IBM IMS Database Solution Pack for z/OS
Version 2 Release 1

Overview and Customization

IBM
Fifth Edition (March 2016)

This edition applies to Version 2 Release 1 of IBM IMS Database Solution Pack for z/OS (program number 5655-DSP) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this information

IBM® IMS™ Database Solution Pack for z/OS® (also referred to as IMS Database Solution Pack) is a product that combines a number of IBM products into a consolidated solution that provides a set of complete and efficient management utilities for IMS full-function databases and High Availability Large Databases (HALDBs).

IMS Database Solution Pack combines the following products into a single offering:
• IBM IMS Database Reorganization Expert for z/OS
• IBM IMS Database Solution Pack for z/OS IMS Online Reorganization Facility
• IBM IMS Database Solution Pack for z/OS IMS High Availability Large Database (HALDB) Toolkit
• IBM IMS High Performance Unload for z/OS
• IBM IMS High Performance Load for z/OS
• IBM IMS High Performance Prefix Resolution for z/OS
• IBM IMS Index Builder for z/OS
• IBM IMS High Performance Image Copy for z/OS
• IBM IMS High Performance Pointer Checker for z/OS
• IBM IMS Library Integrity Utilities for z/OS

IMS Database Solution Pack also includes Database Repair Facility and Database Sensor.

These topics provide an overview of the products and capabilities delivered with IMS Database Solution Pack as well as some common usage scenarios to help you understand the capabilities of the product. It also includes post-SMP/E installation instructions and customization instructions which must be performed before these products can be used.

These topics are designed to help database administrators, system programmers, application programmers, and system operators perform the following tasks:
• Understand the capabilities of the functions associated with IMS Database Solution Pack
• Plan for the installation of IMS Database Solution Pack
• Migrate from previous releases of the tools that comprise IMS Database Solution Pack
• Perform the post-SMP/E installation of IMS Database Solution Pack
• Customize IMS Database Solution Pack

Before using this product, you should understand basic IMS concepts.

To use these topics, you should have a working knowledge of:
• The z/OS operating system
• ISPF
• SMP/E
Always check the IMS Tools Product Documentation page for the most current version of this information:

Chapter 1. IMS Database Solution Pack for z/OS overview

IBM IMS Database Solution Pack for z/OS (also referred to as IMS Database Solution Pack) combines data management tools to provide all the capabilities you need to manage your IMS full-function databases and High Availability Large Databases (HALDBs).

IMS Database Solution Pack is specifically designed to provide database administrators (DBAs) with smart solutions to database operation and maintenance tasks.

Topics:
• “What’s new in IMS Database Solution Pack” on page 2
• “What is IMS Database Solution Pack?” on page 5
• “Tools in IMS Database Solution Pack” on page 8
• “Benefits” on page 20
• “Installation requirements” on page 22
• “Product publications” on page 26
• “Service updates and support information” on page 27
• “IMS Database Solution Pack documentation and updates” on page 28
• “Accessibility features” on page 30
What's new in IMS Database Solution Pack

In addition to the tools and functions included in IMS Database Solution Pack Version 1, IMS Database Solution Pack Version 2 Release 1 supports functions for online database reorganization and HALDB management.

Subtopics:
- “Functional changes”
- “Documentation changes” on page 3

Functional changes

With the addition of online database reorganization, HALDB management, and other new functions, IMS Database Solution Pack further simplifies database management tasks for IMS full-function databases and HALDBs.

Consolidation of IBM IMS Online Reorganization Facility for z/OS

IMS Online Reorganization Facility enables the reorganization of IMS full-function databases and HALDBs. It provides users with full access to the database during data reorganization, helps to improve the overall database availability, and can prevent or significantly reduce planned downtime.

All the functions and features of IMS Online Reorganization Facility for z/OS, Version 1 Release 3, are available in IMS Database Solution Pack. In addition, IMS Online Reorganization Facility of IMS Database Solution Pack supports additional reorganization features such as the conditional reorganization capability.

Consolidation of IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS

IMS HALDB Toolkit provides features to improve the management and operation of the IMS HALDB environment.

IMS Database Solution Pack Version 2 Release 1 includes the functions and features that replace IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS, Version 3 Release 2.

New release of IMS Library Integrity Utilities

The new release of IMS Library Integrity Utilities, Version 2 Release 2, is included. This new release provides the new Multiple Resource Checker utility. You can use this utility to check the consistency of DBD and PSB definitions in the RECON data sets, in the DBD, PSB, and ACB libraries, and to report differences between RECON data sets.

DBD/PSB Map Viewer support

Adds the DBD Map Viewer capability to Tools Base Administration Console and the DBD/PSB Map Viewer capability to Management Console. The DBD Map Viewer and the DBD/PSB Map Viewer are extensions provided by IMS Library Integrity Utilities. With Management Console, you can use the DBD/PSB Map Viewer to view a graphical visualization of a database structure map, program specifications, DBD and PSB macro source, and DBD and PSB XML document. You can also use the cross reference feature to list logical DBDs and PSBs that refer to a specific DBD.

IMS database group-managed reorganization support

Working with Autonomics Director, IMS Database Solution Pack supports IMS database group-managed reorganization. IMS database
group-managed reorganization helps to define a database group to be
reorganized as a single unit. This feature is especially useful when the
group contains databases with external logical relationships.

Option to include PSINDEXes when reorganizing HALDBs
An option is provided to include HALDB partitioned secondary indexes
(PSINDEXes) when the HALDB primary database (PHDAM or PHIDAM)
is being reorganized. This option is supported in IMS High Performance
Load, IMS Index Builder, and IMS Database Reorganization Expert.

Documentation changes

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

SC19-4007-04 (March 2016)
• Information to support Tools Base APAR PI55325 has been added. The
IMS Tools Setup function of Tools Base helps you quickly and efficiently
perform the required post-SMP/E-installation customization process. You
can use this function after an initial installation of IMS Database Solution
Pack. For more information, see Chapter 5, “Initial product
customization using IMS Tools Setup,” on page 57.
• To support the new capabilities of the DBD/PSB Map Viewer for
Management Console, information in the following topics has been
updated (APAR PI50732):
  – “IBM IMS Library Integrity Utilities for z/OS” on page 16
  – “Aggregate information about database resources on a graphical user
    interface” on page 39
  – “Setting up the DBD/PSB Map Viewer for Management Console” on
    page 136
• Information to support the conditional reorganization capability of IMS
Online Reorganization Facility has been added to the following topics:
  – “IMS Online Reorganization Facility” on page 8
  – “Installation requirements” on page 22
  – “Monitor database space utilization” on page 32
  – “Configuring Tools Base Version 1 Release 4” on page 61
  – “Configuring Tools Base Version 1 Release 5 or later” on page 73
• Member names for installing and uninstalling IMS Library Integrity
Utilities extension have been updated from FABLIINS to HPSAIINS and
FABLIUNI to HPSAIUNI. These changes are made to the following
topics:
  – For Management Console, “Installing the DBD/PSB Map Viewer on
    z/OS” on page 137
  – For Administration Console, “Installing the DBD Map Viewer on
    z/OS” on page 143

SC19-4007-03 (December 2014)
Revised the instructions to install and configure the IMS Library Integrity
Utilities extension (DBD Map Viewer).
• For Management Console, “Installing the DBD/PSB Map Viewer on
  Windows” on page 136 and “Installing the DBD/PSB Map Viewer on
  z/OS” on page 137.
- For Administration Console, "Installing the DBD Map Viewer on Windows" on page 142 and "Installing the DBD Map Viewer on z/OS" on page 143.

**SC19-4007-02 (October 2014)**

- To support APAR PI24201, added description of sample skeleton JCL for Database Sensor in "Updating the required sample members in the SHPSSAMP library" on page 88.
- To support IBM Tools Base Version 1 Release 5 and IBM Management Console for IMS and DB2® for z/OS, added or updated the following topics:
  - "Installation requirements" on page 22
  - "Installing Management Console" on page 49
  - "Configuring Tools Base Version 1 Release 5 or later" on page 73
  - "Configuring Management Console" on page 77
  - "Setting up the DBD/PSB Map Viewer for Management Console" on page 136.
- Revised "Configuring Tools Base Version 1 Release 4" on page 61 to clarify which Tools Base components must be configured.

**SC19-4007-01 (March 2014)**

- Added library names for the IVP job and sample JCL jobs. For more information, see "Verifying the installation" on page 56.
- Added information about installing the IMS Library Integrity Utilities extension (DBD Map Viewer). For more information, see "Setting up the DBD Map Viewer for Administration Console" on page 142.
What is IMS Database Solution Pack?

IMS is IBM’s premier transaction and hierarchical database management system. It is the product-of-choice for critical online operational applications and data in which support for high availability, performance, capacity, integrity, and low cost are key requirements. IMS manages the world’s most mission-critical data and is integral to today’s resurgence of mainframe usage.

The total cost of ownership (TCO) of any database management system (DBMS) is comprised of more than software and hardware costs. To determine the total cost, you must factor in scalability, reliability, systems management, the cost of database professionals to program, support, and administer the DBMS, and the cost of the computing resources that are required to operate the DBMS.

IBM IMS Tools further lower IMS’s TCO by enabling personnel who have less IMS and mainframe experience to perform common tasks, while freeing more experienced personnel to focus on complex or strategic tasks. All these benefits can be realized by implementing IBM’s IMS Database Solution Pack.

IMS Database Solution Pack provides an effective and efficient approach for managing IMS full-function databases and HALDBs quickly and accurately. IMS Database Solution Pack can contribute to reducing the overall total cost of ownership of IMS and, in turn, improve the return on investment (ROI).

IMS Database Solution Pack provides the following solutions to simplify management of IMS databases:

- A database monitoring solution that helps to keep databases in optimal condition by automating database monitoring tasks.
- A database reorganization solution that supports two reorganization capabilities. The online reorganization capability shortens database downtime, and the smart reorganization capability automates database reorganization.
- A database optimization solution that helps DBAs analyze IMS databases and build the most effective database organization and definition.

With these solutions and other capabilities, IMS Database Solution Pack covers the entire process of database administration tasks.

Subsections:

- “Database monitoring solution”
- “Database reorganization solution” on page 6
- “Database optimization solution” on page 7

Database monitoring solution

Highly skilled IT resources are vital for keeping databases in optimal condition. Competitive businesses cannot afford for their best people to be tied up with repetitive database maintenance tasks.

The database monitoring solution is the key to autonomic database administration that not only lightens DBAs’ work load but also keeps databases safe. The database monitoring solution of IMS Database Solution Pack helps your DBAs better manage your databases.
Automating database monitoring
DBAs assess database conditions by analyzing various reports that are generated by the tools or programs used in their workshops.

With IMS Database Solution Pack’s database monitoring solution, database statistics are collected automatically during DBA’s daily or weekly operations, and are accumulated in a repository. The accumulated statistics are automatically evaluated from various perspectives, and DBAs are alerted if databases are in exceptional conditions. When database reorganization is needed, reorganization tasks are automatically scheduled.

Viewing database conditions graphically
Database trends are an important factor in making database maintenance and migration plans for optimal database performance. However, DBAs require time, skill, knowledge, and experience to track the trends of databases, assess database statistics, and maintain historical data.

With IMS Database Solution Pack’s database monitoring solution, DBAs can use web browsers to view interactive charts that show historical data and database trends. Through this graphical web interface, DBAs can also view the structure and the source code of the databases.

This graphical web interface helps DBAs acknowledge the database conditions at a glance. Less experienced DBAs can also use the interface to learn the structure and relationships between databases.

The database monitoring solution relieves the day-to-day burden of collecting, analyzing, and managing statistics by automating the monitoring of database health.

Database reorganization solution
Keeping IMS databases reorganized helps ensure that your IMS applications perform at their optimal levels. IMS Database Solution Pack can help reduce the time that is required to keep databases in top condition, while enhancing DBAs’ ability to manage IMS databases.

