, partitions, and areas registered with DBRC and defined in a DBRC group.
- Databases, partitions, and areas that are not defined in any DBRC group.
- Databases, partitions and areas that are defined in any user-defined group.

**Recommendation list**
A list database and database partition names and recommended actions. These results include recommendations and exceptions from the evaluation runs. The most recent evaluation run as well as a history of evaluations are included in the recommendation list.

**Evaluation on demand**
A request for policy evaluation of a database or partition or area of a database. The action can be scheduled immediately (even during the peak period) or in the next available period, on a specified date and time.

**Sensor data collection on demand**
A request for scheduling of a sensor data collection run. The action can be scheduled immediately (even during the peak period), in the next available period, or on a specified date and time.

**Defining the base period**
You can define the default time intervals (base period) for a regular day. This base period can be defined as peak (a period during which no Autonomics Director work is scheduled), or maintenance (a period during which Autonomics Director work is scheduled). The base period is in effect every day, except on days that have overrides.

**About this task**
You can define overrides to the base period for specific days, dates, and times.

For example, if your base period is defined as the time interval from 8:00 a.m. - 5:00 p.m., but on weekends you want your time interval to be from 1:00 p.m. -
2:00 p.m., you can define this exception as an override.

**Procedure**

To define the base period:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option **1 System administration** and press Enter.
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.
2. Select option **1 Manage scheduling calendar**, and press Enter.
   The Autonomics Director Scheduler: Period Management panel (IAVPCLN) is displayed.
3. Select option **1 Create schedules** and press Enter.
   The Autonomics Director Create New Period panel (IAVPNPR) is displayed.
4. Specify the period name and press Enter.
   • The period name must be unique within the existing period names.
   • If you are defining a peak period, specify the period name, which must be **PEAK**.
   • If you are defining a maintenance period, the name can contain a maximum of 16 characters. The period name **NONPEAK** is reserved.
   The Autonomics Director Scheduler: Define Periods panel (IAVPCOM) is displayed.
5. Select option **1 Define the base periods** and press Enter.
   The Autonomics Director Scheduler: Create Base Operational Periods panel (IAVPCBP) is displayed.
6. Enter the start and end times for the peak period.
   The start and end times of a period are expressed in hours (**hh**), minutes (**mm**), and AM or PM. If the time format is set to a 12-hour clock, specify hours as a number in the range 00 - 11. If the time format is set to a 24-hour clock, specify hours as a number in the range 00 - 23. Specify minutes as a number in the range 00 - 59. If you are using the 12-hour clock, the default is AM when the starting hour is earlier than the ending hour; otherwise, the default is PM.
7. Type **SAVE** and press Enter.

**Example**

To define a peak base period of 8:00 a.m. - 9:00 a.m., 12:00 p.m. - 1:00 p.m., and 4:00 p.m. - 5:00 p.m., specify the following values:
Each day, by default, no Autonomics Director activity will be scheduled between the hours of 8:00 a.m. - 9:00 a.m., 12:00 p.m. - 1:00 p.m., and 4:00 p.m. - 5:00 p.m.

**Defining overrides to the base period**
You can define overrides to the base period so that on the dates and times you select, the override definitions are used instead of the base period.

**About this task**
For example, if you define a base period that is 8:00 a.m. - 5:00 p.m., but on the third Friday of each month you want it to be from 1:00 p.m. - 4:00 p.m., you can define this exception as an override.

**Procedure**
To define an override:
1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option **1 System administration** and press Enter.
   
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.
2. Select option **1 Manage scheduling calendar**, and press Enter.
   
   The Autonomics Director Scheduler: Period Management panel (IAVPCLN) is displayed.
3. Select option **2 Edit schedules** and press Enter. The Edit Periods Filter panel (IAVPEOP) is displayed.
4. Apply a filter to narrow your search for operational definitions or press Enter to indicate no filtering.
   
   The Autonomics Director Maintenance Period Name List panel (IAVPEPD) is displayed.
5. Type **A** in the Act column of a period name to define base periods and new overrides for that period and press Enter.
   
   The Autonomics Director Scheduler: Define Periods panel (IAVPCOM) is displayed.
6. Select an override option and press **Enter**:
   
   - **1 (Define the base periods)**: Specifies the default time interval for an activity. For example, you can define your peak base period as 10:00 a.m. - 11:00 a.m. because you know that this interval contains the highest usage level for your systems.
• 2 (Specify base period overrides by using days of the week) : Specifies that overrides are used instead of the base period for the selected days of the week.
  
  a. Enter / to select one or more days of the week. You can also specify all weekdays, all weekends, and monthly overrides by day.
  
  b. Enter the start and end times for the override. The start and end times of a period are expressed in hours (hh), minutes (mm), and AM or PM. If the time format is set to a 12-hour clock, specify hours as a number in the range 00 - 11. If the time format is set to a 24-hour clock, specify hours as a number in the range 00 - 23. Specify minutes as a number in the range 00 - 59. The default is AM if the starting hour is earlier than the ending hour; otherwise, the default is PM.
  
  c. Type SAVE and press Enter. Overrides that are created by using option 2 are saved as WEEK.

• 3 (Specify base period overrides by using generic dates): Specifies overrides that are used instead of the base period for the selected days of the month instead.
  
  a. Enter / for each of the dates that you want to override. The calendar shows all of the possible days within a month. You can also specify the last day or all days in a month.
  
  b. Enter the start and end times for the override. The start and end times of a period are expressed in hours (hh), minutes (mm), and AM or PM. If the time format is set to a 12-hour clock, specify hours as a number in the range 00 - 11. If the time format is set to a 24-hour clock, specify hours as a number in the range 00 - 23. Specify minutes as a number in the range 00 - 59. The default is AM if the starting hour is earlier than the ending hour; otherwise, the default is PM.
  
  c. Type SAVE and press Enter. Overrides that are created by using option 3 are saved as MONTH.

• 4 (Specify base period overrides by using specific dates): Specifies overrides that are used instead of the base period for the selected dates.
  
  a. Enter / for each date that you want to override. The calendar shows the current month by default. To change the month and year, specify a month 1-12 and year 0-99 and press Enter.
  
  b. Enter the start and end times for the override. The start and end times of a period are expressed in hours (hh), minutes (mm), and AM or PM. If the time format is set to a 12-hour clock, specify hours as a number in the range 00 - 11. If the time format is set to a 24-hour clock, specify hours as a number in the range 00 - 23. Specify minutes as a number in the range 00 - 59. The default is AM if the starting hour is earlier than the ending hour; otherwise, the default is PM.

  To define the same override intervals for specific dates of another month, place your cursor on the previous (<<) or next (>>) arrows and press Enter. You may also specify another month or year by specifying the month and year in their input fields.
  
  c. After all the dates for various months have been specified, type SAVE and press Enter. Overrides that are created by using option 4 are saved as DATE.

Examples

Example: Specify base period overrides by using days of the week

In this example, an override is defined for the fourth Thursday of the
Example: Specify base period overrides by using generic dates
   In this example, an override is defined for the 11th, 21st, and 29th of all
    months from 12:10 p.m. - 1:10 p.m.:

Example: Specify base period overrides by using specific dates
   In this example, an override is defined for the 5th, 21st, and 26th of
    August, 2014 from 10:30 p.m. - 11:59 p.m.:
Editing base period definitions

You can edit existing base period definitions.

Procedure

To edit base period definitions:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option **1 System administration** and press Enter.

   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.

2. Select option **1 Manage scheduling calendar**, and press Enter.

   The Autonomics Director Scheduler: Period Management panel (IAVPCLN) is displayed.

3. Select option **2 Edit schedules** and press Enter. The Edit Periods Filter panel (IAVPEOP) is displayed.

4. Apply a filter to narrow your search for operational definitions or press Enter to indicate no filtering.

   The Autonomics Director Maintenance Period Name List panel (IAVPEPD) is displayed.

5. Type an S into in the **Act** column of the period name to choose the period you want to edit. The Autonomics Director Scheduler: Edit Periods panel (IAVPTOP) is displayed.

6. Type an S into the **Action** column to select the period type to edit. Depending on the period type, The Specify Base Periods by Using Days of the Week (IAVPCWO), Specific Dates in a Month (IAVPBDT), or Generic Dates in a Month (IAVPBDY) panel is displayed.

7. Edit the overrides, type SAVE, and press Enter. For more information about how to specify the base period overrides, see “Defining overrides to the base period” on page 50.

8. Issue a REFRESH SCHEDULE server command to force the Autonomics Director server to use the updated definitions.
Viewing the scheduling calendar

You can view the Autonomics Director scheduling calendar for selected days, weeks, or months. The scheduling intervals are based on your period definitions for the selected dates.

Procedure

To view the scheduling calendar:
1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option 1 System administration and press Enter.
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.
2. Select option 1 Manage scheduling calendar, and press Enter.
   The Autonomics Director Scheduler: Period Management panel (IAVPCLN) is displayed.
3. Select option 3 View scheduling calendar and press Enter. The View Periods Filter panel (IAVPVOP) is displayed.
4. Apply a filter to narrow your search of period names or press Enter to indicate no filtering.
   The Autonomics Director Maintenance Period Name List panel (IAVPSPD) is displayed.
5. Select the period for viewing and press Enter.
   By default, the View Scheduling Calendar by Day panel (IAVPVBD) is displayed
6. Select a view option, display mode, and press Enter.

Examples

Example: Display the base period definitions for 26 November, 2015 by using option 1 (Day)

Example: Display the period definitions for the week of 22 February, 2015 by using option 2 (Week)
Example: Display the period definitions for January, 2026 by using option 3 (Month)

Example: Display the base period definitions for 12 October, 2012 by using option 4 (All Days)
Example: Display the base period definitions for 12 October, 2012 by using option 4 (All Days) and display G=graphical.

Suspending the Autonomics Director scheduler

You can suspend the Autonomics Director scheduler by using the Autonomics Director ISPF interface or the SUSPEND command.

In this topic:
- “Suspending the Autonomics Director scheduler by using the ISPF interface” on page 57
- “Suspending the Autonomics Director scheduler by using the SUSPEND command” on page 57
Suspending the Autonomics Director scheduler by using the ISPF interface

You can suspend the Autonomics Director scheduler by using the ISPF interface.

Procedure

To suspend the scheduler:
1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), select option 6 Operations.
   The Autonomics Director XCF Group Name List panel (IAVPSRV) is displayed.
2. Enter row action S and press Enter.
   The Autonomics Director Suspend Command Parameters panel (IAVPSSP) is shown.
3. Select a scheduling component to suspend and press Enter.
   Message IAV6001I is issued to indicate a successful suspend.
4. Press F3 to return to the main panel and repeat steps 1-3 for each scheduling component.

Suspending the Autonomics Director scheduler by using the SUSPEND command

You can suspend the Autonomics Director scheduler by using the SUSPEND command.

In this section:
- "Format"
- "Usage"
- "Syntax"
- "Considerations" on page 58
- "Output from the SUSPEND command" on page 58

Format

```
F server_jobtask,SUSPEND SERVER NAME(server_name) SYSTEM(system_name)
```

Usage

Use the SUSPEND command to temporarily suspend Autonomics Director scheduling activities for the components listed in the TYPE parameter.

Syntax

- **F** The MVS MODIFY (F) command that is used to issue commands on z/OS.
- **server_jobtask** The Autonomics Director server job or started task name that the command is submitted to.
- **SUSPEND** Requests that the servers suspend the component that is specified by the TYPE parameter.
SERVER
   Required positional parameter.

NAME (server_name)
   Specifies the name of the server to suspend. The server name is the job or
   started task name of the server. It can also be specified as NAME (ALL) or
   NAME(*) to indicate all servers. When this parameter is omitted, the default
   for server_name is the same value that is specified for server_jobtask.

SYSTEM (system_name)
   The system_name further qualifies the MVS system on which the processing
   server executes. The system_name can be specified only when the NAME
   server_name parameter is also specified. When this parameter is omitted,
   no system qualification is used.

TYPE
   Specifies the scheduler component type. Valid types are:
   
   REORG
      Suspends the initiation of new database reorganizations or
      continues existing work for active database reorganizations.
   
   EVAL
      Suspends the initiation of new policy and sensor evaluations.
   
   SENSOR
      Suspends the initiation of new sensor data collections.
   
   ALL
      Suspends all database reorganization activity and the initiation of
      new policy and sensor evaluations, and sensor data collection
      activities.

Considerations

You can use the NAME (ALL) or NAME(*) parameters only with commands that are
entered through the z/OS console.

Output from the SUSPEND command

The following example shows the output from the $ server_name,SUSPEND
command:
   IAV6001I - SUSPEND SERVER COMMAND EXECUTED

Resuming the Autonomics Director scheduler

You can resume the Autonomics Director scheduler by using the Autonomics
Director ISPF interface or the RESUME command.

In this topic:

- “Resuming the Autonomics Director scheduler by using the ISPF interface”
- “Resuming the Autonomics Director scheduler by using the RESUME
  command” on page 59

Resuming the Autonomics Director scheduler by using the ISPF interface

You can resume the Autonomics Director scheduler by using the ISPF interface.

Procedure

To resume the scheduler:
1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), select option 6 Operations.
The Autonomics Director XCF Group Name List panel (IAVPSRV) is displayed.
2. Enter row action U and press Enter.
The Autonomics Director Resume Command Parameters panel (IAVPSRP) is shown.
3. Select a scheduling component to resume and press Enter. Message IAV6001I is issued to indicate a successful resume.
4. Press F3 to return to the main panel and repeat for each scheduling component.

Resuming the Autonomics Director scheduler by using the RESUME command

You can resume the Autonomics Director scheduler by using the RESUME command.

In this section:

• “Format”
• “Usage”
• “Syntax”
• “Considerations” on page 60
• “Output from the RESUME command” on page 60

Format

```
F--server_jobtask,RESUME--SERVER-----------NAME(server_name)---
                   SYSTEM(system_name)

TYPE(REORG|EVAL|SENSOR|ALL)
```

Usage

Use the RESUME command to reinstate temporarily suspended Autonomics Director scheduling activities for the components listed in TYPE.

Syntax

F

The MVS MODIFY (F) command that is used to issue commands on z/OS.

server_jobtask

The Autonomics Director server job or started task name to which the command is submitted.

RESUME

Requests that the servers resume the component that is specified by the TYPE parameter.

SERVER

Required positional parameter.

NAME (server_name)

Specifies the name of the server to resume. The server name is the job or started task name of the server. It can also be specified as NAME (ALL) or NAME(*) to indicate all servers. When this parameter is omitted, the default for server_name is the same value that is specified for server_jobtask.
**SYSTEM** (*system_name*)

The *system_name* further qualifies the MVS system on which the processing server executes. The *system_name* can be specified only when the NAME *server_name* parameter is also specified. When this parameter is omitted, no system qualification is used.

**TYPE**  Specifies the scheduler component type. Valid types are:

- **REORG**
  - Resumes the initiation of new database reorganizations or continues existing work for active database reorganizations.

- **EVAL**
  - Resumes the initiation of new policy and sensor evaluations.

- **SENSOR**
  - Resumes the initiation of new sensor data collections.

- **ALL**
  - Resumes all database reorganization activity and the initiation of new policy and sensor evaluations, and sensor data collection activities.

**Considerations**

You can use the NAME(ALL) or NAME(*) parameters only with commands that are entered through the z/OS console.

**Output from the RESUME command**

The following example shows the output from the `F server_name,RESUME` command:

```
IAV6001I - RESUME SERVER COMMAND EXECUTED
```

---

**Managing monitor lists**

The Autonomics Director monitor list is a set of databases, partitions, and areas that are available for monitoring. You can add, update, delete, or change the owner of monitor list entries. The list of available Autonomics Director monitor list entries is populated automatically.