The database reorganization solution reduces the amount of time databases are unavailable by supporting an efficient reorganization process, and helps your DBAs reorganize databases quickly without affecting IMS transactions and applications.

The database reorganization solution covers all the necessary reorganization procedures (unload, reload, prefix resolution, prefix update, secondary index building, pointer checking, and image copy), improves DBA productivity through a single-step reorganization process, and eliminates the need for operator intervention after a reorganization finishes.

IMS Database Solution Pack supports two capabilities for database reorganization: online reorganization and offline reorganization.

Online reorganization capability that keeps downtime to a minimum
Many businesses are moving toward 24x7 operations; to do so, key databases must be available around the clock. Taking systems offline for maintenance can affect your business. In today’s market, systems must be highly available because the cost of outages can be high.

The online reorganization capability provides users with full access to the database during data reorganization, improves overall database availability,
and prevents or significantly reduces planned downtime. DBAs can schedule the reorganization of online databases by predefining an online reorganization window. Scheduling saves DBA resources and increases database availability.

Smart reorganization capability for automation
The smart reorganization capability provides an integrated database reorganization infrastructure for IMS databases. It analyzes databases, evaluates database statuses against policies, and, when necessary, reorganizes databases automatically.

With this capability, DBAs can:
• Achieve fast database reorganization without manual intervention.
• Detect database problems before they negatively affect business.
• Customize and define policies to ensure that each database continues to satisfy its business requirements.
• Easily access all the resources they need from central repositories.

The smart reorganization capability provides an end-to-end database reorganization solution for DBAs.

Database optimization solution
IMS databases are increasing in size to accommodate regulatory compliance requirements and because businesses are serving more customers and using more suppliers. For optimal performance, you need to tune up or expand the structure of databases. Changing database structures require high-level IMS database skills, and involves large work loads and many other tasks.

The database optimization solution of IMS Database Solution Pack handles complex DBA tasks during different phases. This solution recommends the most effective database configuration and provides tuning methods. It also helps to keep your databases optimized for performance and enables DBAs to migrate your databases quickly by allowing them to do complex tasks with small work load.

For example, the HALDB management tool provided in IMS Database Solution Pack helps you reduce administrative costs by providing a range of services to augment the operation and ease the administration of the HALDB environment. This tool can help reduce the time and minimize the skills required to perform application support tasks and provides HALDB maintenance, modeling, and analysis capabilities.

The tool performs a diagnostic test against a HALDB and proposes or re-creates optimized partition structures. It helps to convert your IMS full-function database to a HALDB with suitable partition structures.
Tools in IMS Database Solution Pack

IMS Database Solution Pack combines IMS Tools products into a single solution to provide an effective and efficient approach for managing your IMS full-function databases and HALDBs quickly and accurately.

The following tools are included in IMS Database Solution Pack but are shipped in separate target and distribution libraries:

- IBM IMS Database Reorganization Expert for z/OS
- IBM IMS High Performance Unload for z/OS
- IBM IMS High Performance Load for z/OS
- IBM IMS High Performance Prefix Resolution for z/OS
- IBM IMS Index Builder for z/OS
- IBM IMS High Performance Image Copy for z/OS
- IBM IMS High Performance Pointer Checker for z/OS
- IBM IMS Library Integrity Utilities for z/OS

IMS Database Solution Pack also includes the functions and features that replace the following products:

- IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS, Version 3 Release 2
- IBM IMS Online Reorganization Facility for z/OS, Version 1 Release 3

In addition, IMS Database Solution Pack includes the following functions:

- Database Sensor
- Database Repair Facility

**IMS Online Reorganization Facility**

IMS Online Reorganization Facility performs a one-step reorganization of IMS databases with minimal database availability impact.

Taking systems offline for maintenance can affect business. In today’s market, systems must be highly available because the cost of outages can be too high. IMS Online Reorganization Facility enables online data reorganization, which provides users with full access to the database during a data reorganization, improves the overall database availability, and reduces planned downtime. IMS Online Reorganization Facility supports internal logical relationships, secondary indexes, and HALDBs.

To learn more about IMS Online Reorganization Facility, see the *IMS Database Solution Pack IMS Online Reorganization Facility User’s Guide*.

**Integration with other IMS Tools**

IMS Online Reorganization Facility can reorganize a database by using the unload and load utilities that are provided by IMS. However, reorganization becomes faster if IMS HP Unload and IMS HP Load are used instead of the IMS utilities. Also, other tools of IMS Database Solution Pack provide additional features for database reorganization. For example, the following tools can be called by IMS Online Reorganization Facility:

- IMS Database Reorganization Expert to enable conditional reorganization based on reorganization policy evaluation
• IMS HP Prefix Resolution to resolve and update prefixes of databases that are involved in logical relationships
• IMS HP Image Copy to create image copies of reorganized databases
• IMS HP Pointer Checker to check database pointers during reorganization
• IMS Library Integrity Utilities to print hierarchy diagram of the database

The following figure shows IMS Online Reorganization Facility integration with other IMS tools and components.

Figure 1. IMS Online Reorganization Facility integration

**IMS High Availability Large Database Toolkit**

IMS High Availability Large Database Toolkit (also referred to as IMS HALDB Toolkit) provides High Availability Large Database (HALDB) functions that can be used for HALDB maintenance and operation tasks.

Features of IMS HALDB Toolkit include application enabling functions and system utilities to make better use of the HALDB environment. IMS HALDB Toolkit can help reduce the time and minimize the skills that are required to perform application support tasks and provide IMS HALDB maintenance, modeling, and analysis.

To learn more about IMS HALDB Toolkit, see the *IMS Database Solution Pack IMS HALDB Toolkit User’s Guide*.
Integration with other IMS Tools

IMS HALDB Toolkit performs maintenance tasks on a database by using the utilities that are provided by IMS. However, using IMS tools that are provided in IMS Database Solution Pack adds additional features to simplify the maintenance tasks. The following tools can be called by IMS HALDB Toolkit:

- IMS Online Reorganization Facility to perform “near online” operation when maintaining partitions (splitting or consolidating HALDB partitions) or converting to a HALDB from a full-function database
- IMS HP Load for faster reload
- IMS HP Image Copy to create image copies of HALDBs
- IMS HP Pointer Checker to check database pointers in HALDBs
- IMS Library Integrity Utilities to print hierarchy diagram of the database

The following figure shows IMS HALDB Toolkit integration with other IMS tools and components.

Figure 2. IMS HALDB Toolkit integration

IBM IMS Database Reorganization Expert for z/OS

IBM IMS Database Reorganization Expert for z/OS (also referred to as IMS Database Reorganization Expert) facilitates your reorganization scenario by releasing you from the complex database diagnosis tasks that are needed to acknowledge the database health.

When a database is diagnosed to be in need of reorganization, the product automatically runs the reorganization job, and you will receive a well-summarized report on the database status. By using IMS Database Reorganization Expert, you can reduce the amount of work and expertise that is required for database reorganization tasks and realize higher productivity with less maintenance time and training costs.

To learn more about IMS Database Reorganization Expert, see the IMS Database Reorganization Expert User’s Guide.
Integration with other IMS Tools

IMS Database Reorganization Expert uses IMS HPUnload and IMS HP Load to reorganize a database. Therefore, these tools must be installed together with IMS Database Reorganization Expert. Optionally, IMS Database Reorganization Expert can call the following tools of IMS Database Solution Pack to simplify reorganization tasks:

- IMS Index Builder to build indexes after database reorganization
- IMS HP Prefix Resolution to resolve and update prefixes of databases that are involved in logical relationships
- IMS HP Image Copy to create image copies of reorganized databases
- IMS HP Pointer Checker to check database pointers during reorganization
- IMS Library Integrity Utilities to print hierarchy diagram of the database
- Database Sensor to collect sensor data for monitoring and maintaining the health of the database

The following figure shows IMS Database Reorganization Expert integration with other IMS tools and components.

Figure 3. IMS Database Reorganization Expert integration
IBM IMS High Performance Unload for z/OS

IBM IMS High Performance Unload for z/OS (also referred to as IMS HP Unload) provides high-speed unloading of IMS databases and improves performance of IMS data retrieval application programs by using the Unload application programming interface (API).

As processing volumes increase, more work needs to be done in a shorter period of time due to shrinking batch windows. The tool saves your time and money by reducing the CPU and elapsed time required for IMS database unloading and for running IMS data retrieval application programs. Powerful functions such as the ability to continue processing after a pointer error, a user exit facility, and a variety of unloaded record formats are provided—all with the goal of improving availability and throughput.

To learn more about IMS HP Unload, see the IMS High Performance Unload User’s Guide.

Integration with other IMS Tools

IMS HP Unload is designed for use with the IMS Database Reorganization Expert and IMS Online Reorganization Facility along with other high-performance IMS Tools products to provide the most efficient and powerful end-to-end solution for IMS database reorganization.

IMS HP Unload can also be used as a stand-alone tool to provide high-speed database unloading.

IBM IMS High Performance Load for z/OS

IBM IMS High Performance Load for z/OS (also referred to as IMS HP Load) provides high-speed loading of IMS databases and improves the performance of IMS database initial loading application programs by using the Load Application Programming Interface (API).

As processing volumes increase, more work needs to be done in a shorter period of time due to shrinking batch windows. This tool saves you time and money by reducing the CPU and elapsed time that is required for IMS database loading and reorganization.

To learn more about IMS HP Load, see the IMS High Performance Load User’s Guide.

Integration with other IMS Tools

IMS HP Load is designed for use with the IMS Database Reorganization Expert and IMS Online Reorganization Facility along with other high-performance IMS Tools products to provide the most efficient and powerful end-to-end solution for IMS database reorganization.

IMS HP Load can be used as a stand-alone tool to provide high-speed database loading. It can also be called from IMS HALDB Toolkit to achieve faster database load in HALDB maintenance tasks.

IBM IMS High Performance Prefix Resolution for z/OS

IBM IMS High Performance Prefix Resolution for z/OS (also referred to as IMS HP Prefix Resolution) simplifies the management of IMS database environments by
concurrently performing, in a single job step, the resolution and updating of pointers for logically related databases. These are must do tasks in order to correctly maintain any IMS database that is involved in logical relationships and has been loaded or reorganized.

Compared to the similar functions provided by the IMS utilities, which run these tasks in multiple job steps, IMS HP Prefix Resolution enables you to accomplish these tasks in a considerably easier and faster way by simplifying the job steps and eliminating the use of specific resources. With these advanced features, IMS HP Prefix Resolution facilitates and speeds up the tasks of database administrators (DBAs) and, enhances the availability of your system and human resources.

To learn more about IMS HP Prefix Resolution, see the *IMS High Performance Prefix Resolution User’s Guide*.

**Integration with other IMS Tools**

IMS HP Prefix Resolution can be used as a stand-alone tool, or it can be called by IMS Database Reorganization Expert and IMS Online Reorganization Facility during database reorganization. When IMS HP Prefix Resolution is called in a database reorganization job, it resolves and updates prefixes of databases that are involved in logical relationships after the database is reorganized.

**IBM IMS Index Builder for z/OS**

IBM IMS Index Builder for z/OS (also referred to as IMS Index Builder) provides improved technology for the recovery, maintenance, and addition of IMS indexes and eliminates the need to image copy index data sets for recovery and backup purposes.

IMS Index Builder allows you to rebuild IMS indexes rather than recover or reorganize them using the traditional unload and reload processes used for the primary data store. This eliminates the need to image copy indexes, means faster recovery and reorganization times, and allows for adding new indexes quickly without the need to reorganize the primary databases. IMS Index Builder provides an easy-to-use, one-step procedure for building all IMS index types including primary, secondary, and indirect list data sets.

To learn more about IMS Index Builder, see the *IMS Index Builder User’s Guide*.

**Integration with other IMS Tools**

IMS Index Builder can be used as a stand-alone tool or it can be called by IMS Database Reorganization Expert.

The following figure shows IMS Index Builder integration with other IMS tools and components.
IBM IMS High Performance Image Copy for z/OS

IBM IMS High Performance Image Copy for z/OS (also referred to as IMS HP Image Copy) enables you to quickly back up and recover database data sets by providing support for advanced copying features.

Using image copies to create backup data is essential to the timely recovery of databases after a loss of data or a programming error. However, taking data offline can reduce user productivity and negatively impact your business. IMS HP Image Copy provides rapid image copy features that reduce the amount of time that database data sets are unavailable. These features enable automated operation that takes the database offline before taking a batch image copy and restarts it after the process. IMS HP Image Copy helps you speed recovery time by supporting quick copy and restarting methods, and allows your users to become more productive and avoid expensive losses from missed business opportunities.

To learn more about IMS HP Image Copy, see the *IMS High Performance Image Copy User’s Guide.*

Integration with other IMS Tools

The Image Copy function of IMS HP Image Copy integrates with many IMS tools. For example, you can have the Image Copy function activated within a reorganization job to create an image copy of the reorganized database. Also, the Image Copy function can internally call the database pointer check process of IMS HP Pointer Checker and the sensor data collection process of Database Sensor.

The following figure shows IMS HP Image Copy integration with other IMS tools and components.
IBM IMS High Performance Pointer Checker for z/OS

IBM IMS High Performance Pointer Checker for z/OS (also referred to as IMS HP Pointer Checker) provides a number of utilities designed to help ensure IMS databases are operational, tuned, repaired, and ready for use.

The product reports space utilization, and detects and reports physical and logical direct pointer problems in IMS full-function databases. These reports pinpoint both the errors and their locations within the database. Data is also collected for analysis and report by several utilities provided by this product.

To learn more about IMS HP Pointer Checker, see the IMS High Performance Pointer Checker User’s Guide.
Integration with other IMS Tools

The database pointer check process of IMS HP Pointer Checker can be run in a stand-alone HD Pointer Checker job or be called from IMS HP Image Copy. IMS HP Pointer Checker can call the sensor data collection process of Database Sensor to collect sensor data.

The following figure shows IMS HP Pointer Checker integration with other IMS tools and components.

*Figure 6. IMS HP Pointer Checker integration*

**IBM IMS Library Integrity Utilities for z/OS**

IBM IMS Library Integrity Utilities for z/OS (also referred to as IMS Library Integrity Utilities) provides a set of utilities designed to validate, compare, map, recover, report, and regenerate a number of IMS libraries needed for operations.
Supported libraries include the ACB (application control block), DBD (database description), PSB (program specification block), MFS (Message Format Services) libraries, and RECON (recovery control) data sets. The utilities are used in conjunction with database maintenance tasks and migration operations, and to prevent accidental misuse in production.

To learn more about IMS Library Integrity Utilities, see the *IMS Library Integrity Utilities User’s Guide*.

IMS Library Integrity Utilities also provides the DBD/PSB Map Viewer, which is an IMS Library Integrity Utilities extension for Tools Base Administration Console and Management Console. The DBD/PSB Map Viewer displays graphical visualization of a database structure map, program specifications, DBD and PSB macro source, and DBD and PSB XML document. You can also use the cross reference feature to list logical DBDs and PSBs that refer to a specific DBD.

### Integration with other IMS Tools

IMS Library Integrity Utilities provides many utilities for maintaining IMS libraries. All the utilities are used as stand-alone utilities. However, the DBD/PSB/ACB Mapper utility can be called in IMS Database Reorganization Expert jobs, IMS Online Reorganization Facility jobs, and IMS HALDB Toolkit jobs to print database hierarchy.

The DMB verification function of the Integrity Checker utility uses RDEs (registered DMB entries) to prevent database corruptions caused by accidental misuse of ACBs or DBDs. When a DMB verification-enabled database is initially loaded or reorganized by one of the following IMS tools, the Integrity Checker automatically creates an RDE for the database:

- IMS Database Reorganization Expert
- IMS HP Load
- IMS Online Reorganization Facility

All the utilities of IMS Library Integrity Utilities do not support Tools Base. However, the DBD/PSB Map Viewer must be installed to Tools Base Administration Console or Management Console to extend the functionality of Tools Base Administration Console or Management Console.

### Database Sensor

Database Sensor collects statistics about IMS databases and stores them as *sensor data* in the Sensor Data repository of IMS Tools Knowledge Base. Sensor data can be used for monitoring and maintaining the health, performance, and recoverability of the database.

To learn more about Database Sensor, see the *IMS Solution Packs Database Sensor User’s Guide*.

### Integration with other IMS Tools

Database Sensor can be run as a stand-alone job, or can be called in the following utility jobs:

- IMS Database Reorganization Expert
- IMS HP Image Copy
- IMS HP Pointer Checker
You can use Tools Base Administration Console or Management Console to view graphical visualization and charting of sensor data, exceptions that are detected by the policy evaluations, and recommendations for resolving database exceptions.

The following figure shows Database Sensor integration with other IMS tools and components.

![Database Sensor integration diagram]

**Figure 7. Database Sensor integration**

**Database Repair Facility**

Database Repair Facility is a powerful tool to repair VSAM and OSAM organized IMS databases that contain pointer or data errors. It can be run both interactively for VSAM and OSAM data sets or in batch mode for VSAM only data sets that are either IMS and non IMS data sets.

The interactive capabilities of Database Repair Facility let you make the repair in a short time, which means that the affected database need be taken offline only for a brief period. In this way, Database Repair Facility enhances not only the integrity but also the availability of IMS databases.

To learn more about Database Repair Facility, see the *IMS Database Repair Facility for IMS Solution Packs User’s Guide*. 
Integration with other IMS Tools

Database Repair Facility is generally used as a stand-alone tool to repair databases. However, to repair corrupted HALDB partition reorganization numbers and duplicate ILKs in HALDBs, the ILK Repair utility of Database Repair Facility requires output from the HD Pointer Checker utility of IMS HP Pointer Checker.
Benefits

By using IMS Database Solution Pack, you can simplify and accelerate the database maintenance tasks for IMS full-function databases and HALDBs.

IMS Database Solution Pack provides a complete set of tools that help IMS DBAs in every phase of database management. The tools are high performance, easy-to-use, and powerful, and include capabilities for database reorganization, data backup, health check, verification, tuning, monitoring, and optimization of IMS databases.

IMS Database Solution Pack provides the following benefits:

• The high performance reorganization tools can save time and money by reducing the CPU and elapsed time required for IMS database reorganization tasks, and for the IMS database retrieval and initial loading application programs by providing the APIs.
• IMS Online Reorganization Facility reorganizes online databases without affecting IMS transactions and applications.
• IMS Database Reorganization Expert further reduces time and resource requirements by enabling unload, load, index build, and backup tasks to run concurrently, and by eliminating I/Os for intermediate data sets. It also enhances the productivity of DBAs by making the reorganization processes simpler and easier, and by minimizing manual interventions.
• IMS Database Reorganization Expert saves online system resources by evaluating the database with user-specified criteria, and running the reorganization job only when reorganization is determined to be effective for the database.
• IMS Index Builder eliminates the need to image copy and log updates to IMS index data sets by providing a quick and efficient method for rebuilding indexes. It also provides the ability to add new indexes to existing IMS databases as needed.
• IMS HP Image Copy reduces the unavailability time of databases by providing rapid image copy features, parallel processing, and minimized manual interventions. It also reduces operational and media costs by compressing and stacking the image copies.
• IMS HP Pointer Checker helps ensure that your database pointers are error free. Used in conjunction with Database Repair Facility, it helps you detect and correct database errors quickly and repair them with minimum downtime to your IMS environment.
• IMS Library Integrity Utilities enhances the productivity of DBAs by providing utilities that effectively manage IMS ACB, DBD, PSB, MFS libraries, and RECON data sets in database maintenance tasks and migration operations. It also avoids application downtime by preventing database corruption that might occur from accidental misuse of IMS libraries in production.
• With the automated sensor data collection and exception detection that are provided by Autonomics Director and IMS Database Solution Pack, you can save time and resources in monitoring and tuning IMS full-function databases.
• With the graphical web interface that is provided by Administration Console or Management Console, you can analyze your IMS environment to rapidly identify database exceptions and tuning opportunities.
• IMS HALDB Toolkit efficiently diagnoses HALDB structures and suggests effective database structures.
• IMS Library Integrity Utilities provides a graphical view of IMS databases and program specifications through Administration Console and Management Console. Database structures, program specifications, and source code can be reviewed to simplify database administration tasks. The graphical interface can be used as an educational tool for new DBAs to learn about databases.
Installation requirements

The tools that are provided in IMS Database Solution Pack have dependencies on IMS and require the tools provided in IBM Tools Base for z/OS (also referred to as Tools Base).

Installation requirements

IMS Database Solution Pack requires one of the following versions of z/OS:

• z/OS V1.12 (5694-A01) or later
• z/OS V2.1 (5650-ZOS)

In addition, IMS Database Solution Pack requires IBM Tools Base for z/OS, V1.4 (5655-V93) or later.

Operational requirements

An operational requisite is defined as a product that is required and must be present or a product that is not required but should be present on the system in order for this product to operate all or some of its functions.

IMS Database Solution Pack operates with the following IMS versions:

• IMS Version 12 Release 1 (5635-A03)
• IMS Database Value Unit Edition Version 12 Release 1 (5655-DSQ) (with IMS Value Unit Edition PTF UK93908)
• IMS Version 13 Release 1 (5635-A04)
• IMS Database Value Unit Edition Version 13 Release 1 (5655-DSM)
• IMS Version 14 Release 1 (5635-A05)

To use IMS Database Reorganization Expert, IMS High Performance Load and IMS High Performance Unload must be installed.

To use IMS High Performance Pointer Checker, Database Repair Facility must be installed.

Common tool requirements

The following common tools, which are provided in Tools Base, are used by IMS Database Solution Pack:

• Administration Console (included in Tools Base V1.4 only)
• Autonomics Director
• Distributed Access Infrastructure
• IMS Tools Common Services
• IMS Tools Knowledge Base
• Policy Services

These common tools are not distributed with IMS Database Solution Pack but are instead distributed with Tools Base. Tools Base must be installed and configured before IMS Database Solution Pack can be used.
If you use IBM Tools Base for z/OS V1.5 or later and you plan to use the DBD/PSB Map Viewer, which is the IMS Library Integrity Utilities extension to extend the capabilities of Management Console, the following products must be installed:

- IBM Installation Manager for z/OS 1.7.3 or later or IBM Installation Manager for Windows 1.7.3 or later
- IBM Management Console for IMS and DB2 for z/OS

**Conditional operational requirements**

A conditional operational requisite identifies the following products that are not required for the basic function but are needed at run time for the tool to utilize specific functions.