**Restriction:** Autonomics Director automatic discovery can locate only the master DBD.

In this topic:

- "Adding or updating monitor list entries"
- "Deleting monitor list entries" on page 61
- "Changing the owner of the monitor list entries" on page 62

**Related tasks:**

"Scenario: Creating and activating a monitoring list" on page 27

In this scenario, a customer automates their daily monitoring and maintenance tasks for their mission-critical high-volume IMS HDAM database.

**Adding or updating monitor list entries**

You can add or update monitor list entries from the list of available resources.
Before you begin

You must create skeleton JCL for use with DB Sensor. For more information about creating JCL for DB Sensor, see the IBM Tools Base for z/OS Configuration Guide for IMS.

About this task

The list of available Autonomics Director resources is populated automatically. These entries can be added or removed from the monitor list, and can also be updated.

Restriction: Autonomics Director automatic discovery can locate only the master DBD.

Procedure

To add or update monitor list entries:
1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option 1 System administration and press Enter.
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.
2. Select option 3 Manage monitor list, and press Enter.
   The Autonomics Director Resource Filter panel (IAVPRSC) is displayed.
3. Select a resource group type. You can specify a resource name qualifier to narrow your search to a specific DBRC, user group name, or database in the selected group type. A resource name qualifier consists of the leading characters followed by an asterisk (*). If you do not specify a resource name for the selected group type, all group names in the group type are retrieved for processing. Press Enter.
4. Type A in the Action column for a group and press Enter.
   The Add or Update the Group and Database Attributes panel (IAVPATT) is displayed.
5. In the Priority field, specify the priority level (1-9) that is used when the database, database partition, or area is selected for evaluation. A value of 1 indicates the highest priority, which means that this database, partition, or area is evaluated first.
6. Specify how Policy Services determines the name of the policy when the database or database partition or area is evaluated. Press Enter.
7. Optional: Enter the name of the cataloged data set that contains the sensor JCL member in the Data set name field. This name is required if the sensor JCL is to be submitted as a job. Leave this field blank if the sensor JCL is to run as a started task.
8. Optional: Enter the name of the member that contains the sensor JCL in the Member name field. This name is required if the sensor JCL data set is partitioned or if the sensor JCL is to run as a started task.

Deleting monitor list entries

You can delete resources from the monitor list.
About this task

The list of available Autonomics Director resources is populated automatically. These entries can be added to or deleted from the monitor list.

**Important:** All of the defined parameters and evaluation history for the monitored resource are lost after it is deleted from the monitor list.

A resource that is a member of an active group-managed reorganization group cannot be deleted. You must deactivate the group before removing any monitor list entries.

Procedure

To delete monitor list entries:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option **1 System administration** and press Enter.
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.
2. Select option **3 Manage monitor list**, and press Enter.
   The Autonomics Director Resource Filter panel (IAVPRSC) is displayed.
3. Select a resource group type. You can specify a resource name qualifier to narrow your search to a specific DBRC, user group name, or database in the selected group type. A resource name qualifier consists of the leading characters followed by an asterisk (*). If you do not specify a resource name for the selected group type, all group names in the group type are retrieved for processing. Press Enter.
4. Enter action **D** for a database. Press Enter.
   The Confirm Monitor List Entry Deletion panel (IAVPMED) is displayed.
5. Optional: In the Turn off the monitor list entry delete confirmation field, specify any character to turn off this confirmation panel.
6. Press Enter to confirm the deletion.

Changing the owner of the monitor list entries

You can change the owner of monitor list entries to a different TSO user ID.

About this task

Changing the owner of monitor list entries has implications on the RACF user ID that is used when sensor data collection jobs are submitted.

Procedure

To change the owner:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option **1 System administration** and press Enter.
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.
2. Select option **4 Acquire monitor list entry ownership**, and press Enter.
   The Acquire Monitor List Entry Ownership panel (IAVPOWN) is displayed.
3. Enter the TSO user ID of the current owner of the monitor list entries and press Enter.
All entries that are owned by the TSO ID entered are assigned to your TSO ID.

**Scheduling a reorganization or area extension**

You can schedule reorganizations and DEDB area extensions on user groups. To schedule or initiate these activities, you must create a user group, add resources to the group, assign user group attributes, and activate the group.

You can initiate reorganization and area extensions by using the Autonomics Director scheduler, on demand through the Autonomics Director interface, or through an external job scheduling system.

In this topic:
- “Creating a user group”
- “Deleting a user group” on page 65
- “Adding databases to a user group” on page 65
- “Modifying user group attributes” on page 67
- “Activating or deactivating user groups for reorganizations and area extensions” on page 68
- “Initiating or scheduling on-demand reorganizations and area extensions” on page 70
- “Pausing, continuing, or canceling reorganizations and area extensions” on page 70
- “Viewing the reorganization and area extension history of user-defined groups” on page 71

**Creating a user group**

You can create customized groups of databases from a list of available database resources that are defined in the DBDLIB and DBRC groups. These groups are used when initiating or scheduling group-managed reorganizations and DEDB area extensions.

**About this task**

You can include a database in one or more user groups.

**Procedure**

To create a user group:
1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option 1 System administration and press Enter.
   
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.
2. Select option 3 Manage user groups.
   
   The Autonomics Director Group Administration Options Menu panel (IAVPGAM) is displayed.
3. Select option 1 Create user groups and press Enter.
   
   The Autonomics Director New User Group Name panel (IAVPNEW) is displayed.
4. Specify the group name and description and press Enter. The group name can contain a maximum of 8 characters and the name must be unique within all group types.
The Autonomics Director Group List panel (IAVPGRL) is displayed.

5. To add databases, partitions and areas to the group, enter **SELECT** on the command line. The Autonomics Director Resource Filter panel (IAVPRSC) is displayed.

6. Select a resource group type. You can specify a resource name qualifier to narrow your search to a specific DBRC, user group name, or database in the selected group type. A resource name qualifier consists of the leading characters followed by an asterisk (*). If you do not specify a resource name for the selected group type, all group names in the group type are retrieved for processing. Press Enter.

7. Type **A** in the **Action** column for a group, database, partition or area and press Enter.

**Important:** If **A** is entered in the **Action** column for a group, all databases in the group are added to the confirmation list. If any database on the list has external references, these externally referenced databases also appear in the list. Externally referenced databases can be primary or secondary index databases or databases that are logically related to the selected database. All externally referenced databases are forced to belong to the same group. The result is that when a database is reorganized, the logically related databases are also reorganized or scanned to resolve the relationships.

The primary and secondary indexes databases are rebuilt when the database is reorganized but they can also be reorganized independently as part of the group.

8. Press Enter to confirm.

9. Continue to add more members from the same resource or switch to another input source by pressing PF3 (END command).

10. Optional: Enter the **VIEWX** command to view the relationships among the databases added, as shown in the example.

<table>
<thead>
<tr>
<th>Group name</th>
<th>Group description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCNDBD1</td>
<td>HIDAM database and has a primary index database RCNINDX that uses direct pointers, or a relative byte address pointer, to access its target segment. RCNDBD1 also has a logical parent pointer to a segment in RCNDBD2. RCNDBD2 has a logical child segment in RCNDBD1. There is no pointer from the LPARNT in RCNDBD2 to the LCHILD in RCNDBD1.</td>
</tr>
</tbody>
</table>

RCNDBD1 is a HIDAM database and has a primary index database RCNINDX that uses direct pointers, or a relative byte address pointer, to access its target segment. RCNDBD1 also has a logical parent pointer to a segment in RCNDBD2. RCNDBD2 has a logical child segment in RCNDBD1. There is no pointer from the LPARNT in RCNDBD2 to the LCHILD in RCNDBD1.
11. When you are finished adding databases, partitions, and areas to the group, type SAVE and press Enter.

Related tasks:

- “Adding databases to a user group”
  You can add databases to user groups for group managed reorganization.

Deleting a user group

You can delete user groups from the list of resources.

About this task

The list of available Autonomics Director resources is populated when you create a user group.

Procedure

To delete a user group:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option 1 System administration and press Enter.
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.
2. Select option 3 Manage user groups.
   The Autonomics Director Group Administration Options Menu panel (IAVPGAM) is displayed.
3. Select option 2 Edit or view user groups and press Enter. The Autonomics Director User Group Selection Criteria panel (IAVPGSC) is displayed.
4. Narrow your search of resources to a specific user group name. Press Enter.
   If you do not specify a group name, all group names in the group type are retrieved for processing.
5. Select row action D and press Enter.
   The Autonomics Director Confirm Group Delete panel (IAVPGDL) is displayed.
6. Optional: In the Turn off the monitor list entry delete confirmation field, specify any character to turn off this confirmation panel.
7. Press Enter to confirm the deletion.

Adding databases to a user group

You can add databases to user groups for group managed reorganization.

About this task

The list of available Autonomics Director resources is populated when you create a user group.

Procedure

To add a database to a group:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option 1 System administration and press Enter.
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.
2. Select option 3 Manage user groups.
The Autonomics Director Group Administration Options Menu panel (IAVPGAM) is displayed.

3. Select option **2 Edit or view user groups** and press Enter. The Autonomics Director User Group Selection Criteria panel (IAVPGSC) is displayed.

4. Narrow your search of resources to a specific user group name. Press Enter. If you do not specify a group name, all group names in the group type are retrieved for processing.

5. From the Autonomics Director User Group List panel (IAVPUGL), type S in row action and press Enter. The Autonomics Director Group List panel (IAVPGRL) is displayed.

6. To add databases, partitions and areas to the group, enter **SELECT** on the command line. The Autonomics Director Resource Filter panel (IAVPRSC) is displayed. This panel allows you to select the input source of database groups, databases, partitions and areas to add to the new group.

7. Select a resource group type. You can specify a resource name qualifier to narrow your search to a specific DBRC, user group name, or database in the selected group type. A resource name qualifier consists of the leading characters followed by an asterisk (*). If you do not specify a resource name for the selected group type, all group names in the group type are retrieved for processing. Press Enter.

8. Type **A** in the **Action** column for a group, database, partition, or area and press Enter.

**Important:** If **A** is entered in the **Action** column for a group, all databases in the group are added to the confirmation list. If any database on the list has external references, these externally referenced databases also appear in the list. Externally referenced databases can be primary or secondary index databases or databases that are logically related to the selected database. All externally referenced databases are forced to belong to the same group. The result is that when a database is reorganized, the logically related databases are also reorganized or scanned to resolve the relationships.

   The primary and secondary indexes databases are rebuilt when the database is reorganized.

9. Press Enter to confirm.

10. Continue to add more members from the same resource or switch to another input source by pressing PF3 (END command).

11. Enter the **VIEWX** command to view the relationships among the databases added as shown in the example.
RCNDBD1 is a HIDAM database and has a primary index database RCNINDX that uses direct pointers, or a relative byte address pointer, to access its target segment. RCNDBD1 also has a logical parent pointer to a segment in RCNDBD2. RCNDBD2 has a logical child segment in RCNDBD1. There is no pointer from the LPRNT in RCNDBD2 to the LCHILD in RCNDBD1.

12. Type SAVE and press Enter.

Related tasks:
- “Creating a user group” on page 63

You can create customized groups of databases from a list of available database resources that are defined in the DBDLIB and DBRC groups. These groups are used when initiating or scheduling group-managed reorganizations and DEDB area extensions.

- “Modifying user group attributes”

To implement group-managed reorganization and DEDB areas extensions at the user group level, you must specify values for various user group attributes.

**Modifying user group attributes**

To implement group-managed reorganization and DEDB areas extensions at the user group level, you must specify values for various user group attributes.

**Procedure**

To modify user group attributes:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option 1 System administration and press Enter.
   The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.

2. Select option 3 Manage user groups.
   The Autonomics Director Group Administration Options Menu panel (IAVPGAM) is displayed.

3. Select option 3 Assign reorganization and area extend group attributes and press Enter.
   The Autonomics Director User Group Selection Criteria panel (IAVPGSC) is displayed.
4. Narrow your search of resources to a specific user group name or leave the group name blank to view all group names in the group type. Press Enter. The Autonomics Director User Group List panel (IAVPRAT) is displayed.

5. Select row action S and press Enter. The Autonomics Director User Group Attributes panel (IAVPGAT) is displayed.

6. Specify the attributes and press Enter. For information about specific attribute fields, press F1 to view the embedded help.

User group attributes for group-managed reorganization include Notification list name, Priority, Maximum parallel reorganization jobs, Reorganization interval, and REORG option.

User group attributes for SDEP extensions and IOVF extensions of Fast Path DEDB areas include IMS affinity, SDEP extension option, and IOVF extension option.

Related tasks:

"Adding databases to a user group" on page 65
You can add databases to user groups for group managed reorganization.

"Activating or deactivating user groups for reorganizations and area extensions" You can activate or deactivate user groups for reorganizations and area extensions.

**Activating or deactivating user groups for reorganizations and area extensions**

You can activate or deactivate user groups for reorganizations and area extensions.

**About this task**

The list of available Autonomics Director user groups is populated automatically.

**Important:** User groups must be activated before you initiate a reorganization or area extension. User groups must be deactivated before you make changes to the group, including adding or deleting members or modifying group attributes.

**Procedure**

To activate or deactivate user groups:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), choose option 1 **System administration** and press Enter. The Autonomics Director System Administration Options Menu panel (IAVPSAM) is displayed.

2. Select option 3 **Manage user groups**. The Autonomics Director Group Administration Options Menu panel (IAVPGAM) is displayed.

3. Select option 4 **Monitor reorganization and area extend groups**, and press Enter. The Autonomics Director User Group Selection Criteria panel (IAVPGSC) is displayed.

4. Optional: Narrow your search of resources to a specific user group name and press Enter. If you do not specify a group name, all group names in the group type are retrieved for processing.
The Autonomics Director: Group Monitor List panel (IAVPGML) is displayed.

5. Select the row action A and press Enter.

The Confirm Activation of User Group For Reorganization panel (IAVPACT) is displayed.

6. Optional: In the **Turn off the display of activation confirmation** field, specify any character to turn off this confirmation panel. If the confirmation is not turned off, every activation operation requires you to confirm the addition.

The Confirm Add Member to Monitor List panel (IAVPAML) is displayed.

7. Press Enter to confirm the activation. The Autonomics Director Confirm Add Member to Monitor List panel (IAVPAML) is displayed.

Y in the Monitored column indicates that the member is already in the monitor list. No change is made to its entry. If the element is not on the monitor list, the action column displays A and that member is added to the monitor list.

8. Optional: To cancel the activation process, press the F3 key.

9. Press Enter. For the group attributes, the Autonomics Director User Group Attributes panel (IAVPGAT) is displayed.

   a. To activate full-function databases and Fast Path DEDB areas for group-managed reorganization, specify values for attributes that are related to reorganization: **Notification list name**, **Priority**, **Maximum parallel reorganization jobs**, **Reorganization interval**, and **REORG option**.

   b. To activate all Fast Path DEDB areas in the user group for SDEP extensions and IOVF extensions, specify Y for the **SDEP extension option** and **IOVF extension option** fields.

   c. For reorganizations, SDEP extensions and IOVF extensions of Fast Path DEDB areas to run successfully, specify the IMS ID for the IMS online system that is used to complete the scheduled tasks in the **IMS affinity** field.

   For information about specific attribute fields, press F1 to view the embedded help.

10. For each member of the user group, the following panels are displayed. From these panels, you can modify the attributes of the group and the databases.