**Table 1. Conditional operational requirements**

<table>
<thead>
<tr>
<th>Tool</th>
<th>Function</th>
<th>Required product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Sensor</td>
<td>Stand-alone Database Sensor function</td>
<td>IMS Database Reorganization Expert</td>
</tr>
<tr>
<td>Database Repair Facility</td>
<td>Process through TSO terminals</td>
<td>The Interactive System Productivity Facility (ISPF), which is included in z/OS</td>
</tr>
<tr>
<td>IMS Online Reorganization Facility</td>
<td>Online reorganization</td>
<td>The DFSORT program, which is included in z/OS, or a functionally equivalent sort program</td>
</tr>
<tr>
<td>Enable all the functions of IMS Online Reorganization Facility</td>
<td></td>
<td>The following tools that are provided in IMS Database Solution Pack:</td>
</tr>
<tr>
<td>Control IMS online applications with IMS Program Restart Facility during reorganization</td>
<td></td>
<td>- IMS Database Reorganization Expert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- IMS HP Prefix Resolution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- IMS HP Pointer Checker</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- IMS Library Integrity Utilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IMS Program Restart Facility Version 2</td>
</tr>
<tr>
<td>Tool</td>
<td>Function</td>
<td>Required product</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>IMS HALDB Toolkit</td>
<td>Any functions of HALDB Toolkit</td>
<td>The DFSORT program, which is included in z/OS, or a functionally equivalent sort program</td>
</tr>
<tr>
<td></td>
<td>Enable all the functions of IMS HALDB Toolkit</td>
<td>The following tools that are provided in IMS Database Solution Pack:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS HP Load</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS HP Image Copy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS HP Prefix Resolution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS Library Integrity Utilities</td>
</tr>
<tr>
<td>IMS Database Reorganization Expert</td>
<td>Enable all the functions of IMS Database Reorganization Expert</td>
<td>IMS Online Reorganization Facility</td>
</tr>
<tr>
<td>IMS HP Image Copy</td>
<td>HDPC Hash Pointer Check function</td>
<td>IMS HP Pointer Checker</td>
</tr>
<tr>
<td></td>
<td>DEDB Hash Pointer Check function</td>
<td>IMS Fast Path Solution Pack for z/OS</td>
</tr>
<tr>
<td></td>
<td>Integrated Database Sensor function</td>
<td>IMS Database Reorganization Expert</td>
</tr>
<tr>
<td>IMS HP Load</td>
<td>PSSR function</td>
<td>The DFSORT program, which is included in z/OS, or a functionally equivalent sort program</td>
</tr>
<tr>
<td></td>
<td>Language Environment® interface for user exit routines written in COBOL or PL/I</td>
<td>Language Environment (LE), which is included in z/OS</td>
</tr>
</tbody>
</table>
Table 1. Conditional operational requirements (continued)

<table>
<thead>
<tr>
<th>Tool</th>
<th>Function</th>
<th>Required product</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMS HP Pointer Checker</td>
<td>• HD Pointer Checker utility</td>
<td>The DFSORT program, which is included in z/OS, or a functionally equivalent sort program</td>
</tr>
<tr>
<td></td>
<td>• HD Tuning Aid utility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Space Monitor utility</td>
<td></td>
</tr>
<tr>
<td>DB Historical Data Analyzer utility (to display charts on TSO terminals)</td>
<td>The Interactive System Productivity Facility (ISPF) and the Graphical Data Display Manager (GDDM), which are included in z/OS</td>
<td></td>
</tr>
<tr>
<td>DBD Decode and DBD Mapping options of HD Pointer Checker utility</td>
<td>IMS Library Integrity Utilities</td>
<td></td>
</tr>
<tr>
<td>Integrated Database Sensor function</td>
<td>IMS Database Reorganization Expert</td>
<td></td>
</tr>
<tr>
<td>IMS Index Builder</td>
<td>Index build processing</td>
<td>The DFSORT program, which is included in z/OS, or a functionally equivalent sort program</td>
</tr>
<tr>
<td>IMS Library Integrity Utilities</td>
<td>• ACBLIB Analyzer utility</td>
<td>The DFSORT program, which is included in z/OS, or a functionally equivalent sort program</td>
</tr>
<tr>
<td></td>
<td>• Integrity Checker utility</td>
<td></td>
</tr>
</tbody>
</table>
Product publications

For detailed information about tools and components of IMS Database Solution Pack and related products, refer to the publication libraries of the individual products.

IMS Database Reorganization Expert for z/OS, Version 4 Release 1
   User’s Guide, SC19-1137

IMS Database Solution Pack for z/OS, Version 2 Release 1, IMS HALDB Toolkit
   User’s Guide, SC19-4102

IMS Database Solution Pack for z/OS, Version 2 Release 1, IMS Online Reorganization Facility
   User’s Guide, SC19-4103

IMS High Performance Image Copy for z/OS, Version 4 Release 2
   User’s Guide, SC19-2756

IMS High Performance Load for z/OS, Version 2 Release 1
   User’s Guide, SC18-9222

IMS High Performance Pointer Checker for z/OS, Version 3 Release 1
   User’s Guide, SC19-2401

IMS High Performance Prefix Resolution for z/OS, Version 3 Release 1
   User’s Guide, SC19-9230

IMS High Performance Unload for z/OS, Version 1 Release 2
   User’s Guide, SC27-0936

IMS Index Builder for z/OS, Version 3 Release 1
   User’s Guide, SC18-9101

IMS Library Integrity Utilities for z/OS, Version 2 Release 2
   User’s Guide, SC19-3979

IMS Program Restart Facility for z/OS, Version 2 Release 2
   User’s Guide, SC19-3985

IMS Solution Packs Database Sensor
   User’s Guide, SC19-3283

IMS Database Repair Facility for IMS Solution Packs
   User’s Guide, SC19-2916

All the information about these tools and common tools (Tools Base and Management Console) can be found in IBM Knowledge Center at http://www.ibm.com/support/knowledgecenter
Service updates and support information

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

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

IMS Database Solution Pack 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 Support service.

**IMS Database Solution Pack information on the web**

The IMS Tools Product publications 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:


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


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:


**Receiving documentation updates automatically**

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To register with the My Notifications service:

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

**Prerequisite knowledge**

Before using this information, you must understand basic IMS concepts, the IMS environment, and your installation's IMS system. Therefore, IMS publications are prerequisite for all IMS Database Solution Pack products and components.

**How to send your comments**

Your feedback is important in helping to provide the most accurate and high-quality information. If you have any comments about this book or any other IBM product documentation, use one of the following options:
• Use the online reader comment form, which is located at [http://www.ibm.com/software/data/rcf/](http://www.ibm.com/software/data/rcf/)
• Send your comments by email to comments@us.ibm.com. Include the name of the book, the part number of the book, the version of the product that you are using, and, if applicable, the specific location of the text you are commenting on, for example, a page number or table number.
Accessibility features

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

The major accessibility features in IMS Database Solution Pack enable users to perform the following activities:

- Use assistive technologies such as screen readers and screen magnifier software. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.
- Customize display attributes such as color, contrast, and font size.
- Operate specific or equivalent features by using only the keyboard. 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

These guides describe how to use ISPF, including the use of keyboard shortcuts or function keys (PF keys), include the default settings for the PF keys, and explain how to modify their functions.
Chapter 2. Scenarios: Managing IMS full-function databases and HALDBs

Typical scenarios demonstrate how IMS Database Solution Pack can help you manage your IMS full-function databases and HALDBs.

Topics:
- “Monitor database space utilization” on page 32
- “Prevent application performance degradation and attain better free space usage” on page 33
- “Backup databases” on page 34
- “Analyze, diagnose, and repair databases” on page 35
- “Manage IMS ACB/DBD/PSB/MFS libraries and RECON data sets” on page 36
- “Store tool reports in a central repository for better search” on page 37
- “Automate sensory data collection and exception detection” on page 38
- “Aggregate information about database resources on a graphical user interface” on page 39
Monitor database space utilization

IMS Database Solution Pack, along with Tools Base components, provides a space monitoring solution.

IBM Tools Base IMS Tools Knowledge Base for z/OS provides an infrastructure for common information repositories for IMS system management. It provides centralized management of various types of repositories.

The reports that are generated by the IMS Database Solution Pack products can be stored in a repository. You can search historical copies of those reports by database name, date and time, or other search criteria.

Threshold criteria for detecting database exceptions and recommendations can also be defined and stored in a repository. These resources are used by the Smart Reorg utility of IMS Database Reorganization Expert and IMS Online Reorganization Facility to provide the conditional reorganization capability. Jobs with this capability enabled collect database statistics data and store the data in the Sensor Data repository. The data is evaluated against the threshold criteria to decide whether to reorganize the database.

Two components of IMS Database Solution Pack take advantage of the Sensor Data repository: IMS High Performance Pointer Checker and IMS High Performance Image Copy. You can generate sensor data as a by-product of running your normal IMS HP Pointer Checker and IMS HP Image Copy jobs. This functionality is called the Integrated Database Sensor function.

Additionally, IMS Database Solution Pack includes Stand-alone Database Sensor, whose sole function is to collect and print sensor data. These components, coupled with IBM Tools Base Administration Console for z/OS or IBM Management Console for IMS and DB2 for z/OS and IBM Tools Base Autonomics Director for z/OS, provide a comprehensive database space monitoring environment.

For more information, see the following publications:
- IMS Solution Packs Database Sensor User’s Guide
- Management Console User’s Guide
- Tools Base Administration Console User’s Guide
- Tools Base Autonomics Director User’s Guide
- Tools Base IMS Tools Knowledge Base User’s Guide
- Tools Base Policy Services User’s Guide
Prevent application performance degradation and attain better free space usage

The more you add, update, and delete records in your IMS database, the more frequently you must reorganize the database to restore data clustering and distribute free space evenly. Otherwise, performance will suffer. Reorganizing a database can require significant time, and usually involves taking the database offline.

IMS Database Solution Pack provides a complete set of high performance tools to unload, load, reorganize, build indexes for, back up, verify, and report on IMS full-function databases.

You can use the following stand-alone high-performance tools to cover each task required for database reorganization:

- IMS HP Unload provides high speed database unloading and other capabilities that are not found in IMS base utilities.
- IMS HP Load provides high speed database loading and other capabilities that are not found in IMS base utilities.
- IMS Index Builder provides capability to rebuild indexes avoiding the need to copy and reorganize.
- IMS HP Prefix Resolution provides high speed database prefix resolution and update for logically related databases.

You can combine these multiple tasks into a single job step to obtain higher performance in batch database reorganization by using IMS Database Reorganization Expert. This tool provides an integrated database reorganization infrastructure for controlling the process in a fast and efficient manner by running unload, load, index building, and image copy tasks concurrently. In addition, this tool provides an advanced function that automates and reduces complex decision making tasks required for the DBAs.
Backup databases

Using image copies to create backup data is essential to the timely recovery of databases after a loss of data or a programming mistake. However, taking data offline can reduce user productivity and negatively impact your business.

IMS Database Solution Pack provides IMS HP Image Copy to help you speed recovery time by supporting quick copy and restarting methods, and allows your system users to become more productive and avoid expensive losses from missed business opportunities.

This tool helps you by:
• Providing rapid image copy features that reduce the unavailability of database data sets.
• Enabling you to run the image copy process automatically after a database is reorganized when used with IMS Database Reorganization Expert.
Analyze, diagnose, and repair databases

IMS HP Pointer Checker helps you efficiently manage many database reorganization activities. When used regularly, IMS HP Pointer Checker helps ensure that your database pointers are error free by alerting you when it's time to perform a database reorganization.

This utility provides important information that helps to reduce the time spent handling diagnostics and repairs. These reports reveal errors and their locations within the database, facilitating system tuning and optimization. When IMS HP Pointer Checker is used in conjunction with Database Repair Facility (a powerful tool that can interactively and rapidly repair VSAM- and OSAM-organized IMS databases containing pointer or data errors), their synergy creates a powerful set of productivity aids that helps you detect and correct database errors quickly and repair them with minimum downtime to your IMS environment. These tools help you maintain the data availability you need to help your business thrive.

Chapter 2. Scenarios: Managing IMS full-function databases and HALDBs
Manage IMS ACB/DBD/PSB/MFS libraries and RECON data sets

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

In managing the database administration and change management process, DBAs are faced with many challenges like how do I:

- Ensure that I complete all of the necessary steps when making a change?
- Manage and track the changes to the definitions of my database objects?
- Propagate changes to other database environments quickly?
- Prevent accidental misuse in production?