   * Autonomics Director Add or Update the Group and Database Attributes panel (IAVPATT)
   * Autonomics Director Member Reorg/Scan JCL panel (IAVPJCL) (or the Autonomics Director Member Reorg/Scan JCL with FPE Options panel (IAVPXCL) if the member is a Fast Path DEDB area)

   If the member is a primary or secondary index for a full-function database, you must not specify a reorganization JCL or scan JCL. Otherwise, the group-managed reorganization will fail.

   To activate a specific Fast Path DEDB area for SDEP extensions and IOVF extensions, specify Y for the **SDEP extension option** and **IOVF extension option** in the Autonomics Director Member Reorg/Scan JCL with FPE Options panel (IAVPXCL). For information about specific attribute fields, press F1 to view the embedded help.

Related tasks:

"Modifying user group attributes” on page 67

To implement group-managed reorganization and DEDB areas extensions at the user group level, you must specify values for various user group attributes.
**Initiating or scheduling on-demand reorganizations and area extensions**

You can initiate or schedule group-managed reorganizations and DEDB area extensions on the members of a user group.

**Before you begin**

Before you can initiate an on-demand reorganization or area extension:
- The database group must contain members.
- The database group must be activated.

**Procedure**

To initiate or schedule an on-demand reorganization or area extension:

1. From the Autonomics Director Primary Option Menu panel (IAVPRIM), select option 5 **Schedule reorganization and area extend on demand**.
   - The Autonomics Director User Group Selection Criteria panel (IAVPGSC) is displayed.
2. Optional: Narrow your search of resources to a specific user group name and press Enter.
   - If you do not specify a group name all group names in the group type are retrieved for processing.
   - The Autonomics Director Scheduler: Group List panel (IAVPSRD) is displayed.
3. Select the row action X and press Enter.
   - The Schedule Group Reorg and Area Extend Run On Demand panel (IAVPRAD) is displayed.
   a. Specify the reorganization and area extension condition.
   b. Specify the schedule time option.
   c. Press Enter.

**Results**

The Autonomics Director Scheduler: Group List panel (IAVPSRD) is displayed with a message in the prompt field that indicates the reorganization is initiated.

**Pausing, continuing, or canceling reorganizations and area extensions**

You can pause, continue, or cancel a reorganization or area extension job that is running.

**Procedure**

To pause, continue, or cancel a reorganization or area extension:

1. From the Autonomics Director Primary Options Menu panel (IAVPRIM), select option 3 **Manage group reorganization and area extend activity**.
   - The Autonomics Director User Group Selection Criteria panel (IAVPGSC) is displayed.
2. Optional: Narrow your search of resources to a specific user group name and press Enter.
If you do not specify a group name, all group names in the group type are retrieved for processing.

The Autonomics Director User Group List panel (IAVPUHL) is displayed.

3. Select row action `C` for the group you want to pause, continue, or cancel reorganization or area extension and press Enter.

The Autonomics Director Monitor Status Change (IAVPOPA) is displayed.

4. Choose the menu option that corresponds to the command you want to run. Press Enter. If the command is successful, a completion message is shown.

### Viewing the reorganization and area extension history of user-defined groups

You can view the reorganization and area extension history of user-defined groups.

**Procedure**

To view the history:

1. From the Autonomics Director Primary Option Menu panel (IAVPRIM), select option 3 *Manage group reorganization and area extend activity*.

   The Autonomics Director User Group Selection Criteria panel (IAVPGSC) is displayed.

2. Optional: Narrow your search of resources to a specific user group name and press Enter.

   If you do not specify a group name, all group names in the group type are retrieved for processing.

   The Autonomics Director User Group List panel (IAVPUHL) is displayed.


   The Autonomics Director Reorganization and Area Extend History panel (IAVPVGL) is displayed.

4. Select row action `S` and press Enter.

   The Autonomics Director Reorganization Job Status panel (IAVPVJL) is displayed.

5. Enter `S` for the pre-GMR job to see job details.

### Using the batch interface

You can use the batch interface to request on-demand sensor data collection, policy evaluations, group-managed reorganizations, IOVF extensions, and SDEP extensions. Data collections, policy evaluations, and reorganizations can be done on a database, partition, or area basis. IOVF and SDEP extensions can be done on Fast Path DEDB areas.

**About this task**

The batch interface is compatible with external job schedulers.

**Procedure**

1. Use the following guidelines to create the necessary JCL. For each line of a command that continues into the next line, insert a non-blank character (such as a `+` symbol) in column 72. A non-blank character in column 72 will serve as a continuation marker.
**EXEC statement**

EXEC PGM=IAVBATCH,PARM=‘adgroup,recondsn’

*adgroup*

Required parameter. The name of the Autonomics Director server XCF group.

*recondsn*

Optional parameter. The DBRC RECON1 data set name that identifies the IMS Tools KB RECON environment that is associated with batch requests. If omitted, IAVBATCH uses the RECON1 DFSMDA dynamic allocation member from STEPLIB/JOBLIB to obtain the RECON1 data set name.

**DD statements**

**SYSPRINT**

Contains the batch interface report log which shows the input control statements, options, and results from the interface execution.

**SYSIN**

Contains the input command control statements.

The following diagram shows the syntax of the EXECUTE command when scheduling a reorganization:

```
EXECUTE REORG GROUPTYPE(USERGRP) GROUPNAME(grpname)

TYPE(TIME) DATE(mm/dd/yyyy) TIME(mmmm)

CONDITIONAL(YES NO)
```

The following diagram shows the syntax of the EXECUTE command when scheduling an IOVF extension or SDEP extension on a Fast Path DEDB area:

```
EXECUTE REORG GROUPTYPE(USERGRP) GROUPNAME(grpname)

TYPE(TIME) DATE(mm/dd/yyyy) TIME(mmmm)

CONDITIONAL(YES NO)

DEFIMS(NONE)

DEFACT(XXX)
```

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The following diagram shows the syntax of the EXECUTE command when scheduling a sensor data collection or policy evaluation:

```
EXECUTE SENSOR EVALUATION RUN(ONE | BOTH) TYPE(TIME | NEXTAVAIL)

NAME(databasename) SENSORJCL(datasetname) SENORMEMBER(membername)

SENSORAGE(minutes) POLICYBY(DBTYPE NAME POLICYNAME(name))
```

**SYSIN control cards**

**EXECUTE**
Specifies the command verb.

**REORG**
Specifies that group-managed reorganization is started.

**SENSOR**
Specifies that sensor data collection is started.

**EVALUATION**
Specifies that policy evaluation is started.

**RUN(ONE | BOTH)**
Specifies whether sensor data collection, policy evaluation, or both are run. Where `value` is either:

- **ONE**  Run either sensor data collection or policy evaluation.
- **BOTH** Run sensor data collection and policy evaluation.

**TYPE(TIME | NEXTAVAIL)**
Specifies whether to run immediately or to defer until next non-peak period. Where `value` is either:

- **TIME** If TYPE(TIME) is specified but no DATE and TIME keywords, then the reorganization run is scheduled for immediate execution.
  
  If TYPE(TIME) is specified along with DATE and TIME keywords, the reorganization run is scheduled to run at the specified data and time.
  
  The TYPE(TIME) specification does not take into consideration any period definitions. It will be scheduled immediately or at the date and time specified.

- **NEXTAVAIL**
  If TYPE(NEXTAVAIL) is specified but no DATE and TIME keywords, the reorganization run is scheduled at the first available period that allows it to start.
If TYPE(NEXTAVAIL) is specified along with DATE and TIME keywords, the reorganization run is scheduled at the first available period that allows it to start at or after the specified date and time.

DATE and TIME specify the date when the reorganization run is to run.

NAME(database name)

Specifies the database name.

If the database is a Fast Path DEDB Area or HALDB partition, specify the area or partition name as the second subparameter. For example, NAME($DBNAME$, $ARNAME$).

SENSORJCL(datasetname)

Specifies the fully qualified data set name that contains the sensor job streams that are being submitted.

SENSORMEMBER(membername)

 Specifies the member name that contains the JCL for the sensor data collection run. This parameter is optional if the SENSORJCL data set is non-partitioned (sequential organization).

SENSORAGE(minutes)

 Specifies the maximum sensor data age in minutes. If the sensor data is older than the current time interval, a sensor run is scheduled before an evaluation run.

POLICYBY(DBTYPE | DBDNAME | NAME)

 Specifies how Policy Services determines the name of the policy when the database, database partition, or area is evaluated.

DBTYPE

 The policy name is determined by using the database organization form.

DBDNAME

 The policy name is determined by using the policy name that is associated with the database.

NAME

 The policy name is determined by using the policy name that is specified in the data set name field.

POLICYNAME(name)

 Specifies the policy name that is used for evaluation. This parameter is used in conjunction with POLICYBY(NAME). For example, POLICYBY(name) POLICYNAME(name).

GROUPTYPE

 Specifies the group type. For REORG it is USERGRP.

GROUPNAME

 Specifies the name of the group that is being reorganized

CONDITIONAL(YES | NO)

 Specifies that the reorganization run is scheduled on the condition of whether a reorganization is needed or not. Where value is either:

YES Specifies that the group is scheduled for a
reorganization only if any of the members of the group require reorganization. The Reorg needed condition is set by an earlier evaluation of the group member.

NO  Specifies that the reorganization run is to be scheduled unconditionally.

DATE and TIME specify the date when the reorganization run is to run.

DEFIMS($DD$ | * | imsid)
Specifies the IMS affinity. The IMS affinity is the IMS ID of an IMS online system that is used that is used to complete scheduled tasks, including reorganizations or area extensions.

For reorganizations and area extensions of Fast Path DEDB areas, an IMS affinity is required.

$DD$
No IMS affinity is specified to run the job. Autonomics Director uses the default IMS affinity value if a default value exists. Otherwise, no IMS system is associated with the job.

$DD$ is the default.

*     The job is run on any available MVS system. The MVS system must have an active IMS participating in the TOSI group.

imsid  The job is submitted to the MVS on which the specified IMS online system is running. The IMS online system is identified by the IMS affinity ID (imsid). The TOSI XCF group name that is associated with the IMS system must be specified in the RECON definition. For more information about TOIXCF, the field for the TOSI XCF group name, see the IMS Tools Knowledge Base User’s Guide.

Tip: You can also specify an IMS affinity ID in the following circumstances:

• At the database level when you issue an on-demand reorganization or area extension.
• At the user group level when you issue an on-demand reorganization or area extension.
• For a database when you add databases to a user group.
• For a user group when you define a user group.

The IMS affinity can be changed at the group level or at the database level. If an IMS affinity value is specified at the database level, that value overrides any IMS affinity value that is specified at the user group level. When no IMS affinity is specified at any level, the Autonomics Director default is used.

DEFACT(xxx)
The 3-character value xxx specifies whether to run reorganizations, SDEP extensions, and IOVF extensions on the
DEDB areas in the user group. The first character of \texttt{xxx} is for reorganizations, the second character is for SDEP extensions, and the third character is for IOVF extensions, where each value of \( x \) is either:

\begin{itemize}
  \item \texttt{D} The default action is used.
  \item \texttt{Y} The action is submitted.
  \item \texttt{N} The action is not submitted.
\end{itemize}

\texttt{DEFACT(DDD)} is the default value.

For example, if \texttt{DEFACT(YDN)} is specified, the following actions occur:

\begin{itemize}
  \item The DEDB areas in the user group are reorganized.
  \item The IOVF portion of the areas is extended if the default value is \( Y \).
  \item The SDEP portion of the areas is not extended.
\end{itemize}

\textbf{Tip:} You can also specify whether to run reorganizations, SDEP extensions, and IOVF extensions on DEDB areas in the following circumstances:

\begin{itemize}
  \item When you issue an on-demand reorganization or area extension.
  \item When you define a user group.
  \item When you add databases to a user group.
\end{itemize}

\texttt{OVERRIDE(dbname, areaname, xxx, imsid)}

Specifies an override for a specific area, with the following values:

\begin{itemize}
  \item \texttt{dbname} The name of the database.
  \item \texttt{areaname} The name of the area.
  \item \texttt{xxx} Specifies whether to run reorganizations, SDEP extensions, and IOVF extensions for the specified DEDB area. The first character of \( XXX \) is for reorganizations, the second character is for SDEP extensions, and the third character is for IOVF extensions, where each value of \( X \) is either:
    \begin{itemize}
      \item \texttt{D} The default action is used.
      \item \texttt{Y} The action is submitted.
      \item \texttt{N} The action is not submitted.
    \end{itemize}
  \item \texttt{imsid} The IMS ID of the IMS online system.
\end{itemize}

2. Submit the job and ensure that it completes with a return code of RC=0.

\textbf{Example}

In the following example, the \texttt{'+'} symbol is used in column 72 as a continuation marker.
EXECUTE EVALUATION RUN(ONE) TYPE(TIME) NAME(DEVICE_DB) +
SENSORJCL('IMTOOLB.ITB14.FPQ12.JCLLIB') +
SENSORMEMBER(SENSOR) +
POLICYBY(DBTYPE)

Scheduling on-demand sensor data collection and policy evaluations

You can initiate immediate or delayed sensor data collection and policy evaluations.

About this task

In addition to automatic sensor data collection and policy evaluations, you can schedule on-demand sensor data collection and policy evaluations immediately, on a specified date, or after a specified date.

On-demand job submissions are accomplished by using the TSO user ID of the requestor, so this user ID must have the proper RACF authority. The TSO user ID on the on-demand REORG issuer is used on all JOB submissions.

Procedure

To schedule collection and evaluations:
1. From the Autonomics Director Primary Options Menu panel, select option 4 Schedule sensor and policy evaluation on demand and press Enter.
   The View Recommendation Lists Resource Type Filter panel (IAVPSCD) is displayed.
2. Select a resource group type and press Enter.
   The View Recommendation List: Group Type Filter panel (IAVPFLT) is displayed.
3. Apply a filter to narrow your search to monitor list members that have specific attributes or press Enter to indicate no filtering.
   The Autonomics Director Monitor List Entries panel (IAVPXML) is displayed.
4. From the Autonomics Director Monitor List Entries panel, select row action X and press Enter.
   The Schedule Sensor or Evaluation Job Run On Demand panel (IAVPXAD) is displayed.
   a. Specify Y to schedule an on demand sensor data collection, policy evaluation, or both.
      If you do not select policy evaluation, a policy evaluation still runs if you previously added the resource to the monitor list and enabled the "Evaluate after sensor run" option. Similarly, if you do not schedule a sensor data collection, a sensor data collection still runs under the following conditions: the age of the sensor data exceeds the specified maximum and a policy evaluation is requested. For more information, see “Adding or updating monitor list entries” on page 60.
   b. Specify the schedule time option.
      With option 2 or 3, enter the date and time to schedule the runs. Enter the time in the appropriate time format (AM/PM or 24-hour clock). You can enter a question mark (?) in the month field to display the current month.
   c. Press Enter.
      The Sensor Run Overrides panel (IAVPSAI) is displayed.
   d. Specify the optional sensor JCL overrides and press Enter.
The Schedule Evaluation Overrides panel (IAVPSEAE) is displayed.

**e.** Specify the option from Policy name selection that determines the policy name that is used to perform the evaluation run and press Enter.

If you specify option 3 and the policy name is not known, you can enter a question mark (?) in the policy name field to get a list of available policy names.

The Schedule Sensor/Evaluation Job Information panel (IAVPSSI) is displayed.

---

**Viewing recommendations**

You can view current recommendations for a database and view evaluation history.

**About this task**

Autonomics Director evaluates the most recent database sensor data against your defined policies and rules and recommends when a database reorganization or DEDB area extension is needed.