The answers to these questions are provided by IMS Library Integrity Utilities. This tool helps you by providing the features and functions that enable you to manage your ACB libraries, DBD libraries, PSB libraries, MFS libraries, and RECON data sets. These features and functions include:

- The IMS Advanced ACB Generator utility, which contains additional features and functions to help you manage your IMS ACB libraries more effectively and provides a high-speed generation process.
- The Consistency Checker utility, which helps you ensure that the necessary definitions in your IMS subsystem have been created.
- The Integrity Checker utility, which protects your databases from corruption caused by using the wrong IMS control blocks for access.
- The Multiple Resource Checker utility, which helps you identify the resources that contain different definitions across multiple sets of RECON data sets or DBDLIBs, PSBLIBs, and ACBLIBs.
- The Catalog Manager utility, which helps you ensure that the DBDs and PSBs in the IMS catalog are maintained correctly by validating the consistency of DBDs and PSBs in the ACB libraries with those in the IMS catalog.
Store tool reports in a central repository for better search

DBAs use many utilities to maintain the health of their databases. But how do they manage the reports that were generated by these utilities? Through their daily database maintenance tasks, various types of reports might be generated and accumulated. Managing and searching these accumulated reports can be cumbersome.

Many of the IMS Tools products that are provided in IMS Database Solution Pack can store their reports in a central repository that is managed by IBM Tools Base. IMS Tools Knowledge Base.

IMS Tools Knowledge Base helps you locate the target report for a specific database quickly and easily:

- You can use the IMS Tools Knowledge Base ISPF user interface to manage and display the stored reports.
- The ISPF user interface provides a powerful report search capability that uses indexes that were added to the stored reports. Each report that is stored in the repository is assigned predefined search indexes that are associated with the resource that was processed during the product job. The index information includes the database DBD name, the partition name, the DD name, the date and time, the job name and the job step name, and the user ID under which the job was submitted.
- You can access the historical reports on respective database resources through the ISPF interface.
Automate sensory data collection and exception detection

Typically, identifying database tuning opportunities requires highly skilled DBA expertise that involves analyzing detailed analysis reports, identifying exceptional states of the databases, and determining the best approach to recover the databases in good condition.

IBM Tools Base Autonomics Director for z/OS assists you in identifying and performing the functions that are needed to maintain the health of IMS full-function databases.

The Autonomics Director scenario is based on sensor data that is derived as a by-product of IMS HP Pointer Checker and IMS HP Image Copy jobs. The sensor data can also be collected by Stand-alone Database Sensor.

Autonomics Director with IMS Database Solution Pack provides:
• Automatic and consistent collection of sensor data related to database state
• Automatic and consistent analysis of database state against user-defined threshold criteria
• Generation of recommended actions for subject databases and database groups based on user-defined policies and thresholds
Aggregate information about database resources on a graphical user interface

Analyzing the figures in analysis reports and identifying the state of databases can be a complicated task that requires a tremendous amount of a DBA’s time and effort.

IBM Tools Base Administration Console for z/OS and IBM Management Console for IMS and DB2 for z/OS consolidates key IMS statistics into an intuitive, graphical web interface.

You can view aggregate information for customizable groups of databases as well as the following types of detailed information for individual databases:

- Graphical charts that show historical sensor data that is collected by IMS Tools
- Database exceptions that are detected by Autonomics Director through the automated analysis of database state and recommended resolutions
- Various reports that are generated by IMS Tools

When the DBD Map Viewer of IMS Library Integrity Utilities is installed to Tools Base Administration Console, you can also view the following information:

- Graphical view of the database structure
- DBD source
- DBD XML documents

When the DBD/PSB Map Viewer of IMS Library Integrity Utilities is installed to Management Console, you can also view the following information:

- Graphical view of the database structure
- Graphical view of the program specification
- DBD and PSB source
- DBD and PSB XML documents
- Relation between DBDs and logical DBDs, and DBDs and PSBs (cross reference feature)

The cross reference feature helps you identify how DBDs and PSBs are related to each other. You can use this feature to identify and analyze the following resources:

- Logical DBDs that refer to a specific DBD.
- PSBs that refer to a specific DBD or a logical DBD.
- Source DBDs that each PCB of PSB refers to.
Chapter 3. Migration considerations

If you have one or more of the products that are included in IMS Database Solution Pack installed on your system or if you have IMS Database Solution Pack Version 1 installed on your system, complete the migration tasks.

IMS Database Solution Pack Version 2 includes the functions and features that replace the following products:
- IMS Online Reorganization Facility for z/OS, Version 1
- IMS High Availability Large Database Toolkit for z/OS, Version 3 Release 2

In addition, IMS Database Solution Pack Version 2 includes the following products:
- IMS Database Reorganization Expert for z/OS, Version 4 Release 1
- IMS High Performance Unload for z/OS, Version 1 Release 2
- IMS High Performance Load for z/OS, Version 2 Release 1
- IMS High Performance Prefix Resolution for z/OS, Version 3 Release 1
- IMS High Performance Image Copy for z/OS, Version 4 Release 2
- IMS High Performance Pointer Checker for z/OS, Version 3 Release 1
- IMS Index Builder for z/OS, Version 3 Release 1
- IMS Library Integrity Utilities for z/OS, Version 2 Release 2

IMS Database Solution Pack also includes the following components:
- Database Sensor
- Database Repair Facility

Product and component changes in Version 2

Product and component changes in IMS Database Solution Pack Version 2 from Version 1 are as follows:
- Provides functions and features that replace IMS Online Reorganization Facility for z/OS, Version 1.
- Provides functions and features that replace IMS High Availability Large Database Toolkit for z/OS, Version 3 Release 2.
- Provides a new release of IMS Library Integrity Utilities for z/OS.

Topics:
- “Migrating from IMS Database Solution Pack Version 1” on page 42
- “Migrating from individual products” on page 44
Migrating from IMS Database Solution Pack Version 1

If you have been using IMS Database Solution Pack Version 1, complete the following steps to migrate to IMS Database Solution Pack Version 2.

Procedure


IMS Database Solution Pack Version 2 can be installed in the same SMP/E CSI zone that is used for IMS Database Solution Pack Version 1 or in a different SMP/E CSI zone.

**Important**: If you install IMS Database Solution Pack Version 2 in the same SMP/E CSI zone, the IMS Database Solution Pack Version 1 resources are replaced with the IMS Database Solution Pack Version 2 resources. If you plan to use the same the SMP/E CSI zone, create a backup copy of all SMP/E data sets, target libraries, and distribution libraries before you complete the migration steps.

2. Install the latest version of IBM Tools Base for z/OS in the target SMP/E CSI zone.

IMS Database Solution Pack Version 2 requires Tools Base for z/OS, Version 1 Release 4 or later. Tools Base must be installed before IMS Database Solution Pack Version 2 can be installed.

3. Migrate the Tools Base components.

The following Tools Base components must be migrated:

**IMS Tools Knowledge Base**
If you have been using IMS Tools Knowledge Base, migrate existing IMS Tools Knowledge Base to that of Tools Base 1.4 or later. For instructions, see the topic "Configuring an existing installation of IMS Tools KB (migration)" in the *Tools Base IMS Tools Knowledge Base User’s Guide*.

**IMS Tools Online System Interface and IMS Tools Generic Exits**
If you have been using the IMS Tools Online System Interface and IMS Tools Generic Exits, migrate the existing components to those of Tools Base 1.4 or later. For migration considerations, see the *Tools Base IMS Tools Common Services User’s Guide*.

4. If you plan to install IMS Database Solution Pack in the same SMP/E CSI zone, complete the following steps:

   a. If you already have one or more of the following products installed from IMS Database Solution Pack Version 1, apply all maintenance for these products and ensure that they are at the latest maintenance level.
      • IMS Database Reorganization Expert for z/OS, Version 4 Release 1
      • IMS High Performance Unload for z/OS, Version 1 Release 2
      • IMS High Performance Load for z/OS, Version 2 Release 1
      • IMS High Performance Prefix Resolution for z/OS, Version 3 Release 1
      • IMS Index Builder for z/OS, Version 3 Release 1
      • IMS High Performance Image Copy for z/OS, Version 4 Release 2
      • IMS High Performance Pointer Checker for z/OS, Version 3 Release 1 (includes Database Repair Facility)
Important: When you install IMS Database Solution Pack Version 2, you do not need to install the products that you already installed in IMS Database Solution Pack Version 1 except for IMS Library Integrity Utilities. IMS Database Solution Pack Version 2 provides a new release of IMS Library Integrity Utilities; ensure that you install IMS Library Integrity Utilities. Installing IMS Library Integrity Utilities for z/OS, Version 2 Release 2 will replace IMS Library Integrity Utilities for z/OS, Version 2 Release 1.

b. If you plan to reuse all the data sets that are used in IMS Database Solution Pack Version 1 in the IMS Database Solution Pack Version 2 environment, ensure that libraries SHPSLMD0 and AHPSMOD0 exist.

The required size of data sets in IMS Database Solution Pack Version 2 can be larger than the size required in Version 1. See the Program Directory for IBM IMS Database Solution Pack for z/OS, V2.1, GI10-8942 and determine the required size for the data sets. If the size of the data sets is insufficient, increase the size.


What to do next

After you install IMS Database Solution Pack Version 2, follow the instructions in Chapter 6, “Customizing IMS Database Solution Pack,” on page 59 and complete the customization steps.

Some of the customization steps that were done when you installed IMS Database Solution Pack Version 1 can be bypassed, however, because IMS Database Solution Pack Version 2 provides new functions and features, review all the customization steps and complete the steps that are required for your environment.
Migrating from individual products

If you have been using one or more of the products included in IMS Database Solution Pack, complete the following steps to migrate to the IMS Database Solution Pack Version 2 environment.

Procedure


IMS Database Solution Pack Version 2 can be installed in the same SMP/E CSI zone that is used for the existing product or in a different SMP/E CSI zone.

Important: If you install IMS Database Solution Pack Version 2 in the same SMP/E CSI zone, the resources of the existing products are replaced with the IMS Database Solution Pack Version 2 resources. If you plan to use the same the SMP/E CSI zone, create a backup copy of all SMP/E data sets, target libraries, and distribution libraries before you complete the migration steps.

2. Install the latest version of IBM Tools Base for z/OS in the target SMP/E CSI zone.

IMS Database Solution Pack Version 2 requires Tools Base for z/OS, Version 1 Release 4 or later. Tools Base must be installed before IMS Database Solution Pack Version 2 can be installed.

3. Migrate the Tools Base components.

The products included in IMS Database Solution Pack previously required older versions of IMS Tools Knowledge Base, IMS Tools Online System Interface, and IMS Tools Generic Exits than what is required by this release of IMS Database Solution Pack. These common tools, along with several other tools are now delivered with Tools Base.

If the existing products have been configured to use the following Tools Base components, complete the migration task for each Tools Base component that you use:

IMS Tools Knowledge Base

If you have been using IMS Tools Knowledge Base, migrate existing IMS Tools Knowledge Base to that of Tools Base 1.4 or later. For instructions, see the topic "Configuring an existing installation of IMS Tools KB (migration)" in the Tools Base IMS Tools Knowledge Base User’s Guide.

IMS Tools Online System Interface and IMS Tools Generic Exits

If you have been using the IMS Tools Online System Interface and IMS Tools Generic Exits, migrate the existing components to those of Tools Base 1.4 or later. For migration considerations, see the Tools Base IMS Tools Common Services User’s Guide.

All the components included in Tools Base are compatible with earlier releases of IMS Tools Knowledge Base, IMS Tools Online System Interface, and IMS Tools Generic Exits.


What to do next

After you install IMS Database Solution Pack Version 2, follow the instructions in Chapter 6, “Customizing IMS Database Solution Pack,” on page 59 and complete
the customization steps. Review all the customization steps and complete the steps that are required for your environment.
Chapter 4. Installing IMS Database Solution Pack

Before you install IMS Database Solution Pack, you must first complete the SMP/E installation of Tools Base.

Complete the SMP/E installation of the products in the following order:

1. “Installing the required common tools from Tools Base” on page 48
2. “Installing Management Console” on page 49
3. “Installing the components of IMS Database Solution Pack” on page 50
4. “Gathering the data set names of IMS Database Solution Pack and Tools Base” on page 52
5. “Verifying the installation” on page 56
Installing the required common tools from Tools Base

Many of the tools included in IMS Database Solution Pack require the use of the common tools that are included in Tools Base.

The following common tools integrate with the tools in IMS Database Solution Pack:

- Administration Console (included in Tools Base V1.4 only)
- Autonomics Director
- Distributed Access Infrastructure
- IMS Tools Common Services
- IMS Tools Knowledge Base
- Policy Services

To perform the SMP/E installation, see the Program Directory for IBM Tools Base for z/OS, GI10-8819. This process allocates and downloads the target and distribution libraries and performs the SMP/E installation of the tools included in Tools Base.

After you install Tools Base, continue with the installation of Management Console (optional) and IMS Database Solution Pack before customizing the tools included in Tools Base.
Installing Management Console

If you installed Tools Base V1.5 or later and you plan to use the graphical web interface of Management Console (replacement tool for Tools Base Administration Console), install IBM Management Console for IMS and DB2 for z/OS.

To perform the installation, see the Program Directory for IBM Management Console for IMS and DB2 for z/OS, GI10-9007.

While you install Management Console, make sure that you install the Management Console feature that includes capabilities for managing IMS environments. This feature is installed by the following parameter or option during installation:

- For z/OS: `imsbase.feature` parameter on the `install` command
- For Windows: `Management Console for IMS Management Base Feature` option
Installing the components of IMS Database Solution Pack

Install the IMS Database Solution Pack libraries provided to you by IBM.

The tools of IMS Database Solution Pack are shipped in separate target and distribution libraries.

To perform the SMP/E installation, see the Program Directory for IBM IMS Database Solution Pack for z/OS, V2.1, GI10-8942.

The following table lists the data sets of the target libraries distributed in IMS Database Solution Pack.

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Description</th>
<th>Local DSN name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLIST</td>
<td>SFABCLIB</td>
<td>Executable CLIST members for Database Repair Facility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHPSCLIB</td>
<td>Executable CLIST members for IMS HP Pointer Checker</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIHCSKEL</td>
<td>Executable CLIST members for IMS HALDB Toolkit</td>
<td></td>
</tr>
<tr>
<td>LMOD</td>
<td>SFABLMD0</td>
<td>Executable load library for Database Repair Facility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHPSLMD0</td>
<td>Executable load library for IMS Database Solution Pack</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHRFLOAD</td>
<td>Executable load library for IMS Online Reorganization Facility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIHCLOAD</td>
<td>Executable load library for IMS HALDB Toolkit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIIULMOD</td>
<td>Executable load library for IMS Index Builder</td>
<td></td>
</tr>
<tr>
<td>MAC</td>
<td>SHPSMAC0</td>
<td>Distributed product macros</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHRFMACS</td>
<td>Distributed product macro for IMS Online Reorganization Facility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIHCMACS</td>
<td>Distributed product macro for IMS HALDB Toolkit</td>
<td></td>
</tr>
<tr>
<td>MESSAGE</td>
<td>SFABMLIB</td>
<td>ISPF messages for Database Repair Facility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHPSMLIB</td>
<td>ISPF messages for IMS HP Pointer Checker</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIHCMESG</td>
<td>ISPF messages for IMS HALDB Toolkit</td>
<td></td>
</tr>
<tr>
<td>PANEL</td>
<td>SFABPLIB</td>
<td>ISPF panels for Database Repair Facility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHPSPLIB</td>
<td>ISPF panels for IMS HP Pointer Checker</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIHCPANL</td>
<td>ISPF panels for IMS HALDB Toolkit</td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Data sets of the target libraries for IMS Database Solution Pack (continued)

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Description</th>
<th>Local DSN name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMPLE</td>
<td>SHPSBASE</td>
<td>SMP/E JCL members for installation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHPSJCL0</td>
<td>IVP and customization JCL members</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHPSSAMP</td>
<td>Sample JCL members, exit codes, and cataloged procedures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIIUBASE</td>
<td>SMP/E JCL members for installing IMS Index Builder (see Note)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIIUCNTL</td>
<td>Sample JCL members for IMS Index Builder</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIIUPROC</td>
<td>Sample cataloged procedures for IMS Index Builder</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHRFSAMP</td>
<td>Sample JCL members for IMS Online Reorganization Facility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIHCSAMP</td>
<td>Sample JCL members for IMS HALDB Toolkit</td>
<td></td>
</tr>
</tbody>
</table>

| File system path | SHPSIHFS       | File system path for IMS Library Integrity Utilities                          |                  |
|                  |                | Maps to: pathprefix/usr/lpp/InstallationManagerRepository/H27P220/IBM/        |                  |

**Note:** The SIIUBASE library is created during the installation of IMS Database Solution Pack, but it is not used.
Gathering the data set names of IMS Database Solution Pack and Tools Base

After you installed Tools Base and IMS Database Solution Pack, record your data set names.

Fill in the following tables with the data set names for modifying the procedures and JCL members.

Subsections:
- “Data set names of IMS Database Solution Pack”
- “Data set names of Tools Base” on page 54
- “Data set names of IMS libraries” on page 54
- “Data set names of other libraries” on page 55
- “Data set names of your program libraries” on page 55

Data set names of IMS Database Solution Pack

IMS Database Solution Pack provides the libraries that are summarized in the following tables.

The SHPSxxxx libraries include the data sets for the following IMS Database Solution Pack tools and resources:
- IMS Database Reorganization Expert
- IMS HP Image Copy
- IMS HP Load
- IMS HP Pointer Checker
- IMS HP Prefix Resolution
- IMS HP Unload
- IMS Library Integrity Utilities
- Database Sensor
- IMS Database Solution Pack macro library
- IMS Database Solution Pack sample JCL library

Table 3. Data set names of IMS Database Solution Pack resources (SHPSxxxx library)

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Your data set name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHPSLMD0</td>
<td>Executable load module library</td>
<td></td>
</tr>
<tr>
<td>SHPSBASE</td>
<td>SMP/E JCL members for installation</td>
<td></td>
</tr>
<tr>
<td>SHPSJCL0</td>
<td>Sample JCL members</td>
<td></td>
</tr>
<tr>
<td>SHPSSAMP</td>
<td>Sample cataloged procedures</td>
<td></td>
</tr>
<tr>
<td>SHPSMAC0</td>
<td>Distributed product macros</td>
<td></td>
</tr>
<tr>
<td>SHPSCLIB</td>
<td>Executable CLIST members</td>
<td></td>
</tr>
<tr>
<td>SHPSMLIB</td>
<td>ISPF messages</td>
<td></td>
</tr>
<tr>
<td>SHPSPLIB</td>
<td>ISPF panels</td>
<td></td>
</tr>
</tbody>
</table>

The SIIUxxxx libraries include the data sets for IMS Index Builder.
Table 4. Data set names of IMS Index Builder (SIIUxxxx library)

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIIULMOD</td>
<td>Executable load module library for IMS Index Builder</td>
</tr>
<tr>
<td>SIIUCNTL</td>
<td>Sample JCL members for IMS Index Builder</td>
</tr>
<tr>
<td>SIIUPROC</td>
<td>Sample cataloged procedures for IMS Index Builder</td>
</tr>
</tbody>
</table>

The SHRFxxxx libraries include the data sets for IMS Online Reorganization Facility.

Table 5. Data set names of IMS Online Reorganization Facility (SHRFxxxx library)

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHRFLOAD</td>
<td>Executable load module library for IMS Online Reorganization Facility</td>
</tr>
<tr>
<td>SHRFMACS</td>
<td>Distributed product macro for IMS Online Reorganization Facility</td>
</tr>
<tr>
<td>SHRFSAMP</td>
<td>Sample JCL members for IMS Online Reorganization Facility</td>
</tr>
</tbody>
</table>

The SIHCxxxx libraries include the data sets for IMS HALDB Toolkit.

Table 6. Data set names of IMS HALDB Toolkit (SIHCxxxx library)

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIHCLOAD</td>
<td>Executable load module library for IMS HALDB Toolkit</td>
</tr>
<tr>
<td>SIHCSKEL</td>
<td>Executable CLIST member for IMS HALDB Toolkit</td>
</tr>
<tr>
<td>SIHCMSG</td>
<td>ISPF messages for IMS HALDB Toolkit</td>
</tr>
<tr>
<td>SIHCPNL</td>
<td>ISPF panels for IMS HALDB Toolkit</td>
</tr>
<tr>
<td>SIHCMACS</td>
<td>Distributed product macro for IMS HALDB Toolkit</td>
</tr>
<tr>
<td>SIHCSAMP</td>
<td>Sample JCL members for IMS HALDB Toolkit</td>
</tr>
</tbody>
</table>

The SFABxxxx libraries include the data sets for Database Repair Facility.

Table 7. Data set names of Database Repair Facility (SFABxxxx library)

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFABLMOD</td>
<td>Executable load module library for Database Repair Facility</td>
</tr>
<tr>
<td>SFABCLIB</td>
<td>Executable CLIST members for Database Repair Facility</td>
</tr>
</tbody>
</table>
Table 7. Data set names of Database Repair Facility (SFABxxxx library) (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFABMLIB</td>
<td>ISPF messages for Database Repair Facility</td>
</tr>
<tr>
<td>SFABPLIB</td>
<td>ISPF panels for Database Repair Facility</td>
</tr>
</tbody>
</table>

Data set names of Tools Base

The following table summarizes the libraries of Tools Base.

Table 8. Data set names of Tools Base

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAIILINK</td>
<td>Executable load module library for Distributed Access Infrastructure</td>
</tr>
<tr>
<td>SFOILOAD</td>
<td>Executable load module library for IMS Tools Online System Interface</td>
</tr>
<tr>
<td>SGLXLOAD</td>
<td>Executable load module library for IMS Tools Generic Exits</td>
</tr>
<tr>
<td>SHKTLOAD</td>
<td>Executable load module library for Autonomics Director, IMS Tools Knowledge Base, and Policy Services</td>
</tr>
<tr>
<td>SHKTCEXE</td>
<td>Executable CLIST members for IMS Tools Knowledge Base</td>
</tr>
</tbody>
</table>

Data set names of IMS libraries

The following table summarizes the IMS resources.

Table 9. Data set names of IMS resources

<table>
<thead>
<tr>
<th>Name</th>
<th>Your data set name</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMS SDFSRESL</td>
<td></td>
</tr>
<tr>
<td>IMS SDFSMAC</td>
<td></td>
</tr>
<tr>
<td>IMS SMP/E CSI data set</td>
<td></td>
</tr>
<tr>
<td>IMS PROCLIB</td>
<td></td>
</tr>
<tr>
<td>DBDLIB</td>
<td></td>
</tr>
<tr>
<td>PSBLIB</td>
<td></td>
</tr>
<tr>
<td>ACBLIB</td>
<td></td>
</tr>
<tr>
<td>MDALIB</td>
<td></td>
</tr>
<tr>
<td>USERLIB (see Note)</td>
<td></td>
</tr>
<tr>
<td>RECON1</td>
<td></td>
</tr>
<tr>
<td>RECON2</td>
<td></td>
</tr>
<tr>
<td>RECON3</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** USERLIB is the load module library where your randomizer, segment compression exits, user exit routines, and other resources exist.
Data set names of other libraries

The following table summarizes other resources.

*Table 10. Data set names of other resources*

<table>
<thead>
<tr>
<th>Name</th>
<th>Your data set name</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDDM (SADMMOD)</td>
<td></td>
</tr>
<tr>
<td>ISPF (SISPLPA)</td>
<td></td>
</tr>
<tr>
<td>ISPF (SISPLOAD)</td>
<td></td>
</tr>
<tr>
<td>LE (SCEELKED)</td>
<td></td>
</tr>
<tr>
<td>MVS™ PROCLIB</td>
<td></td>
</tr>
</tbody>
</table>

Data set names of your program libraries

Use the following table to record the program libraries in which your user exit modules, site default modules, and base configuration modules are stored.