**Procedure**

To view recommendations:

1. From the Autonomics Director Primary Option Menu panel, select option 2 View recommendation lists and press Enter.
   
   The View Recommendation Lists Resource Type Filter panel (IAVPSCD) is displayed.

2. Select a resource group type and press Enter.
   
   The View Recommendation List: Group Type Filter panel (IAVPFLT) is displayed.

3. Apply a filter to narrow your search to monitor list members that have specific attributes or press Enter to indicate no filtering.
   
   The Autonomics Director Monitor List Entries panel (IAVPXML) is displayed.

4. From the Autonomics Director Monitor List Entries panel (IAVPXML), select row action V and press Enter.
   
   The Evaluation Run Information panel (IAVPVRL) is displayed.

5. Optional: Enter / to view the evaluation run exceptions and press Enter.
   
   The Database Diagnosis Report is displayed.

For more information on the messages displayed, see *IBM Tools Base Policy Services for z/OS User’s Guide*.

---

**Frequently asked questions when using Autonomics Director**

This topic answers common Autonomics Director usage questions.

The following frequently asked questions are answered:

- "After a reconfiguration of the RECONs by DBRC, I receive message DSP0388I. What do I do?" on page 79
- "If the REORG needed indicator is set to "Y", how can the indicator be reset to "N"?" on page 79
- "Why do I get error message "DBD not in DBDLIB" when adding members of a DBGRP group to the monitor list?" on page 79
After a reconfiguration of the RECONs by DBRC, I receive message DSP0388I. What do I do?

During RECON reconfiguration (also known as a RECON switch), you may receive IMS message DSP0388I. This message identifies which subsystems have access to the RECONs. If Autonomics Director is identified as a subsystem in message DSP0388I, you must perform the Autonomics Director REFRESH RECON process to deallocate the RECON data sets so that the RECON in error can be removed and reallocated.

When a RECON ID is added or changed in the IMS Tools KB repository, the Autonomics Director environment is not automatically updated. For information on how to update your Autonomics Director server RECON environment, see “Refreshing the Autonomics Director server resources” on page 43.

If the REORG needed indicator is set to "Y", how can the indicator be reset to "N"?

Each time a policy evaluation is run, the REORG needed indicator is set or reset. Typically, after a reorganization, an image copy or pointer checker, or both, are performed. The integrated sensors in an image copy or pointer checker automatically drive the policy evaluation if you set AUTOEVAL=Y for the Autonomics Director monitored database, partition, or area. You can also use the standalone database sensor to run policy evaluations.

Why do I get error message "DBD not in DBDLIB" when adding members of a DBGRP group to the monitor list?

When members of a DBGRP are DEDB areas or HALDB partitions, Autonomics Director does not know the database name of those members. Because of this, Autonomics Director is unable to retrieve DBD data from DBDLIB to build the monitor list entries. The solution is to add them individually by using the ‘DATABASE’ method instead of the ‘DBGRP’ method.

Here is an example of the error message:
How is the evaluation interval used?

The evaluation interval (EVALINT) controls the currency of the database reorganization status. It is the time interval requested between database evaluations. The shorter the EVALINT, the more timely your database REORG status is.

You can set the EVALINT for a whole database group or for each monitored database. Some databases may require no automatic evaluation at all and you can set EVALINT=0 for these. No automatic evaluation is scheduled for databases with EVALINT=0. However, it still might be useful to have these databases on the monitor list because they can be used during on-demand database evaluations. Also, evaluation history is kept and can be accessed from the Autonomics Director client for these databases.
Chapter 5. Utilities reference

The topics in this section provide information about Autonomics Director utilities.

Autonomics Director Pre-scan Utility IAVXSCAN

The Autonomics Director Pre-scan Utility (IAVXSCAN) verifies whether a database that is will be scanned actually requires a scan. Whether a database requires a scan is determined by the IMS Pre-reorganization Utility (DFSURPR0).

The IAVXSCAN utility execution must immediately precede the step that starts the IMS Pre-reorganization Utility (DFSURGS0) for a database. The IAVXSCAN utility uses the punched control statements that are created by a preceding execution of the DFSURPR0 utility as input. The IAVXSCAN utility verifies that one of the punched control statements contains a scan statement for a database before it is scanned. When a matching scan statement is found, the IAVXSCAN utility ends with a condition code of 0. When no matching scan statement is found, the IAVXSCAN utility notifies the Autonomics Director server that the scan is complete, and ends with a condition code of 8. The subsequent scan step must then be bypassed by using conditional JCL logic such as COND=(0,LT).

Autonomics Director Policy Services Exception Reporting utility (IAVXTRC0)

Use the Autonomics Director Policy Services Exception Reporting utility (IAVXTRC0) to produce reports of the Policy Services exception messages that are generated during phase 1 of one or more policy evaluations. The utility retrieves the exceptions from the Autonomics Director repository in IMS Tools Knowledge Base.

Requirements

To run the IAVXTRC0 utility, you must have standard repository access to both of the following IMS Tools Knowledge Base repositories:

- Autonomics Director repository (IAV_AUTODIR)
- Input repository (HKT_INPUT)

Both repositories must belong to the same IMS Tools Knowledge Base XCF group.

Input and output

The IAVXTRC0 utility requires the following input:

- The IMS Tools Knowledge Base XCF group that contains the Autonomics Director repository and the Input repository.
- The RECON data set name identifier (RECON ID).

The utility can produce the following output:

- Report with the summary exception messages that are generated during phase 1 of one or more policy evaluations. The summary exception messages are displayed in the order that they were generated. This report is included in the output data set that is defined by the SUMMARY DD.
• Report with the detailed exception notifications that are generated during phase 1 of one or more policy evaluations. The detailed exception notifications are displayed in the order that they were generated. This report is included in the output data set that is defined by the DETAILS DD.

**Important:** The reports that are output by the utility are formatted differently than the email notifications sent by Policy Services. The information in the reports is not identical to the information in the Policy Services email notifications. The exception messages in the reports relate to the RECON ID that you provide in the input, and the reports may include exception messages from policy evaluations that occurred over several months.

**JCL specifications**

The IAVXTRC0 utility is run as a standard z/OS job. The following JCL statements are required:

- A JOB statement that you define to meet the specifications of your installation
- An EXEC statement
- DD statements that define inputs and outputs

**EXEC statement**

Use the following format for the EXEC statement:

```
//RUN EXEC PGM=IAVXTRC0,REGION=0M,
//    PARM='GROUP=itkb_xcf_group_name,RECONDSN=recon_data_set_id'
```

The following list describes the parameters in the EXEC statement for the IAVXTRC0 utility:

- **GROUP=itkb_xcf_group_name**
  - IMS Tools Knowledge Base XCF group that contains both the Autonomics Director repository (IAV_AUTODIR) and the Input repository (HKT_INPUT).

- **RECONDSN=recon_data_set_id**
  - Restricts processing to those members associated with the RECON ID.
  - The data set name that is specified can contain wildcards, such as % for a single character match and * for zero or more multiple character matches. For example, RECONDSN=MYRECON.DATASET and RECONDSN=MY*.DATA %%%% are both correctly formatted.
  - This parameter is optional. If the RECONDSN parameter is not specified, all RECON members are processed.

**DD statements**

- **STEPLIB DD**
  - Points to the PDS(E) load library. The STEPLIB DD statement is required.
  
  ```
  //STEPLIB DD DSN=pds_load_library,DISP=SHR
  ```

- **SUMMARY DD**
  - Defines the output data set for the summary messages. The SUMMARY DD statement is required.
  - The output file attributes are RECFM=FBA and LRECL=133. The file can be either a data set or a SYSOUT=* specification.
**DETAILS DD**
Defines the output data set for the detailed messages. The DETAILS DD statement is required.

The output file attributes are RECFM=FBA and LRECL=133. The file can be either a data set or a SYSOUT=* specification.

**SYSLOG DD**
Defines the output data set for the repository audit trail of the process for possible debugging. The SYSLOG DD statement is optional.

If the optional DD statement is present, then the file attributes are RECFM=FB and LRECL=80. The file can be either a data set or a SYSOUT=* specification.

**Recommendation:** Use a data set for the output because the output can be large.

**Example JCL**
```plaintext
//********************************************************************
//* FIRST TEST OF AD REPOSITORY ***
//********************************************************************
//RUN EXEC PGM=IAVXTRC0,REGION=0M,
// PARM='GROUP=itkb_xcf_group_name,RECONDSN=*'
//STEPLIB DD DISP=SHR,DSN=itkb_high_level_qualifier.SHKLOAD
//SUMMARY DD SYSOUT=*    //SYSLOG DD SYSOUT=*    //DETAILS DD SYSOUT=*    //SYSABEND DD SYSOUT=*

Return codes

<table>
<thead>
<tr>
<th>Return code</th>
<th>Reason code</th>
<th>Severity</th>
<th>Message</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>7</td>
<td>I</td>
<td>NO MEMBERS FOUND</td>
<td>No members were found with the requested criteria (for example, the RECON data set). Verify that the RECON data set name is spelled correctly.</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>E</td>
<td>MEMBER NOT FOUND</td>
<td>A member was not found. Verify that the member was not modified by another user during the processing of this utility.</td>
</tr>
<tr>
<td>12</td>
<td>3</td>
<td>E</td>
<td>INVALID KEYWORD SPECIFIED</td>
<td>The specified keyword is not supported. Verify that the keyword is spelled correctly.</td>
</tr>
<tr>
<td>12</td>
<td>4</td>
<td>E</td>
<td>ADR INITIALIZATION FAILED</td>
<td>Attempt to access the Autonomics Director repository failed. Verify that the GROUP parameter is correct and that the repository environment was set up correctly.</td>
</tr>
</tbody>
</table>
Table 3. Reason and return codes for the IAVXTRC0 utility (continued)

<table>
<thead>
<tr>
<th>Return code</th>
<th>Reason code</th>
<th>Severity</th>
<th>Message</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 5</td>
<td>E</td>
<td>BEGIN LIST ACCESS FAILED</td>
<td>Attempt to access the member list environment failed. Verify your connection to the Autonomics Director interface.</td>
<td></td>
</tr>
<tr>
<td>12 6</td>
<td>E</td>
<td>GET LIST ACCESS FAILED</td>
<td>Attempt to obtain the member list failed.</td>
<td></td>
</tr>
<tr>
<td>12 9</td>
<td>E</td>
<td>POINT RECORD EXCEPTION</td>
<td>Unable to point to a requested record.</td>
<td></td>
</tr>
<tr>
<td>12 11</td>
<td>E</td>
<td>RECON ACCESS ERROR</td>
<td>Failed to obtain the RECON data set description from the RECON registry. Verify the validity of the RECON definition.</td>
<td></td>
</tr>
<tr>
<td>12 13</td>
<td>E</td>
<td>MEMORY MEMBER DELETE FAILED</td>
<td>After processing the Autonomics Director repository member, the memory that was used could not be removed.</td>
<td></td>
</tr>
<tr>
<td>16 1</td>
<td>E</td>
<td>DETAILS FILE OPEN ERROR</td>
<td>Unable to open the print file. Verify that the DETAILS DD statement is included in the JCL.</td>
<td></td>
</tr>
<tr>
<td>16 2</td>
<td>E</td>
<td>SUMMARY FILE OPEN ERROR</td>
<td>Unable to open the output file. Verify that the SUMMARY DD statement is included in the JCL.</td>
<td></td>
</tr>
</tbody>
</table>

Example report: Output from the SUMMARY DD

At the beginning of the report, a table lists the associated RECONs. The following messages are a sampling of SUMMARY DD output:

```
GROUP=DAIFPQS2 RECON(DATASET)="**
INDEX EXT. RECON DATASET NAME
1. NORECON NORECON
2. BSNGLUBL BSNGLUBL
3. QA13 DBGTOL.LM.QA.Q13A.RECON1
4. ACDEMOFF MODERN1.ACDEMO.FF.RECON1
5. MODERN1 MODERN1.ADC1.RECON1
6. MODERN12 MODERN1.ADC1.RECON1
7. ACDEMOFP DBGTOL.ACDEMO.DAIFPQS2.RECON1
8. BSNSCDREV DBGTOL.IMSTOOL.YSL.BNSNCDREV.RECON1
```

NUMBER OF RECONS ACCEPTED=+8
SUMMARY ANALYSIS: RC=00000004 HSN=000000041 RECON=BSNSCDREV MSGLEN=0
SUMMARY ANALYSIS: RC=0000000C HSN=000000000 RECON=BSNSCDREV MSGLEN=0
SUMMARY ANALYSIS: RC=00000000 HSN=000000000 RECON=BSNSCDREV RTYPE=EVIL MSGLEN=+72
SUM MSG:HP2910I ACTION "REORG" IS RECOMMENDED FOR DB30AR0 IN RECONID=BSNSCDREV.
SUMMARY ANALYSIS: RC=00000000 HSN=000000000 RECON=BSNSCDREV RTYPE=EVIL MSGLEN=+77
SUM MSG:HP2910I ACTION "EXTENDIVF" IS RECOMMENDED FOR DB30AR0 IN RECONID=BSNSCDREV.
SUMMARY ANALYSIS: RC=00000000 HSN=000000000 RECON=BSNSCDREV RTYPE=EVIL MSGLEN=+77
SUM MSG:HP2910I ACTION "EXTENDSDEP" IS RECOMMENDED FOR DB30AR0 IN RECONID=BSNSCDREV.

EXC MSG:The average number of 1/0s per DB record exceeded a threshold in area DB30AR0.
EXC MSG:The maximum number of 1/0s per DB record exceeded a threshold in area DB30AR0.
EXC MSG:Free spaces in RAA BASE and IOVF are used inefficiently in area DB30AR0.
EXC MSG:Free spaces in DOVF and IOVF are used inefficiently in area DB30AR0.
EXC MSG: Free spaces in RAA, DOVF, and IOVF are used inefficiently in area DB30AR0.
EXC MSG: The percentage of RAP CIs using overflow exceeded a threshold in area DB30AR0.
EXC MSG: The percentage of free space in IOVF fell below a threshold in area DB30AR0.
EXC MSG: The percentage of UOWs that match the RBASEFS or the RDOVFFS condition exceeded a threshold in area DB30AR0.

SUMMARY ANALYSIS: RC=00000000 RSN=00000000 RECON=BSNSCDRV RTYPE=EVAL MSGLEN=+72
SUM MSG: HFP2910I ACTION "REORG" IS RECOMMENDED FOR DB30AR0 IN RECONID=BSNSCDRV.

EXC MSG: The average number of I/Os per DB record exceeded a threshold in area DB30AR0.
EXC MSG: The maximum number of I/Os per DB record exceeded a threshold in area DB30AR0.
EXC MSG: The percentage of RAP CIs using overflow exceeded a threshold in area DB30AR0.
EXC MSG: The percentage of UOWs that match the RBASEFS or the RDOVFFS condition exceeded a threshold in area DB30AR0.

SUMMARY ANALYSIS: RC=00000000 RSN=00000000 RECON=MODERN12 RTYPE=EVAL MSGLEN=+72
SUM MSG: HFP2910I ACTION "REORG" IS RECOMMENDED FOR CCARA001 IN RECONID=MODERN12.

SUMMARY ANALYSIS: RC=00000000 RSN=00000000 RECON=MODERN12 RTYPE=EVAL MSGLEN=+77
SUM MSG: HFP2910I ACTION "EXTENDIOVF" IS RECOMMENDED FOR CCARA001 IN RECONID=MODERN12.

SUMMARY ANALYSIS: RC=00000000 RSN=00000000 RECON=MODERN12 RTYPE=EVAL MSGLEN=+77
SUM MSG: HFP2910I ACTION "EXTENDSDEP" IS RECOMMENDED FOR CCARA001 IN RECONID=MODERN12.

EXC MSG: The average number of I/Os per DB record exceeded a threshold in area CCARA001.
EXC MSG: The maximum number of I/Os per DB record exceeded a threshold in area CCARA001.
EXC MSG: Free spaces in RAA BASE and IOVF are used inefficiently in area CCARA001.
EXC MSG: Free spaces in DOVF and IOVF are used inefficiently in area CCARA001.
EXC MSG: Free spaces in RAA, DOVF, and IOVF are used inefficiently in area CCARA001.
EXC MSG: The percentage of RAP CIs using overflow exceeded a threshold in area CCARA001.
EXC MSG: The percentage of free space in IOVF fell below a threshold in area CCARA001.
EXC MSG: The percentage of free space in SDEP fell below a threshold in area CCARA001.
EXC MSG: The percentage of UOWs that match the RBASEFS or the RDOVFFS condition exceeded a threshold in area CCARA001.

Example report: Output from the DETAILS DD

At the beginning of the report, a table lists the associated RECONs. The following information is a sampling of DETAILS DD output:

DETAILS POLICY SERVICES EXCEPTION UTILITY DATE/TIME=04/08/2014 08:19:27.084583
-------------------------------------------------------------------------------------------
GROUP=DAIFPQS2 RECON(DATASET)=*
INDEX EXT. RECON DATASET NAME
-------------------------------------------------------------------------------------------
1. NORECON NORECON
2. BSNGLBL BSNGLBL
3. QA13 DBGTOOL.QA.Q13A.RECON1
4. ACDEMOFF MODERN1.ACDEMO.FF.RECON1
5. MODERN MODERN1.acci.RECON1
6. MODERN12 MODERN1.acci.RECON1
7. ACDEMOFP DBGTOOL.ACDEMO.DAIFPQS2.RECON1
8. BSNSCDRV DBGTOOL.IMSTOOL.YSL.BSNSCDRV.RECON1
-------------------------------------------------------------------------------------------
NUMBER OF RECONS ACCEPTED=+8
VER=1 TYPE=S INDEX=000001 RC=00000000 RSN=00000000 RECON=BNSSCDRV RTEYPE=EVAL DBUSE=DL1 MSGLEN=0
INDICATORS: REORG NEEDED=7 SEVERITY=7 SDEP NEEDED=7 IOVF NEEDED=7
EXTENSION: TOD2=02/02/2014 12:16:49.822158(CCCB1A80DF9CEBB3)
SENSOR TOD=02/02/2014 12:16:42.460750(CCCB1A80DF9CEBB3)
-------------------------------------------------------------------------------------------
VER=1 TYPE=S INDEX=000002 RC=00000000 RSN=00000000 RECON=BNSSCDRV RTEYPE=EVAL DBUSE=DL1 MSGLEN=0
INDICATORS: REORG NEEDED=7 SEVERITY=7 SDEP NEEDED=7 IOVF NEEDED=7
EXTENSION: TOD2=02/03/2014 06:33:52.039032(CCD9B89357EF6000)
SENSOR TOD=02/03/2014 06:33:46.137334(CCD9B89357EF6000)
-------------------------------------------------------------------------------------------
VER=2 TYPE=S INDEX=000003 RC=00000000 RSN=00000000 RECON=BNSSCDRV RTEYPE=EVAL DBUSE=DL1 MSGLEN=+72
INDICATORS: REORG NEEDED=7 SEVERITY=7 SDEP NEEDED=7 IOVF NEEDED=7
EXTENSION: TOD2=02/18/2014 20:45:38.124513(CCD9B89357EF6000)
SENSOR TOD=02/18/2014 20:45:38.124513(CCD9B89357EF6000)
INDICATORS: REORG NEEDED=7 SEVERITY=7 SDEP NEEDED=7 IOVF NEEDED=7
SUM MSG: HFP2910I ACTION "REORG" IS RECOMMENDED FOR DB30AR0 IN RECONID=BNSSCDRV.
The content of the output varies according to the information in the Autonomics Director repository. The following fields might be displayed in the output:

**GROUP**
IMS Tools Knowledge Base XCF group that was specified for the utility.

**RECON(DATASET)**
The RECON ID that was specified for the utility. DATASET is the RECON dataset name filter (wildcards allowed) for the pertinent exception messages.

**EXT. RECON**
External RECON ID.

**DATASET NAME**
Name of the data set associated with the RECON.

**NUMBER OF RECONS ACCEPTED**
Number of RECON data sets that were accessed by the utility.

**VER**
Version of the output.

1. Contains a single exception message.
2. Contains one or more exception messages.

**TYPE**
Message type.

E Exception message.
SUM  Summary message.

INDEX
Number or exceptions or summary messages.

RC  Return code from the evaluation in hex format.

RSN  Reason code from the evaluation in hex format.

RECON
RECON associated with the message. The RECON must be defined in the RECON registry.

RTYPE
Record type.

SPOL  Created by Policy Services.
SENS  Created from sensor data.
EVAL  Created from a policy evaluation.
????  Undefined.

DBUSE
Type of database. Examples are DLI and DB2.

MSGLEN
Length of the message.

REORG NEEDED
Indicates whether a reorganization is recommended.

N  Reorganization is not recommended.
Y  Reorganization is recommended.

SEVERITY
Level of severity (W for warning, C for critical, S for severe).

SDEP NEEDED
Indicates whether an SDEP extension of a DEDB area is recommended.

N  SDEP extension is not recommended.
Y  SDEP extension is recommended.

IOVF NEEDED
Indicates whether an IOVF extension of a DEDB area is recommended.

N  IOVF extension is not recommended.
Y  IOVF extension is recommended.

TOD2
Date and time that the evaluation ended.

SENSOR TOD
Date and time of the most recent sensor data collection before the evaluation.

SUM MSG
Content of the summary message.

LEVEL
Exception level of the message (WARNING, CRITICAL, or SEVERE) from Policy Services.
NAME
Name of the action.

REORG
A reorganization is recommended.

EXTENDSDEP
An SDEP extension of a DEDB area is recommended.

EXTENDIOVF
An IOVF extension of a DEDB area is recommended.

MESSAGE
A rule exception message is issued.

CLASS
Exception class name. For more information about an exception class name, see the IBM Tools Base Policy Services for z/OS User’s Guide.

CODE PAGE
Translation code page for the message.

RULE
Policy rule or user set exception level. For more information about a rule, see the IBM Tools Base Policy Services for z/OS User’s Guide.

EXC MSG
The long version of the message. For more information about an exception message, see the IBM Tools Base Policy Services for z/OS User’s Guide.
Chapter 6. Troubleshooting

Messages, abend codes, and diagnostic information can help you diagnose and correct problems with Autonomics Director.

Topics:

- “Autonomics Director messages”
- “Autonomics Director abend codes” on page 100
- “Gathering diagnostic information” on page 102

Autonomics Director messages

Use the information in these messages to help you diagnose and solve Autonomics Director problems.

Message format

Autonomics Director messages adhere to the following format:

IAVnnnx

IAV Indicates that the message was issued by Autonomics Director.

nnn Indicates the message identification number.

x Indicates the severity of the message:

A Indicates that operator intervention is required before processing can continue.

E Indicates that an error occurred, which might or might not require operator intervention.

I Indicates that the message is informational only.

W Indicates that the message is a warning to alert you to a possible error condition.

Each message also includes the following information:

Explanation:

The Explanation section explains what the message text means, why it occurred, and what its variables represent.

System action:

The System action section explains what the system does in response to the event that triggered this message.

User response:

The User response section describes whether a response is necessary, what the appropriate response is, and how the response affects the system or program.

IAVD460I COULD NOT LOCATE DATABASE IN THE DBDLIB

Explanation: The Autonomics Director database discovery task did not find the database that is being added to the monitor list in the DBDLIB.

System action: Processing continues.

User response: Make sure that the DBD entry exists in
the DBDLIB for the database that you are adding to the monitor list.

**IAV461I** THE DATABASE IS NOT STORED IN ITKB

**Explanation:** The Autonomics Director data discovery task did not store the database in the IMS Tools KB INPUT repository.

**System action:** Processing continues.

**User response:** None.

**IAV470E** CANNOT CONNECT TO HKT_INPUT REPOSITORY

**Explanation:** The Autonomics Director database discovery task did not connect to the HKT_INPUT repository.

**System action:** Processing continues. Autonomics Director does not store the discovery data for the database in the IMS Tools KB repository.

**User response:** Contact IBM Software Support and provide the Autonomics Director job log.

**IAV472E** FAILED TO CREATE ITKB DB RECORD MEMBER

**Explanation:** The Autonomics Director database discovery task did not create a database record member in the HKT_INPUT repository.

**System action:** Processing continues. Autonomics Director does not store the discovery data for the database in the IMS Tools KB repository.

**User response:** Contact IBM Software Support and provide the Autonomics Director job log.

**IAV473E** DELETE ITKB DB MEMBER FAILED

**Explanation:** The Autonomics Director database discovery task did not delete the database member in the HKT_INPUT repository.

**System action:** Processing continues. Autonomics Director does not store the discovery data for the database in the IMS Tools KB repository.

**User response:** Contact IBM Software Support and provide the Autonomics Director job log.

**IAV474E** ADD ITKB DB RECORD FAILED

**Explanation:** The Autonomics Director database discovery task did not add the database record to the HKT_INPUT repository.

**System action:** Processing continues. Autonomics Director does not store the discovery data for the database in the IMS Tools KB repository.

**User response:** Contact IBM Software Support and provide the Autonomics Director job log.

**IAV475E** WRITE ITKB DB MEMBER FAILED

**Explanation:** The Autonomics Director database discovery task did not write the database member to the HKT_INPUT repository.

**System action:** Processing continues. Autonomics Director does not store the discovery data for the database in the IMS Tools KB repository.

**User response:** Contact IBM Software Support and provide the Autonomics Director job log.

**IAV476E** CREATE ITKB DUMMY MEMBER FAILED

**Explanation:** The Autonomics Director database discovery task did not create the dummy member in the HKT_INPUT repository.

**System action:** Processing continues. Autonomics Director does not store the discovery data for the database in the IMS Tools KB repository.

**User response:** Contact IBM Software Support and provide the Autonomics Director job log.

**IAV477E** ITKB WRITE DUMMY MEMBER FAILED

**Explanation:** The Autonomics Director database discovery task did not write the dummy member to the HKT_INPUT repository.

**System action:** Processing continues. Autonomics Director does not store the discovery data for the database in the IMS Tools KB repository.

**User response:** Contact IBM Software Support and provide the Autonomics Director job log.
database in the IMS Tools KB repository.

User response: Contact IBM Software Support and provide the Autonomics Director job log.

IAV0002I task-id TCB INITIALIZATION COMPLETE

Explanation: Initialization for an Autonomics Director task task-id has successfully completed.

System action: Autonomics Director initialization continues.

User response: None.

IAV0003I task-id TCB TERMINATION COMPLETE

Explanation: Termination for an Autonomics Director task task-id has completed.

System action: Autonomics Director termination continues.

User response: None.

IAV0004I AD SYSTEM INITIALIZATION COMPLETE

Explanation: Initialization for Autonomics Director has successfully completed.

System action: Autonomics Director continues normal operation.

User response: None.

IAV0005E KEY 7 EXECUTION REQUIRED

Explanation: An error has been detected in the Autonomics Director server program execution key. The Autonomics Director servers are required to execute in key 7.

System action: The Autonomics Director server abnormally terminates with a user abend U0050-X’0A’.

User response: An MVS Program Properties Table entry must be created for program IAVCI000 with a key 7 specification.

IAV0007E INVALID TYPE= PARAMETER

Explanation: An error has been detected in the initialization of the Autonomics Director server address space. The TYPE= subparameter specification on the job step PARM= is invalid.

System action: The address space abnormally terminates with a user abend U0050-30.

User response: Correct the TYPE= specification to reflect the proper address space type.

IAV0010E INVALID CONFIGURATION MEMBER SPECIFIED

Explanation: An invalid PROCLIB configuration member name was specified on the JCL execute statement.

System action: Autonomics Director abnormally terminates with a user abend U0070-40.

User response: Specify a valid PROCLIB member name for the IAVCFG= subparameter on the JCL execute statement.

IAV0015I SERVER server IS NOW THE MASTER SERVER FOR GROUP group

Explanation: The role of master server has been transferred from the original master server to another active or failover server.

System action: Processing continues.

User response: None.

IAV0020E INVALID CONFIGURATION PARAMETER SPECIFIED - parameter

Explanation: The PROCLIB configuration parameter indicated in the message was specified incorrectly.

System action: The Autonomics Director server abnormally terminates with user abend U0070-40.

User response: Correct the specified parameter value. This parameter is in the Autonomics Director server configuration member.

IAV0022I THE AD SCHEDULING IS INITIALIZED

Explanation: The Autonomics Director scheduling has completed processing the period definitions for the day and is initialized for work.

System action: None.

User response: None.

IAV0023I ERROR TERMINATING AD REPOSITORY CONNECTION ON xxxxxxxx, RC=return, RSN=reason

Explanation: An error was encountered while attempting to terminate the connection on node xxxxxxxx. RC indicates the return code, and RSN indicates the reason code.

System action: The Autonomics Director server continues terminating.

User response: See the IMS Tools KB return and reason codes for more information.
<table>
<thead>
<tr>
<th>Message ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAV0024I</td>
<td>CONNECTED TO THE AD REPOSITORY ON \textit{xxxxxxx}</td>
</tr>
</tbody>
</table>
| Explanation: Autonomics Director is connected to the Policy Services Autonomics Director repository on node \textit{xxxxxxx}.  
System action: None.  
User response: None. |
| IAV0025I   | CAN NOT CONNECT TO AD REPOSITORY ON server, \textit{RC}=return, \textit{RSN}=reason |
| Explanation: Autonomics Director cannot connect to the IMS Tools KB Autonomics Director repository located on server \textit{server}. RC indicates the return code, and RSN indicates the reason code.  
System action: Processing continues.  
User response: Review your IMS Tools KB configuration and retry. |
| IAV0026I   | DISCONNECTED FROM THE AD REPOSITORY ON server |
| Explanation: Autonomics Director disconnected from the IMS Tools KB Autonomics Director repository located on server \textit{server}.  
System action: Processing continues.  
User response: Review your IMS Tools KB configuration and retry. |
| IAV0027I   | AD PROCESSING IS STARTED |
| Explanation: Autonomics Director is started and ready to accept users.  
System action: None.  
User response: None. |
| IAV0028I   | AD PROCESSING IS SUSPENDED, NO CONNECTION TO THE REPOSITORY ON \textit{xxxxxxx} |
| Explanation: Autonomics Director detects that the connection to the IMS Tools KB server has been lost, which indicates that IMS Tools KB has been stopped. The variable \textit{xxxxxxx} indicates the name of the active server.  
System action: Autonomics Director remains active, but rejects all commands and does not perform any scheduled work. Autonomics Director resumes processing when IMS Tools KB comes back online.  
User response: None. |
| IAV0029I   | AD PROCESSING IS RESUMED, THE CONNECTION IS RESTORED TO THE REPOSITORY ON \textit{xxxxxxx} |
| Explanation: The Autonomics Director server detected that IMS Tools KB is back online again. The variable \textit{xxxxxxx} indicates the name of the active server.  
System action: Autonomics Director processing is resumed.  
User response: None. |
| IAV0030E   | INVALID AWE FUNCTION FOR SERVER \textit{server} |
| Explanation: An asynchronous work element (AWE) with an invalid function identifier was detected by an Autonomics Director server AWE server \textit{server}. This is an internal Autonomics Director problem.  
System action: The invalid AWE is ignored and the Autonomics Director server continues.  
User response: Contact IBM Software Support. |
| IAV0040W   | ITKB SERVER TERMINATION DETECTED |
| Explanation: UNKNOWN  
System action: UNKNOWN  
User response: UNKNOWN |
| IAV0041I   | ITKB SERVER AVAILABILITY DETECTED |
| Explanation: An available IMS Tools KB server has been detected.  
System action: Processing continues.  
User response: None. |
| IAV0086E   | ROUTER \textit{router} SERVICE FAILURE \textit{RC}=return, \textit{RSN}=reason |
| Explanation: Autonomics Director routing services encountered an error while working with MVS Workload Manager.  
System action: Routing Services are not available at this time. Only local routing can be used.  
User response: If this problem persists contact IBM Software Support. |
| IAV0087I   | display command output |
| Explanation: This is a generic message that contains output from the Autonomics Director DISPLAY command. The message content varies depending on the type of DISPLAY command that is used.  
System action: None. |
User response: None.

IAV0088E  DCB SYNAD EXIT TAKEN FOR DDNAME name

Explanation: While attempting to access the sensor JCL from the user specified data set, an error was encountered.

System action: The JCL is not accessible and the sensor job was not submitted.

User response: Search the Autonomics Director server job log for accompanying message IEC141I that explains the cause of the error.

IAV0089E  DCB ABEND EXIT TAKEN FOR DDNAME name, RC=return, RSN=reason

Explanation: While attempting to access sensor JCL from the data set specified by the user, an error was encountered. The RC indicates the return code and the RSN indicates the reason code.

System action: The JCL is not accessible and the sensor job was not submitted.

User response: Contact IBM Software Support.

IAV0090E  SUBMIT service SERVICE FAILURE RC=return, RSN=reason

Explanation: While attempting to submit sensor JCL to the internal reader an error was encountered.

System action: It is unknown if the sensor JCL was submitted based upon the specific nature of the error.

User response: Contact IBM Software Support with the information provided in the service, return, and reason values.

IAV0430E  XCF service SERVICE FAILURE RC=retcode, RSN=rscode

Explanation: A cross-system coupling facility (XCF) request failed. The requested service in the message indicates the failing XCF service. RC= indicates the return codes and RSN= indicates the reason codes that are returned by XCF.

System action: Processing continues unless the error is critical to the caller of XCF services.

User response: A common cause of XCF errors is a missing Autonomics Director component address space. Another cause might be an improperly specified XCF group or member name for a component address space. For more information about XCF services, see the MVS Sysplex Services Reference. If the problem persists, Contact IBM Software Support.

IAV0600W  SAF service SERVICE FAILURE SAF=safrc, RC=retcode, RSN=rscode

Explanation: A System Authorization Facility (SAF) service request failed. The requested service in the message indicates the failing SAF/RACF (or equivalent) service. SAF= indicates the SAF return code returned in R15 from the call to SAF. RC= and RSN= indicate the return and reason codes returned by RACF (or equivalent).

System action: Autonomics Director server processing continues. The authorization request might be denied.

This warning is generally caused by the RACF protection of entering IMS Autonomics Director commands from the Autonomics Director client or submission of sensor jobs.

User response: Additional information about SAF services can be found in the OS/390 Security Server RACROUTE Macro Reference publication.

If the problem persists, contact IBM Software Support.

IAV0701I  READY FOR DATABASE EVALUATIONS

Explanation: Autonomics Director has successfully connected to the IMS Tools KB repository, Policy Services, and Sensor Data environments.

System action: Waiting for database evaluation request

User response: You can begin performing database evaluations by using Autonomics Director.

IAV0705W  UNABLE TO PROCESS DATABASE EVALUATIONS-INIT FAILED

Explanation: Autonomics Director cannot connect to the Policy Services or Sensor Data Extractor environments. Database evaluations cannot be performed.

System action: None.

User response: Examine the job log for any error messages prefixed with BSN for a possible cause of the failure.

IAV0706W  UNABLE TO PROCESS DATABASE EVALUATIONS-ITKB DOWN

Explanation: Database evaluations cannot be performed because the connection to the IMS Tools KB repository was lost or never established.

System action: None.

User response: Verify that the Autonomics Director connection to the IMS Tools KB repository is properly configured and that the IMS Tools KB is up and running.
The Notification Service Failed, Service=service, RC=rc, RSN=rsn

Explanation: An error occurred during Autonomics Director User Notification Service processing. The service name, return code, and reason code are displayed.

System action: The user notification occurs.

User response: Verify that the Autonomics Director connection to the IMS Tools KB notification repository is properly configured and that the IMS Tools KB is up and running.

The Notification Service Failed, Unknown Notification List name

Explanation: The Autonomics Director User Notification Service failed to send a notification message because the notification list name was not found in the IMS Tools KB notification list repository.

System action: The notification message is not sent.

User response: Correct the notification list name. The incorrect notification list name could be in either the IMS Tools KB notification list repository or the Autonomics Director monitor list.

Shutdown Scheduled

Explanation: The Autonomics Director server received a scheduled shutdown request.

System action: The Autonomics Director server has internally queued the request for shutdown. Shutdown processing continues when all outstanding Autonomics Director server requests have been processed.

User response: None.

A/S Cleanup Complete

Explanation: The Autonomics Director server has completed the final phase of termination processing.

System action: Autonomics Director server address space termination follows immediately.

User response: None.

SDump Failed for ABEND abend, retcode, rsncode

Explanation: Autonomics Director error recovery attempted to issue an SDUMP macro/service to capture diagnostic information for the ABEND abend in the message. The SDUMP was suppressed by MVS dump analysis and elimination (DAE). Autonomics Director recovery routines gather symptom string data related to an abend and provide this data to MVS when an SDUMP is requested. If DAE is enabled, MVS suppresses duplicate dumps; for example, dumps that have symptom strings identical to previously captured dumps are suppressed. DAE is controlled through the MVS ADYSETxx PARMLIB member and the MVS SET DAE command. For details on specifying DAE options, see OS/390 MVS Initialization and Tuning Reference.

System action: The SDUMP is skipped. An Autonomics Director generated dump is suppressed if its symptom string matches a previous dump, and if the current DAE setting in ADYSETxx is either SUPPRESS or SUPPRESSALL.

User response: None.

IMS AD component subcomponent ABEND abend

Explanation: Autonomics Director error recovery detected an ABEND abend in component component and subcomponent subcomponent.

System action: Autonomics Director error recovery attempts to generate a system dump to capture diagnostic data.

User response: Retain the generated system dump and contact IBM Software Support.

The Open Failed for the SYSPRINT DDNAME

Explanation: The Autonomics Director batch client (IAVBATCH) failed to open the DDNAME SYSPRINT.

System action: IAVBATCH terminates with an error.

User response: Add or correct the SYSPRINT DD statement.

The Open Failed for the SYSIN or SYSPUNCH DDNAME

Explanation: The Autonomics Director batch client (IAVBATCH) failed to open the DDNAME SYSIN. For an execution of the Pre-scan utility (IAVXSCAN), the
open failed for DDNAME SYSPUNCH.

**System action:** IAVBATCH or the IAVXSCAN utility terminates with an error.

**User response:** Add or correct the SYSIN or SYSPUNCH DD statement.

**IAV5002E** A SYNTAX ERROR WAS FOUND WHILE PARSING INPUT PARAMETERS

**Explanation:** The Autonomics Director batch client (IAVBATCH) detected a syntax error on the EXEC statement PARM= parameters.

**System action:** IAVBATCH terminates with an error.

**User response:** Review the EXEC statement PARM= parameters and correct the syntax.

**IAV5003E** THE LOAD OPERATION FAILED FOR THE DFSMDA MEMBER FOR RECON1

**Explanation:** The Autonomics Director batch client (IAVBATCH) failed to load the DFSMDA member for RECON1 from the STEPLIB or JOBLIB data set.

**System action:** IAVBATCH terminates with an error.

**User response:** To fix this issue, complete one of the following actions:
- Add the library that contains the DFSMDA member for RECON1 to the STEPLIB or JOBLIB data set concatenation.
- Supply the data set name for RECON1 on the EXEC statement PARM= parameter.

**IAV5004E** AD FAILED TO CONNECT TO THE SSI INTERFACE WITH SERVICE=xxxxxxxx, RC=xxxxx, RSN=xxxx

**Explanation:** The Autonomics Director batch client (IAVBATCH) received an error when it tried to connect to the Autonomics Director subsystem interface.

**System action:** IAVBATCH terminates with an error.

**User response:** Verify that the Autonomics Director subsystem interface is properly installed on the system where the batch client is running. For information about installing and updating the Autonomics Director subsystem interface, see the IBM Tools Base for z/OS Configuration Guide for IMS.

If the problem persists, contact IBM Software Support.

**IAV5005E** THE COMMAND INPUT CANNOT SPAN MORE THAN 16 INPUT STATEMENTS

**Explanation:** A single Autonomics Director batch client (IAVBATCH) input command spanned more than 16 input statements.

**System action:** IAVBATCH terminates with an error.

**User response:** Reduce the number of continued input statements.

**IAV5006E** AN EOF WAS FOUND WHILE RETRIEVING THE COMMAND CONTINUATION RECORD

**Explanation:** The Autonomics Director batch client (IAVBATCH) expected a continued command input statement but instead reached an EOF (end-of-file) in the SYSIN control statement.

**System action:** IAVBATCH terminates with an error.

**User response:** Correct the erroneous command input statement.

**IAV5007E** THE MASTER AD SERVER CANNOT BE LOCATED

**Explanation:** The Autonomics Director batch client (IAVBATCH) tried to locate the Autonomics Director master server but it is not available.

**System action:** IAVBATCH terminates with an error.

**User response:** To fix this issue, complete one of the following actions:
- If an alternate server is available, resubmit the job.
- If an alternate server is not available, start the Autonomics Director master server and then resubmit the job.

**IAV5008E** AN INVALID RESPONSE WAS RECEIVED FROM THE AD SERVER - NO REQBLK

**Explanation:** The Autonomics Director batch client (IAVBATCH) received an invalid response from the Autonomics Director server.

**System action:** IAVBATCH terminates abnormally.

**User response:** Save the output from the batch client job and review the Autonomics Director configuration. For more information about the Autonomics Director server environment, see the IBM Tools Base for z/OS Configuration Guide for IMS.

If the problem persists, contact IBM Software Support.
IAV5010W  AN INVALID AWE WAS FOUND - NO GEPL

Explanation: The Autonomics Director batch client (IAVBATCH) received an invalid XCF notification about a member of the batch client XCF group.

System action: IAVBATCH continues running.

User response: If the problem persists, contact IBM Software Support.

IAV5011E  INCOMPATIBLE RELEASE LEVELS FOR THE AD SERVER AND BATCH CLIENT

Explanation: The Autonomics Director batch client (IAVBATCH) and Autonomics Director master server are not at the same release level.

System action: IAVBATCH terminates with an error.

User response: Ensure that both the Autonomics Director batch client and Autonomics Director master server are at the same release level.

IAV5500E  A SYNTAX ERROR WAS FOUND WHILE PARSGNG INPUT PARAMETERS

Explanation: The Autonomics Director notification utility (IAVXNTFY) or Pre-Scan utility (IAVXSCAN) detected a syntax error on the EXEC statement PARM= parameters.

System action: The IAVXNTFY or IAVXSCAN utility terminates with an error.

User response: Review the input parameters and correct the syntax.

IAV5503E  THE LOAD OPERATION FAILED FOR THE DFSMDA MEMBER FOR RECON1

Explanation: The Autonomics Director notification utility (IAVXNTFY) or Pre-Scan utility (IAVXSCAN) failed to load the DFSMDA member for RECON1 from the STEPLIB or JOBLIB data set.

System action: IAVXNTFY or IAVXSCAN terminates with an error.

User response: To fix this issue, complete one of the following actions:
- Add the library that contains the DFSMDA member for RECON1 to the STEPLIB or JOBLIB data set concatenation.
- Supply the data set name for RECON1 on the EXEC statement PARM= parameter.

IAV5505E  AN INVALID parmname PARAMETER WAS FOUND WHILE PARSGNG THE INPUT PARAMETERS

Explanation: The Autonomics Director notification utility (IAVXNTFY) or Pre-Scan utility (IAVXSCAN) was validating the input parameters passed on the EXEC statement PARM= parameters. The parmname input parameter was found to be invalid.

System action: The IAVXNTFY or IAVXSCAN utility terminates with an error.

User response: Review the input parameter syntax and correct the invalid parameter.

IAV5510E  THE AD NOTIFY INTERFACE FAILED WITH SERVICE=XXXXXXXX, R15=XXXX, RC=XXXXX, RSN=XXXX

Explanation: The Autonomics Director notification utility (IAVXNTFY) or Pre-scan utility (IAVXSCAN) interface received an error when it tried to communicate with the Autonomics Director server.

System action: The IAVXNTFY or IAVXSCAN utility terminates with an error.

User response: To fix this issue, complete one of the following actions:
- Verify that the Autonomics Director subsystem interface is properly installed on the system where IAVXNTFY is running.
- Verify that the master Autonomics Director server is started.
- For more information about installing and updating the Autonomics Director subsystem interface, see IBM Tools Base for z/OS Configuration Guide for IMS.

IAV5515E  A NEGATIVE ACKNOWLEDGEMENT WAS RECEIVED FROM THE AD SERVER: explanatory text

Explanation: The Autonomics Director notification utility (IAVXNTFY) or Pre-scan utility (IAVXSCAN) received an error from the Autonomics Director master server. The explanatory text of the message describes the negative acknowledgment.

System action: The IAVXNTFY or IAVXSCAN utility terminates with an error.

User response: Take corrective action that is based on the explanatory text.

A possible cause of this error is the use of an unknown RECON1 data set name, or an unknown database group, database, partition, or area.

This message might also be an indication that the job is participating in a group-managed reorganization job stream and is not known by the Autonomics Director server.
IAV6000E  cmdverb SERVER COMMAND
REJECTED: reason

Explanation: The Autonomics Director server operational command identified by cmdverb was rejected by the server for the reason identified by reason.

System action: The Autonomics Director server rejects the command.

User response: If appropriate, correct and resubmit the command.

IAV6001I  cmd-name SERVER COMMAND
EXECUTED

Explanation: The Autonomics Director server MODIFY command cmd-name was successfully executed.

System action: The Autonomics Director server has taken the command action and the operation continues in the state requested.

User response: None.

IAV6006E  INVALID COMMAND command
SERVER

Explanation: The Autonomics Director operational command entered is invalid.

System action: The command is ignored.

User response: Correct and resubmit the command.

IAV7000I  IMS AD VERSION vrm SSI
INITIALIZATION COMPLETE

Explanation: The Autonomics Director User Interface Subsystem initialization routine completed initialization. The vrm within the message identifies the version and release of the initialization routine.

System action: None.

User response: None.

IAV7002E  IMS AD SSI ERROR ACTION=action,
RC=rc, RSN=rsn

Explanation: The Autonomics Director Subsystem Interface encountered an error.

System action: Initialization of the Autonomics Director Subsystem Interface fails.

User response: Contact IBM Software Support.
Autonomics Director database evaluation error messages

Use the information in these messages to help you diagnose and solve Autonomics Director database evaluation problems.

Message format

Each message includes the following information:

Explanation: The Explanation section explains what the message text means, why it occurred, and what its variables represent.

System action: The System action section explains what the system does in response to the event that triggered this message.

User response: The User response section describes whether a response is necessary, the appropriate response, and how the response affects the system or program.

POLICY Get FAILED in ASLK

Explanation: An error occurred while retrieving the policy for the evaluation. ASLK indicates the Policy Services API function call.

System action: The database evaluation fails.

User response: For the cause of the failure, lookup the return code and reason code combination in the IBM Tools Base Policy Services for z/OS User’s Guide.

EVALUATION FAILED in PAEV

Explanation: An error occurred while attempting to evaluate the database with the given policy. PAEV indicates the Policy Services API function call.

System action: The database evaluation fails.

User response: For the cause of the failure, lookup the return code and reason code combination in the IBM Tools Base Policy Services for z/OS User’s Guide.

Get ACTION DESCRIPTONG-AMGA

Explanation: An error occurred while retrieving the Action Descriptors or Exceptions for the database. AMGA indicates the Policy Services API function call.

System action: The database evaluation fails.

User response: For the cause of the failure, lookup the return code and reason code combination in “Sensor data extractor return and reason codes” on page 101.

Get ACTION STATUS FAIL-AMUS

Explanation: An error occurred while retrieving Policy Services status information. AMUS indicates the Policy Services API function call.

System action: The database evaluation fails.

User response: For the cause of the failure, lookup the return code and reason code combination in the IBM Tools Base Policy Services for z/OS User’s Guide.

Get SUMMARY DESC. Fail-AMTM

Explanation: An error occurred while retrieving the summary message for the database evaluation. AMTM indicates the Policy Services API function call.

System action: The database evaluation fails.

User response: For the cause of the failure, lookup the return code and reason code combination in the IBM Tools Base Policy Services for z/OS User’s Guide.

READ OF SENSOR DATA FAILED

Explanation: An error occurred while attempting to READ the sensor data record for the database.

System action: The database evaluation fails.

User response: For the cause of the failure, lookup the return code and reason code combination in “Sensor data extractor return and reason codes” on page 101.
How to look up message explanations

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/bkzserv/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.

**Autonomics Director abend codes**

This reference section provides detailed information about Autonomics Director abend codes.

For each abend code, the following information is provided where applicable:

**Explanation:**
The Explanation section explains what the abend code means, why it occurred, and what its variable entry fields are (if any).

**System Action:**
The System Action section explains what the system will do next.

**User Response:**
The User Response section describes whether a response is necessary, what the appropriate response, and how the response will affect the system or program.

---

**020**

**Explanation:** An error occurred in the use of a BPE service. The abend subcode details the nature of the error:
- X'01' - AWE get failed
- X'05' - AWE enqueue failed
- X'10' - BPETIMER initialization failed
- X'15' - BPETIMER cancel failed
- X'20' - BPEATTCH failed
- X'25' - BPELTCB failed
- X'30' - BPELOADC failed
- X'035' - BPEPOST failed
- X'100' - BPETERM failed
- X'105' - BPELAGET failed
- X'110' - BPELAREL failed
- X'115' - BPESPRNT failed

**System Action:** The Autonomics Director server address space in which the abend occurred is abnormally terminated.

**User Response:** Retain diagnostic information and contact IBM Software Support.

---

**040**

**Explanation:** An error occurred while trying to obtain virtual storage. The abend subcode details the nature of the error:
- X'005' - SSBL storage unavailable
- X'010' - XCF JOIN answer area storage unavailable
- X'015' - RESMGR ADD failed
- X'030' - Invalid TYPE= subparameter on execute statement
- X'035' - XCF send parameter list buffer unavailable

**System Action:** The Autonomics Director server address space in which the abend occurred is abnormally terminated.

**User Response:** For all other subcodes, retain diagnostic information and contact IBM Software Support.

---

**070**

**Explanation:** An error occurred in an internal Autonomics Director service. The abend subcode further determines the nature of the error:
- X'010' - XCF QUERY for servers failed
- X'015' - XCF QUERY failed
080

**Explanation:** An error occurred in an SRB service routine. The abend subcode details the nature of the error:

- X'001' - SRB service initialization failure
- X'030' - SRB service Cell Pool get failure

**System action:** The Autonomics Director address space is terminated.

**User response:** Retain diagnostic information and contact IBM Software Support.

---

110

**Explanation:** An error occurred in an internal Autonomics Director service. The abend subcode further determines the nature of the error:

- X'020' - XCF JOIN failed
- X'030' - XCF LEAVE failed
- X'050' - Cell Pool services get failed
- X'065' - XCF send services failed
- X'070' - Internal logic error

**System action:** The Autonomics Director address space is terminated.

**User response:** Retain diagnostic information and contact IBM Software Support.

---

### Sensor data extractor return and reason codes

This topic provides detailed information about the sensor data extractor return and reason codes.

<table>
<thead>
<tr>
<th>Return code</th>
<th>Reason code</th>
<th>Message text</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-</td>
<td>SUCCESSFULLY PROCESSED</td>
</tr>
</tbody>
</table>
Table 4. Sensor data extractor return and reason codes (continued)

<table>
<thead>
<tr>
<th>Return code</th>
<th>Reason code</th>
<th>Message text</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>8</td>
<td>MEMBER NOT FOUND</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>ATTEMPTING TO INITIALIZE AN ALREADY INITIALIZED ENVIRONMENT</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>API LEVEL IS INVALID</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>INVALID FUNCTION</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>SERVER NAME MISSING</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>CANNOT CONNECT TO SERVER</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>MISSING REQUIRED PARAMETER</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>SERVER ERROR ON BROWSE</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>STORAGE LENGTH INVALID</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>CORRUPT ENVIRONMENT</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>INVALID LIST TYPE</td>
</tr>
<tr>
<td>16</td>
<td>10</td>
<td>BAD MEMBER READ</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>BAD TAG IN RECORD</td>
</tr>
</tbody>
</table>

Gathering diagnostic information

Before you report a problem with Autonomics Director to IBM Software Support, you need to gather the appropriate diagnostic information.

Procedure

Provide the following information for all Autonomics Director 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 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 capture 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 submitted batch processing, provide the following information
- The complete job log
- SYSPRINT output
- Contents of any data sets that were used during the processing
Chapter 7. BPE commands

Autonomics Director uses the Base Primitive Environment (BPE) and BPE commands.

Topics:
- “BPE command syntax and invocation”
- “BPE TRACETABLE commands” on page 105
- “BPE USEREXIT commands” on page 110

BPE command syntax and invocation

Autonomics Director BPE supports two command formats: a verb only format, and a verb-resource type format.

The verb only format consists of a verb, followed by zero or more keyword-value pairs, with the values enclosed in parentheses.

**BPE verb-only command syntax**

![Diagram of BPE verb-only command syntax]

The verb-resource type format consists of a verb, a resource type, and zero or more keyword value pairs.

**BPE verb-resource type command syntax**

![Diagram of BPE verb-resource type command syntax]

The verb-resource type format consists of a verb, a resource type, and zero or more keyword value pairs.

**verb**
A command verb that represents an action. Some verb examples are DISPLAY, UPDATE, and REFRESH.

**resourcetype**
The type of resource that is operated on by the verb. Some resource examples are TRACETABLE and USEREXIT.

**keyword(value)**
A set of zero or more keywords and values that represent attributes, filters, or other modifiers that apply to the command. For example, NAME() to identify the specific resources or LEVEL() to specify a trace level.
BPE command invocation
You can invoke Autonomics Director BPE commands only through the MVS MODIFY command.

The following diagram illustrates the general syntax for entering commands through the modify interface.