*Table 11. Data set names of your program libraries*

<table>
<thead>
<tr>
<th>Description</th>
<th>Your data set name</th>
</tr>
</thead>
</table>
Verifying the installation

After completing all the installation requirements, run the installation verification procedure (IVP) job for IMS Database Solution Pack.

The IVP member is HPSAIVP in the SHPSBASE data set. This IVP job checks IMS Database Solution Pack and its individual products, and verifies that all installation tasks have been completed successfully and that you are ready to configure the tools of IMS Database Solution Pack. Edit the member by following the instructions within the member and run the job.
Chapter 5. Initial product customization using IMS Tools Setup

IMS Tools Setup is a function that helps you quickly and efficiently perform the required post-SMP/E-installation customization process for the products included in the IMS Tools solution packs that you have installed. IMS Tools Setup is provided by IBM Tools Base Version 1 Release 5 and later releases.

What does IMS Tools Setup do?

After the selected IMS Tools solution pack products have been installed into SMP/E data sets, you must complete customization tasks for all the IMS Tools included in the packs in order to begin using the tools. The goal of IMS Tools Setup is to greatly ease the time and effort it takes to have IMS Tools products up and running in your environment.

The IMS Tools Setup function (HKTQSETU) provides a step-by-step structured process (ISPF) that partially automates many of the normally time-consuming manual customization tasks. IMS Tools Setup generates JCL members that you then submit as jobs, or perform as tasks, that will complete the customization process.

IMS Tools Setup is intended for initial product installations, first-time users, and product evaluations. IMS Tools Setup is not intended for maintenance purposes.

IMS Tools products that can use IMS Tools Setup

The following IMS Tools solution packs can make use of IMS Tools Setup:
- IBM IMS Database Solution Pack for z/OS
- IBM IMS Fast Path Solution Pack for z/OS
- IBM IMS Recovery Solution Pack for z/OS

IBM Tools Base components are also configured and customized during the IMS Tools Setup process. IBM Tools Base provides important supporting components and infrastructure that are required for the operation of many IMS Tools functions, such as storage repositories, autonomics, and interaction with IMS.

Starting IMS Tools Setup

The IMS Tools Setup function can be found in IBM Tools Base Version 1 Release 5 and later releases. You can start the function by executing the following REXX EXEC:

EXEC 'smpeh1q.SHKTCEXE(HKTQSETU) ' 'HLQ(smpeh1q)'

The IMS Tools Setup ISPF panels provide an organized and logical approach to the customization tasks. The panels explain the operation and sequence of each member that is generated in the CUSTJCL data set. The correct JCL job and task operation order is very important.

Each panel contains embedded panel-context and individual field-context Help information. All information about using IMS Tools Setup is contained in the embedded Help. There is no separate user guide.
IMS Tools Setup output

IMS Tools Setup produces the following output:

- JCL to optionally combine all selected IMS Tools libraries
- JCL to APF-authorize load library(s) (dynamic and permanent)
- JCL to add MVS PPT entries to SYS1.PARMLIB (dynamic and permanent)
- JCL to add load modules to LPA (dynamic and permanent)
- JCL to add Subsystem entries to MVS (dynamic and permanent)
- JCL to add RACF® security for all tools that require security
- Parameters (IMS Tools Generic Exits, IMS Tools Online System Interface, configuration members)
- JCL to create global options modules and members
- PROCs, address spaces, other required data sets
- DBDs, PSBs, ACBs, MDAs, DB Initialization for IVPs

Completing IMS Tools Setup

After you execute the HKTQSETU REXX EXEC, locate member $$READ in the generated CUSTJCL data set. This member explains the JCL members that were just generated for informational purposes only. The $$READ member contains a table of member names, the associated role types, and short descriptions.

Each of the generated JCL members begin with "#" and are named in the logical sequence of operation. Any members ending with "@" require manual steps. You must begin with the first #xxxx member and submit the JCL job or perform the task. After that job or task completes, you continue on to the next member and submit that JCL job or perform that task, and so forth.

The first few members are all SYSPROG related (APF, LPA, SSN, MVSPPT), followed by security related members, TPNS ADMIN related members, DBA related members, and others.

You must process all members in the correct order to complete the full customization task properly.

Each JCL member has its own descriptive comment section that explains what the member does and which group it might belong to.
Chapter 6. Customizing IMS Database Solution Pack

Before using any of the tools that are included in IMS Database Solution Pack, all the tools must be customized. Use the following topics to manually customize tools in IMS Database Solution Pack. These topics also cover customization of common tools that are included in Tools Base for z/OS.
# Customization checklist

Use the following checklist to customize the tools and components for IMS Database Solution Pack.

**Table 12. Customization checklist**

<table>
<thead>
<tr>
<th>Status</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>See either of the following topics depending on the release of Tools Base that you installed:</td>
</tr>
<tr>
<td></td>
<td>• &quot;Configuring Tools Base Version 1 Release 4&quot; on page 61</td>
</tr>
<tr>
<td></td>
<td>• &quot;Configuring Tools Base Version 1 Release 5 or later&quot; on page 73</td>
</tr>
<tr>
<td>2.</td>
<td>&quot;Configuring Management Console&quot; on page 77 (applies only to Tools Base Version 1 Release 5 or later)</td>
</tr>
<tr>
<td>3.</td>
<td>APF authorizing the program libraries&quot; on page 78</td>
</tr>
<tr>
<td>4.</td>
<td>Performing security-related tasks&quot; on page 79</td>
</tr>
<tr>
<td>5.</td>
<td>&quot;Obtaining XCF group names for Tools Base servers&quot; on page 87</td>
</tr>
<tr>
<td>6.</td>
<td>&quot;Updating sample procedures and JCL&quot; on page 88</td>
</tr>
<tr>
<td>7.</td>
<td>&quot;Setting up IMS Online Reorganization Facility&quot; on page 92</td>
</tr>
<tr>
<td>8.</td>
<td>&quot;Setting up IMS HALDB Toolkit&quot; on page 101</td>
</tr>
<tr>
<td>9.</td>
<td>&quot;Setting up the Integrity Checker utility of IMS Library Integrity Utilities&quot; on page 103</td>
</tr>
<tr>
<td>10.</td>
<td>See either of the following topics depending on the product that you will use:</td>
</tr>
<tr>
<td></td>
<td>• &quot;Setting up the DBD/PSB Map Viewer for Management Console&quot; on page 136</td>
</tr>
<tr>
<td></td>
<td>• &quot;Setting up the DBD Map Viewer for Administration Console&quot; on page 142</td>
</tr>
<tr>
<td>11.</td>
<td>&quot;Setting up the ISPF interfaces&quot; on page 148</td>
</tr>
</tbody>
</table>
Configuring Tools Base Version 1 Release 4

Many of the tools included in IMS Database Solution Pack use the common tools that are included in Tools Base.

The following table shows the Tools Base components and whether they are supported by each tool of IMS Database Solution Pack. Tools Base components that are not listed in the table are not used by the tools of IMS Database Solution Pack.

Use this table to identify which Tools Base components will be used in your environment and then configure the identified Tools Base components.

<table>
<thead>
<tr>
<th>IMS Tools</th>
<th>Administration Console</th>
<th>Autonomics Director</th>
<th>Distributed Access Infrastructure</th>
<th>IMS Tools Common Services</th>
<th>IMS Tools Knowledge Base</th>
<th>Policy Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMS Online Reorganization Facility</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Required</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>IMS HALDB Toolkit</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IMS Database Reorganization Expert</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>IMS HP Unload</td>
<td>Optional</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
</tr>
<tr>
<td>IMS HP Load</td>
<td>Optional</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
</tr>
<tr>
<td>IMS HP Prefix Resolution</td>
<td>Optional</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
</tr>
<tr>
<td>IMS Index Builder</td>
<td>Optional</td>
<td>-</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>-</td>
</tr>
<tr>
<td>IMS HP Image Copy</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>IMS HP Pointer Checker</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>IMS Library Integrity Utilities</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IMS Library Integrity Utilities extension (DBD Map Viewer)</td>
<td>Required</td>
<td>-</td>
<td>Required</td>
<td>-</td>
<td>Required</td>
<td>-</td>
</tr>
<tr>
<td>Database Sensor</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Required</td>
<td>Optional</td>
</tr>
<tr>
<td>Database Repair Facility</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Administration Console

Administration Console is an application server that consolidates key IMS information into a single, intuitive, graphical web interface. This interface is used on a client to connect to different IMS Tools and Tools Base components.

Autonomics Director

Autonomics Director provides automation of IMS database monitoring based on an understanding of the current state of your IMS databases.

Distributed Access Infrastructure

Distributed Access Infrastructure acts as a gateway for communication between distributed platforms and z/OS.

IMS Tools Common Services

IMS Tools Generic Exits provides the ability to define multiple IMS exits and enable them to be called within the IMS control region. One of the exits supported is the Partner Product exit routine (DFSPPUE0). This exit is
required to use IMS Tools Online System Interface. The installation and configuration of IMS Tools Online System Interface guides you through the setup that is needed for this exit.

IMS Tools Online System Interface is a command interface that allows IMS Tools to interface with all supported versions of IMS.

**IMS Tools Knowledge Base**

IMS Tools Knowledge Base is the foundational infrastructure that provides a centralized information management environment for IMS Tools products and Policy Services.

**Policy Services**

Policy Services is a core IMS Tools technology that can monitor specific database state by evaluating the sensor data collected by an IMS Tools product, and by providing a response to any conditions that exceed the threshold values specified for this state.
Configuring IMS Tools Generic Exits

You must configure the IMS Tools Generic Partner Exit interface to use IMS Online Reorganization Facility or functions of IMS Database Solution Pack tools that use IMS Tools Online System Interface. The IMS Tools Generic Partner Exit interface is distributed as part of the IMS Tools Generic Exits. The IMS Tools Generic Partner Exit interface is a general-purpose interface that allows multiple exits to be defined and called.

About this task

The IMS Tools Generic Partner Exit interface is required to operate the IMS Tools Online System Interface in IMS Database Solution Pack and to use IMS Online Reorganization Facility.

Procedure

Complete either of the following tasks:

- “Configuring IMS Tools Generic Exits (basic configuration)”
- “Configuring IMS Tools Generic Exits for IMS Online Reorganization Facility” on page 64

Important: If you plan to use IMS Online Reorganization Facility, ensure that you complete the instructions in “Configuring IMS Tools Generic Exits for IMS Online Reorganization Facility” on page 64.

Configuring IMS Tools Generic Exits (basic configuration)

The IMS Tools Generic Partner Exit interface is distributed as part of the IMS Tools Generic Exits. The IMS Tools Generic Partner Exit interface is required to operate the IMS Tools Online System Interface.

About this task

As part of the installation and configuration for the IMS Tools Generic Partner Exit, you might have already performed the following steps. However, if these steps have not yet been completed, complete them now.

Important: If you plan to use IMS Online Reorganization Facility, instead of completing the steps in this topic, complete the steps in “Configuring IMS Tools Generic Exits for IMS Online Reorganization Facility” on page 64.

The executable load libraries of IMS Tools Generic Exits must be APF-authorized. The APF-authorization procedures will be guided in the subsequent tasks.

Procedure

1. Create a unique GPRiii0 member for each IMS system in which IMS Tools Online System Interface is needed. iii is the 4-character IMS subsystem identifier.
2. Update your IMS control region JCL to include in the //STEPLIB concatenation the executable load libraries for IMS Tools Generic Exits and IMS Tools Online System Interface.

What to do next

For detailed instructions on how to add a GPRsid0 or GPREXIT0 member, see the Tools Base IMS Tools Common Services User’s Guide.
Important:

- If you use any other user-defined or vendor partner exit that does not support IMS Tools Generic Exits, you must ensure that the libraries that contain the DFSPPUE0 exit are concatenated ahead of the SGLXLOAD and those exits must pass control to the next exit in the STEPLIB so that IMS Tools Generic Exits get control.
- The IMS Tools Generic Exits load library, SGLXLOAD, must be in front of the IMS Tools Online System Interface load library, SFOILOAD, in the IMS control region //STEPLIB concatenation.