```
F jobname,command
```

These elements are defined as follows:
F    The MVS modify command.
jobname      The job name of the address space to which the command is directed.
command      The command that is being issued.

BPE wildcard character support
Some parameters on BPE commands support wildcard characters for pattern matching.

For such parameters, you can use the following wildcard characters:

*    Matches zero or more characters
%    Matches exactly one character

The following examples illustrate some uses of wildcard characters.
BE*    Matches any string that begins with 'BE', of any length. For instance: BE, BEE, BEEBLEBROX.
%%S    Matches any 3-character string that ends with an 'S'. For instance: IMS, SMS.
R*T%R  Matches any string that begins and ends with 'R', having an 'S', followed by a 'T' in the middle, with any number of intervening characters between the first 'R', the 'S', and the 'T', and exactly one character between the 'T' and the final 'R'. For instance: ROASTER, ROSTER, RESORTER, RESCEPTOR, RSTZR.
*    Matches any string.

Specifying command parameters
Autonomics Director BPE commands enable you to display and update resources that Autonomics Director BPE manages.

About this task
Some resource types are defined and owned by Autonomics Director BPE itself. These resource types are known as system resource types.

Other resource types are defined and owned by Autonomics Director. These resource types are known as component resource types or user-product resource types.
Autonomics Director BPE commands also provide the ability to restrict the resource types upon which a command operates to either those owned by Autonomics Director BPE, or to those owned by Autonomics Director itself. This is done through the OWNER keyword on commands that support OWNER.

- Use OWNER(BPE) to restrict the command operation to resource types that BPE owns and defines (system resource types).
- Use OWNER(SMDC) to restrict the command operation to resource types that the IMS Autonomics Director data collector defines and owns (component resource types).
- Use OWNER(SMUI) to restrict the command operation to resource types that the IMS Autonomics Director server defines and owns (component resource types).

**BPE TRACETABLE commands**

The TRACETABLE resource type refers to the internal Autonomics Director BPE-managed trace tables that are defined either by Autonomics Director BPE (for example: DISP, CBS, STG, LATC), or by Autonomics Director.

Two command verbs operate on the TRACETABLE resource type:

**DISPLAY**
Display trace level and number of trace table pages of specified trace tables.

**UPDATE**
Update trace level attributes of specified trace tables.

**DISPLAY TRACETABLE command**

The DISPLAY TRACETABLE command displays the current attribute settings for the requested trace tables.

**Format of the DISPLAY TRACETABLE command**

Use the DISPLAY TRACETABLE command to display the current attribute settings for the requested trace tables.

```
DISPLAY TRACETABLE
```

**Usage rules for the DISPLAY TRACETABLE command**

Use the DISPLAY TRACETABLE command according to its usage rules.

**DISPLAY | DIS**
A required parameter that specifies that the action against the specified resource is to display attributes of the resource.

**TRACETABLE | TRTAB**
A required parameter that specifies that the resource type being acted upon is a BPE-managed trace table.

**NAME(trace_table_name)**
A required parameter that specifies the name of the trace table type or types about which you want attributes displayed. You can specify a single trace table name or a list of trace table names separated by commas. Trace
table names can contain wildcard characters. Trace table names can be Autonomics Director BPE-defined trace tables or Autonomics Director-defined trace tables.

The following Autonomics Director BPE-defined trace table types are available:

- **AWE**  Asynchronous work element (AWE) trace table
- **CBS**  Control block services trace table
- **CMD**  Command trace table
- **DISP**  Dispatcher trace table
- **LATC**  Latch trace table
- **SSRV**  System services trace table
- **STG**  Storage service trace table

**OWNER(BPE | SMDC | SMUI)**

An optional parameter that specifies the owner of the user exit type or types about which you want attributes displayed. You can specify one of the following values:

- **BPE**  For all Autonomics Director components that are running in a BPE address space. No BPE user exit routine types are defined at this time.
- **SMDC**  For Autonomics Director data collector-defined trace table types.
- **SMUI**  For Autonomics Director server address space-defined trace table types.

The OWNER parameter acts as a filter to help you select the trace tables that you want to display. You could specify `NAME(*) OWNER(BPE)` to display all of the Autonomics Director BPE-defined trace table types. If OWNER is omitted, then both Autonomics Director BPE and Autonomics Director component trace tables might be displayed (depending on the tables specified on `NAME`).

**DISPLAY TRACETABLE command output:**

The DISPLAY TRACETABLE command output consists of a header line, one line per selected trace table, and one message BPE0032I line that indicates that the command has completed.

The following example shows the output from the DISPLAY TRACETABLE command.

```
BPE0030I TABLE  OWNER  LEVEL  #PAGES
BPE0000I DISP  BPE  HIGH  12
BPE0000I STR  SMDC  MEDIUM  8
BPE0032I DISPLAY TRACETABLE COMMAND COMPLETED
```

These columns are in the DISPLAY TRACETABLE output:

**TABLE**

Specifies the name of the trace table type about which information is being displayed on the current row.
OWNER
Specifies the Autonomics Director component that owns the trace table (BPE, SMDC or SMUI).

LEVEL
Specifies the current level setting of the trace table. A trace table's level determines the volume of trace data that is collected. These levels are possible:

NONE
No tracing is being done into the table.

ERROR
Only traces for error or exception conditions are being made into the table.

LOW
Only major event trace entries are made into the table.

MEDIUM
Major event trace entries and some minor event trace entries are made into the table.

HIGH
All trace entries are made into the table.

INACTV
The trace table is inactive and cannot be used. This status occurs only when BPE was unable to get any storage for the trace table. No tracing will be done for the indicated table type, and you cannot change the level for the trace table with the UPDATE TRACETABLE command. You must restart the address space in order to use the trace table again.

#PAGES
Specifies the number of 4 KB (4096 byte) pages that are allocated for the trace table type.

DISPLAY TRACETABLE example 1:
This example displays the status of the Autonomics Director BPE dispatcher trace table (DISP).

Command:
F SMDC1,DISPLAY TRACETABLE NAME(DISP)

Output:
BPE0030I TABLE OWNER LEVEL #PAGES
BPE0000I DISP BPE HIGH 4
BPE0032I DIS TRTAB COMMAND COMPLETED

DISPLAY TRACETABLE example 2:
This example displays the status of all traces in an Autonomics Director address space.

Command:
F SMDC1,DIS TRTAB NAME(*)

Output:
The UPDATE TRACETABLE command changes the trace level setting for the requested trace tables.

Format of the UPDATE TRACETABLE command
Use this command to change the trace level setting for the requested trace tables.

```
UPDATE TRACETABLE
  NAME(trace_table_name)
  OWNER(BPE)
  LEVEL(None, Error, Low, Medium, High)
```

Usage rules for the UPDATE TRACETABLE command
Use the UPDATE TRACETABLE command according to its usage rules.

UPDATE | UPD
A required parameter that specifies that the action against the trace table is to update its attributes.

TRACETABLE | TRTAB
A required parameter that specifies that the resource type being acted upon is an IMS Autonomics Director BPE-managed trace table.

NAME(trace_table_name)
A required parameter that specifies the name of the trace table type or types that you want to update. You can specify a single trace table name or a list of trace table names separated by commas. Trace table names can contain wildcard characters. Trace table names can be IMS Autonomics Director BPE-defined trace tables or IMS Autonomics Director-defined trace tables.

The following IMS Autonomics Director BPE-defined trace table types are available:

- AWE  Asynchronous work element (AWE) trace table
- CBS  Control block services trace table
- CMD  Command trace table
- DISP Dispatcher trace table
LATC  Latch trace table
SSRV  System services trace table
STG  Storage service trace table

You can update IMS Autonomics Director-defined trace tables only for IMS Autonomics Director address spaces.

**OWNER(BPE|SMDC|SMUI)**
An optional parameter that specifies the owner of the trace table type or types that you want to update. You can specify one of the following values:

**BPE**  For IMS Autonomics Director BPE-defined trace table types

**SMDC**  For IMS Autonomics Director Data Collector-defined trace table types

**SMUI**  For IMS SM Server-defined trace table types

The OWNER parameter acts as a filter to help you select the trace tables that you want to update. You could specify **NAME(*) OWNER(SMUI)** to update all of the Autonomics Director Server-defined trace table types. If OWNER is omitted, then both IMS Autonomics Director BPE and IMS Autonomics Director trace tables might be updated (depending on the tables specified on NAME).

**LEVEL(level)**
An optional parameter that sets the new tracing level for the specified trace tables. If LEVEL is omitted, the level of the specified trace tables is not changed. These levels are possible:

**NONE**  No tracing is being done into the table.

**ERROR**  Only traces for error or exception conditions are being made into the table.

**LOW**  Only major event trace entries are made into the table.

**MEDIUM**  Major event trace entries and some minor event trace entries are made into the table.

**HIGH**  All trace entries are made into the table.

**Important:**  You cannot change the level for the trace table type ERR. IMS Autonomics Director BPE forces the level to HIGH to ensure that error diagnostics are captured. Any level that you specify for the ERR trace table is ignored.

**UPDATE TRACETABLE command output:**

The UPDATE TRACETABLE command output consists of message BPE0032I, which indicates that the command has completed.

An example of the UPDATE TRACETABLE command output message is:

BPE0032I UPDATE TRACETABLE COMMAND COMPLETED
**UPDATE TRACETABLE example 1:**

This example updates the level of the Autonomics Director BPE dispatcher trace table (DISP) to HIGH.

**Command:**

```
F SMDC1,UPDATE TRACETABLE NAME(DISP) LEVEL(HIGH)
```

**Output:**

```
BPE0032I UPDATE TRACETABLE COMMAND COMPLETED
```

**UPDATE TRACETABLE example 2:**

This example updates the level of all Autonomics Director (SMDC) trace tables to MEDIUM.

**Important:** You cannot change the level for the trace table type ERR, even when using a wildcard character to select all tables with a given owner, as in this example. Autonomics Director BPE forces the level to HIGH to ensure that error diagnostics are captured.

**Command:**

```
F SMDC1,UPD TRTAB NAME(*) OWNER(SMDC) LEVEL(MEDIUM)
```

**Output:**

```
BPE0032I UPDATE TRACETABLE COMMAND COMPLETED
```

---

**BPE USEREXIT commands**

BPE-specific user exit routines are not supported at this time. Only Autonomics Director-specific user exit routines are currently available.

Throughout these topics, the term user exit routine means user-supplied exit routine.

The USEREXIT resource type refers to the user exit routine types that are defined to and managed by the IMS component that is using BPE (for example, SMUI).

**DISPLAY**

Display attributes of specified user exit routine types.

**REFRESH**

Load new copies of the user exit modules for specified user exit routine types.

**DISPLAY USEREXIT command**

Use the DISPLAY USEREXIT command to display attributes for all modules that are associated with the specified user exit routine types.

**Format of the DISPLAY USEREXIT command**

Use the DISPLAY USEREXIT command by following its syntax format.
Usage of DISPLAY USEREXIT command

Use the DISPLAY USEREXIT command according to its usage rules.

DISPLAY | DIS
A required parameter that specifies that the action against the specified resource(s) is to display attributes of the resources.

USEREXIT | USRX
A required parameter that specifies that the resource type being acted upon is a BPE-managed user exit routine type.

NAME(user_exit_type_name)
A required parameter that specifies the name of the user exit type or types about which you want attributes displayed. You can specify a single user exit type name or a list of user exit type names separated by commas. User exit routine type names can contain wildcard characters.

Important: The names that are specified in this parameter are the names of user exit routine types, not the names of individual user exit routine modules.

User exit routine types are defined in the Autonomics Director UI address space, as specified by OWNER(SMUI), and include the following types:

EXCEPTNS
User exceptions exit routine

SECURITY
User security exit routine

OWNER(BPE|SMDC|SMUI)
An optional parameter that specifies the owner of the user exit routine type or types about which you want attributes displayed. You can specify one of the following values:

BPE For all IMS components that are running in a BPE address space.
No BPE user exit routine types are defined at this time.
SMDC
For Autonomics Director data collector address space only.

SMUI  For Autonomics Director server address space only.

The OWNER parameter acts as a filter to help you select the user exit types that you want to display. For example, you could specify NAME(*)&
OWNER(SMUI) to display all of the Autonomics Director server-defined exit routines in the UI address space. If OWNER is omitted, then both BPE and component user exits can be displayed (depending on the exits specified on NAME).

SHOW(attribute)
An optional parameter that specifies the attributes that you want to display about the requested user exits.

When you display information about user exits, each row of display output contains the requested attributes for one user exit module, in columns. Every display for user exits contains the columns labeled EXITTYPE (the type of the exit), and MODULE (the load module name of the exit). Additionally, any of the following attributes can be requested by using the SHOW parameter:

**ABENDS**
The number of abends that have occurred in the user exit module since the last user exit refresh of that module (or since address space initialization if no refreshes have been done). BPE keeps track of the number of abends that have occurred in each user exit module. When this number reaches the number that is defined on the ABLIM= parameter of the EXITDEF statement for the exit’s type, BPE stops calling the module. If the user exit module is refreshed, this count is reset to zero, and BPE calls the module again.

If the abend limit (ABLIM) value is not zero, and if the number of abends is greater than or equal to the abend limit value, then the user exit has reached its abend limit, and is no longer being called by BPE.

The maximum value that can be displayed in this field is 2147483647 (2^{31}-1). If the abend count exceeds this value, 2147483647 is displayed.

**ABLIM**
The abend limit count for the user exit type, as specified on the ABLIM= parameter on the EXITDEF statement for the user exit type in the BPE exit list PROCLIB member. This is the number of times the user exit module is allowed to abend before BPE stops calling the user exit. A value of 0 indicates that there is no abend limit.

The maximum value that can be displayed in this field is 2147483647 (2^{31}-1). If the abend limit count exceeds this value, 2147483647 is displayed.

**ACTIVE**
The number of currently active instances of the user exit routine. This is a point-in-time number that represents the number of calls to the user exit routine that have not yet returned.
The maximum value that can be displayed in this field is 999999. If the active count exceeds this value, 999999 is displayed.

**CALLS**
The number of calls to the user exit routine since the last user exit routine refresh.

For performance reasons, serialization is not obtained when BPE collects this number. For an exit type that can run multiple instances in parallel, this number should be considered an approximation only.

The maximum value that can be displayed in this field is 2147483647 ($2^{31}-1$). If the call count exceeds this value, 2147483647 is displayed.

**ENTRYPT**
The entry point address of the user exit module.

**ETIME**
The total (cumulative) elapsed time that was spent in the exit module since it was last refreshed, in milliseconds.

For performance reasons, serialization is not obtained when BPE collects this number. For an exit routine type that can run multiple instances in parallel, this number should be considered an approximation only.

The maximum value that can be displayed in this field is 2147483647 ($2^{31}-1$). If the elapsed number of milliseconds exceeds this value, 2147483647 is displayed.

**LOADPT**
The load point address of the user exit module.

**OWNER**
The IMS component that owns the user exit routine type. BPE-owned user exit routine types are system exit routine types, and exist in all IMS component address spaces that use BPE. User exit routine types that are specific to the component show the 1- to 4-character component identifier in this column (for example, SMUI).

**RTIME**
The refresh time of the user exit module. This is the local date and time that the user exit module was last refreshed (or initially loaded, if no refreshes have been done). The format of this output field is:

```
yyyy-mm-dd hh:mm:ss.th
```

**SIZE**
The size of the user exit load module, in bytes (displayed in hexadecimal).

**TEXT**
27 bytes starting from offset +04 from the module’s entry point, translated to EBCDIC, with non-printable characters replaced by periods (.). This is a common location for module identification information. If your user exits contain printable identification data at this point in the module, the TEXT option enables that information to be displayed.
If the SHOW parameter is not specified, the default attributes that are displayed after the EXITTYPE and MODULE are: OWNER, ACTIVE, and ABENDS.

The order in which you list the attributes on the SHOW parameter has no effect on the order the attributes are displayed. BPE determines the order of the attribute columns in the display output. This order is as follows:

- OWNER
- ACTIVE
- ABENDS
- ABLIM
- CALLS
- ETIME
- RTIME
- ENTRYP
- LOADPT
- SIZE
- TEXT

**Important:** It is possible to request so many attributes that the length of the output line is too long to display with a WTO. If this occurs, the command is processed, but some lines might be truncated. The maximum line length that BPE displays is 126 characters.

**DISPLAY USEREXIT command output:**

The DISPLAY USEREXIT command output consists of a header line, one line per user exit module about which information is being displayed, and one message BPE0032I line that indicates that the command has completed.

For example, the command:

```
F UI,DISPLAY USEREXIT NAME(EXCEPTNS)
```

returns the following output:

```
BPE0030I EXITTYPE MODULE OWNER ACTIVE ABENDS
BPE0000I IAVUEXXT SMUI 0 0
BPE0032I DISPLAY USEREXIT COMMAND COMPLETED
```

The EXITTYPE and MODULE columns are present for all DISPLAY USEREXIT commands, regardless of what is specified on SHOW. When multiple exit modules are listed for a single user exit routine type, the order in which they are listed is the order in which they are called.

**Command example 1:**

This example displays the number of calls to, the elapsed time spent in, and the abend limit for all SMUI user exit routine types.

**Command:**

```
F UI,DIS USRX NAME(*) OWNER(SMUI) SHOW(CALLS,ETIME,ABLIM)
```

**Output:**
REFRESH USEREXIT command

The REFRESH USEREXIT command requests that BPE reprocess the user exit routine PROCLIB members that are specified in the BPE configuration PROCLIB member, and reloads the user exit routine modules that are currently listed in the user exit PROCLIB members for the types that are specified on the command.

This command enables you to make updates to your user exit routines without stopping and restarting the address space.

When you enter the command, BPE performs the following processing:

• Reads any user exit PROCLIB members that are specified on EXITMBR= statements in the BPE configuration PROCLIB member. Because BPE re-reads these members at the time you issue the command, you can edit the user exit
PROCLIB members prior to issuing the REFRESH command and make changes to the user exit definitions. BPE does not re-read the main BPE configuration PROCLIB member, so you cannot change the names of the user exit routine PROCLIB members; you can change only their contents.

- Loads the user exit routine modules that are specified on the EXITDEF= statements for the user exit routine types that are specified on the command.
- Quiesces all current user exit routines. The command waits for any active exit routines to complete processing, and delays any new calls to the current exit routines. This ensures that no user exit routine is running while the exit routine is being refreshed.
- Replaces pointers to the previous user exit modules with pointers to the newly loaded modules in internal BPE control blocks, which are used to manage the calling of the exit routines.
- Resumes the user exit routines and allows calls to be made to the newly loaded exit routines.
- Deletes the old copy of the user exit routines.

BPE loads the new copies of the user exit modules before deleting the old modules. If an error occurs during this process (for instance, a module could not be loaded or BPE internal control block storage could not be obtained), BPE will fail the command and leave the old copies of the user exits in effect. All modules of the specified user exit routine types must be loaded successfully for the command to complete successfully.

When a user exit module is refreshed, its abend count is reset to zero. In this case, a user exit module that had reached its abend limit (as specified by the ABLIM parameter on the EXITDEF statement) was no longer being called by BPE.

**Important:** If you changed the ABLIM parameter for a user exit routine in the PROCLIB member, the new value of ABLIM takes effect after the refresh command.

**Considerations for refreshing user exit routines**

When you are refreshing user exit routines, be aware of the following considerations.

- When you refresh a user exit routine type, BPE reloads all exit routine modules that are defined for that type. The new copies of the modules will be at a different virtual address than the old copies. If your modules are re-entrant, no problems should occur. However, if your modules are not re-entrant and they store data within themselves, they must be able to tolerate being reloaded and losing the information that was previously stored within them.
  **Recommendation:** Code and link-edit all user exit routine modules as re-entrant.
- If you refresh a user exit routine module that had previously been loaded, BPE continues to pass the same static work area that the previous copy of the module had been using. If the new version of the module has a different mapping or use of this area than the previous version, the new version must contain toleration code that can handle the old-style formatted data within this static work area.
  **Recommendation:** Place a version number in the static work area so that your exit routines are able to determine when they are using a back-level data structure within this work area.
- If you remove a user exit routine module from an EXITDEF list and refresh the exit routines, BPE deletes the static work area that is associated with that exit...
routine module. If you later add the module back to the EXITDEF list and refresh the exit routines, the module gets a new (cleared) static work area, not the work area it had previously.

- If your user exit routines are being managed by LLA by using VLF (or an equivalent product), you must ensure that the copies of the modules that are being refreshed are updated in LLA prior to issuing the REFRESH USEREXIT command. See the z/OS MVS Initialization and Tuning Reference for information about LLA-managed libraries.

- If you have user exit routines that issue MVS WAITs for long periods of time (for example, a WAIT for an external event that might be delayed, such as a WTOR), issuing a REFRESH USEREXIT command can cause a performance problem or work stoppage. This problem results because BPE must quiesce the user exit routines to process the REFRESH command. BPE must wait until all of the currently called user exit routines complete before it can perform the user exit routine refresh. BPE prevents any new calls to user exit routines until after the command completes. If a user exit routine has been called and does not return to BPE for a long period of time, the REFRESH command is delayed until the exit routine returns. No other user exit routines can be called while BPE is waiting, so the processes that are invoking the user exit routines are also put into a wait.

**Recommendation:** Ensure that your user exit routines avoid long WAITs, and avoid issuing services that might WAIT.

**Format of REFRESH USEREXIT command**

Use the REFRESH USEREXIT command by following its syntax format.

```
REFRESH USEREXIT NAME(user_exit_type_name)
```

**Usage of REFRESH USEREXIT command**

Use the REFRESH USEREXIT command according to its usage rules.

**REFRESH | REF**

A required parameter that specifies that the action against the specified resources is to refresh the resources.

**USEREXIT | USRX**

A required parameter that specifies that the resource type that is being acted upon is a BPE-managed user exit routine type.

**NAME(user_exit_type_name)**

A required parameter that specifies the name of the user exit type or types that you want to refresh. You can specify a single user exit type name or a list of user exit type names separated by commas. User exit routine type names can contain wildcard characters.

**Important:** The names that are specified in this parameter are the names of user exit routine types, not the names of individual user exit routine modules.

User exit routine types are defined in the Autonomics Director server address space, as specified by OWNER(SMUI), and include the following types:
EXCEPTNS
User exceptions exit routine

SECURITY
User security exit routine

OWNER(BPE|SMDC|SMUI)
An optional parameter that specifies the owner of the user exit routine
type or types that you want to refresh. You can specify one of the
following values:

BPE  For all IMS components that are running in a BPE address space.
No BPE user exit routine types are defined at this time.

SMDC  For data collector address space.

SMUI  For Autonomics Director server address space.

The OWNER parameter acts as a filter to help you select the user exit
types that you want to refresh. For example, you can specify NAME(*)
OWNER(SMUI) to refresh all of the Autonomics Director UI-defined user exit
type in the UI address space. If OWNER is omitted, both BPE and
component user exit routines can be refreshed (depending on the exits
specified on NAME).

REFRESH USEREXIT command output:

The REFRESH USEREXIT command output consists of message BPE0032I that
indicates that the command has completed.

An example of the REFRESH USEREXIT command output message is:
BPE0032I REFRESH USEREXIT COMMAND COMPLETED

Command example 1:

This example refreshes all user exit routine modules.

Command:
F UI,REFRESH USEREXIT NAME(*)

Output:
BPE0032I REFRESH USEREXIT COMMAND COMPLETED

Command example 2:

This example refreshes the Autonomics Director server user exceptions exit routine.

Command:
F UI,REF USRX NAME(EXCEPTNS)

Output:
BPE0032I REFRESH USEREXIT COMMAND COMPLETED
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