Configuring IMS Tools Generic Exits for IMS Online Reorganization Facility

If you plan to use IMS Online Reorganization Facility, you must install and configure the IMS Tools Generic Partner Exit interface and the IMS Tools Generic Logger Exit interface. Both of them are distributed as part of the IMS Tools Generic Exits. The IMS Tools Generic Partner Exit interface allows multiple exit routines to be called during IMS initialization, while the IMS Tools Generic Logger Exit interface allows multiple exit routines to be called during IMS logger execution.

About this task

As part of the installation and configuration for the IMS Tools Generic Partner Exit, you might have already performed part of the following steps. If you have not completed some of these steps yet, complete them now.

Procedure

1. Create a unique GPRssid0 member for each IMS system in which you plan to use IMS Online Reorganization Facility. ssid is the 4-character IMS subsystem identifier.
   Add the following lines to each GPRssid0 member:
   ```
   EXITDEF(TYPE(PARTNER) EXITNAME(HRFOPPUE) LOADLIB(your_SHRFLOAD))
   EXITDEF(TYPE(PARTNER) EXITNAME(FOIPPUUE1) LOADLIB(your_SFOILOAD))
   ```
   Where your_SHRFLOAD and your_SFOILOAD are the data set names of the SHRFLOAD and SFOILOAD libraries.

2. Create a unique GLXssid0 member for each IMS system in which you plan to use IMS Online Reorganization Facility. ssid is the 4-character IMS subsystem identifier.
   Add the following lines to each GLXssid0 member:
EXITDEF(TYPE(LOGR) EXITNAME(HRFFLGX0)
   LOADLIB(your_SHRFLOAD))

Where your_SHRFLOAD is the data set name of the SHRFLOAD library.

3. Update your IMS control region JCL to include in the //STEPLIB concatenation the executable load libraries for IMS Tools Generic Exits, the IMS Tools Online System Interface, and IMS Online Reorganization Facility.

What to do next

For detailed instructions on how to add GPRssid0 and GLXssid0 members, see the Tools Base IMS Tools Common Services User’s Guide.

Important:

- If you use any other user-defined or vendor partner exit that does not support IMS Tools Generic Exits, you must ensure that the libraries that contain the DFSPPUE0 and DFSFLGX0 exits are concatenated ahead of the SGLXLOAD and those exits must pass control to the next exit in the STEPLIB so that IMS Tools Generic Exits get control.

- The IMS Tools Generic Exits load library, SGLXLOAD, must be in front of the IMS Tools Online System Interface load library, SFOILOAD, in the IMS control region //STEPLIB concatenation.

- The IMS Online Reorganization Facility library, SHRFLOAD, must be in front of the IMS SDFSRESL in the IMS control region //STEPLIB concatenation.

- The same maintenance level of IMS Online Reorganization Facility must exist in the //STEPLIB concatenations of all IMS control regions that share the same RECON data sets.
Configuring IMS Tools Online System Interface

You must configure IMS Tools Online System Interface to use IMS Online Reorganization Facility or functions of IMS Database Solution Pack tools that use IMS Tools Online System Interface. It is a general-purpose IMS command interface that is distributed as part of Tools Base.

About this task

IMS Tools Online System Interface is an IMS command interface that is used by multiple products to issue commands to an IMS subsystem. IMS Tools Online System Interface is used by many of the functions included in IMS Database Solution Pack. IMS Tools Online System Interface requires the use of the IMS Tools Generic Partner Exit interface.

As part of the installation and configuration for IMS Tools Online System Interface, you might have already performed the following steps. However, if these steps have not yet been performed, complete them now.

The executable load libraries of IMS Tools Online System Interface must be APF-authorized. The APF-authorization procedures will be guided in the subsequent tasks.

Procedure

1. Verify your installation and configuration of the IMS Tools Generic Partner Exit interface.
2. Create a unique FOIssidP member for each IMS system in which IMS Tools Online System Interface is needed. ssid is the 4-character IMS subsystem identifier.
   
   Within this FOIssidP member, there is a 5-character maximum XCFGROUP name. This XCFGROUP name is used later in the installation process and contains a "TOI" prefix that is used to create the complete XCF group name. Record each XCFGROUP name to use later.
3. Update your IMS control region JCL to include in the //STEPLIB concatenation the executable load libraries for IMS Tools Generic Exits and IMS Tools Online System Interface.
Configuring IMS Tools Knowledge Base

You must configure IMS Tools Knowledge Base if you want to store reports and sensor data in central repositories, use autonomic capabilities provided by Autonomics Director, or use the graphical web interface of Administration Console. IMS Tools Knowledge Base is a repository for reports and other information that is used by products in IMS Database Solution Pack. It is distributed as part of Tools Base.

About this task

IMS Tools Knowledge Base is the foundational infrastructure that provides a centralized information management environment for IMS Tools products and Policy Services.

IMS Tools Knowledge Base is a Tools Base component that allows you to store, manage, and access resources (such as reports, sensor data, policies, rules, notification lists, and decoded DBDs) that are generated or used by any tool product that has been enabled and registered to participate in an IMS Tools Knowledge Base information management environment.

Configuration of IMS Tools Knowledge Base includes configuring the IMS Tools Knowledge Base environment, registering the products and reports to IMS Tools Knowledge Base, and defining the product RECON ID records and IMS DBD libraries.

Procedure

For instructions for configuring IMS Tools Knowledge Base, see the topic "IMS Tools KB administrator reference" in the Tools Base IMS Tools Knowledge Base User’s Guide.

While you follow the instructions in the Tools Base IMS Tools Knowledge Base User’s Guide, you register the IMS Tools products and reports by using the product administration utility (HKTAPRA0) of IMS Tools Knowledge Base. Follow the instructions in the topic "Registering IMS Tools products by using the definition table of the product" to do this. For the product definition tables to specify on the ADDPROD statements, see the following table.

Table 13. Product definition tables and IDs for IMS Database Solution Pack

<table>
<thead>
<tr>
<th>Tool</th>
<th>Product definition table</th>
<th>Product ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Sensor</td>
<td>BBESITK2</td>
<td>DG</td>
</tr>
<tr>
<td>IMS Database Reorganization Expert</td>
<td>HPSGITKB</td>
<td>DA</td>
</tr>
<tr>
<td>IMS HP Unload</td>
<td>HPSUITKB</td>
<td>DU</td>
</tr>
<tr>
<td>IMS HP Load</td>
<td>HPSRITKB</td>
<td>DL</td>
</tr>
<tr>
<td>IMS HP Prefix Resolution</td>
<td>FABYITKB</td>
<td>DH</td>
</tr>
<tr>
<td>IMS HP Pointer Checker</td>
<td>FABPITKB</td>
<td>DP</td>
</tr>
<tr>
<td>IMS HP Image Copy</td>
<td>FABJITKB</td>
<td>DI</td>
</tr>
<tr>
<td>IMS Index Builder</td>
<td>IIUTITKB</td>
<td>DX</td>
</tr>
</tbody>
</table>

For example, the following ADDPROD statements are for registering the reports of the Database Sensor component and IMS Database Reorganization Expert:

ADDPROD TABLE=BBESITK2,REPLACE=YES
ADDPROD TABLE=HPSGITKB,REPLACE=YES
After you register IMS Database Solution Pack with IMS Tools Knowledge Base, follow the instructions in the topic "Listing registered products and reports" in the Tools Base IMS Tools Knowledge Base User’s Guide to list the registered products and reports, and ensure that product IDs of the products that you registered exist (for product IDs, see Table 13 on page 67).
Configuring Policy Services

You must configure Policy Services if you plan to use the Conditional Reorganization Support Service in Smart Reorg utility jobs of IMS Database Reorganization Expert or IMS Online Reorganization Facility jobs, or if you plan to use Database Sensor.

About this task

Configuration requirements for Policy Services include the coordination of the following product components and information that is provided in their respective user guides.

Tools Base IMS Tools Knowledge Base

IMS Tools Knowledge Base is the foundational infrastructure that provides a centralized information management environment for IMS Tools products and Policy Services.

IMS Tools Knowledge Base is a Tools Base component that allows you to store, manage, and access resources (such as reports, sensor data, policies, rules, and notification lists) that are generated or used by any tool product that has been enabled and registered to participate in an IMS Tools Knowledge Base information management environment.

Tools Base Policy Services

Policy Services is the core technology that supports conditional autonomic database health management functionality provided by participating IMS Tools products.

IMS Database Solution Pack products

The Conditional Reorganization Support Service of the Smart Reorg utility provides the ability to automate the decision-making tasks that are involved in database reorganization. It evaluates the database and determines whether reorganization is needed. To use the Conditional Reorganization Support Service of the Smart Reorg utility, you must install and configure IMS Database Reorganization Expert.

Database Sensor collects statistics of IMS databases and stores the data in a central repository that is provided by IMS Tools Knowledge Base. The stored data can be used by Autonomics Director, Policy Services, and Administration Console for database analysis and tuning purposes. To use Database Sensor, you must install IMS Database Reorganization Expert.

The Database Sensor process can be called within IMS HP Image Copy and IMS HP Pointer Checker jobs. If you plan to use Database Sensor in these product jobs, install and configure these products.

Procedure

For instructions for configuring Policy Services, see the topic "Configuring Policy Services" in the Tools Base Policy Services User’s Guide.
**Configuring Autonomics Director**

You must configure Autonomics Director if you want Database Sensor to send a sensor data collection notification to Autonomics Director. Autonomic Director will use this notification as a trigger to start analyzing and generating recommendations for the database.

**About this task**

Autonomics Director is a tool that automates recurring database monitoring tasks, including on-demand scheduling of database sensor and evaluation.

Autonomics Director uses sensor data that is stored in the Sensor Data repository of IMS Tools Knowledge Base to monitor the health, performance, and recoverability of the database. In the Autonomics Director jobs, policy evaluation of Policy Services is internally called to evaluate the database state based on the sensor data that is stored in the Sensor Data repository.

Configuration of Autonomics Director includes configuring IMS Tools Knowledge Base, Policy Services, and the Autonomics Director environment, which includes setting up the Autonomics Director server and the Autonomics Director ISPF user interface.

**Procedure**

For instructions for configuring Autonomics Director, see the topic "Configuring Autonomics Director" in the Tools Base Autonomics Director User's Guide. While you configure Autonomics Director, you will be guided to create skeleton JCL for DB Sensor. You can use the sample skeleton JCL, BBESJCL2, in the SHPSSAMP library to do so.
Configuring Administration Console

You must configure Administration Console if you want to view sensor data charts, database exceptions, reports, graphical view of database structures, and DBD source through a web browser.

About this task

You can install the web server for Administration Console on Windows or on z/OS. The Administration Console web server is a central server that consolidates information from various z/OS sources, so only a single server must be installed.

Procedure

For instructions for configuring the Administration Console server, see the topic "Installing the Administration Console web server" in the Tools Base Administration Console User’s Guide.

What to do next

To display graphical view of database structures and DBD source, you must also install the DBD Map Viewer add-on feature, which is provided by IMS Library Integrity Utilities, to Administration Console. The instructions for installing the DBD Map Viewer are provided in the subsequent topic.
Configuring Distributed Access Infrastructure

You must configure Distributed Access Infrastructure if you want to view DBD maps with the DBD Map Viewer in Administration Console. Distributed Access Infrastructure facilitates the message transmission between the DBD Map Viewer in Administration Console and IMS Library Integrity Utilities installed on the z/OS system.

About this task

Distributed Access Infrastructure operates in a z/OS environment and uses a TCP Server, the Tools Access Server (TAS), and the Subordinate TAS (SOT) to provide distributed access to IMS Library Integrity Utilities from the Administration Console client.

Procedure

Configure the TCP Server, TAS, and SOT. For instructions, see the topic "Configuring Distributed Access Infrastructure” in the Tools Base Distributed Access Infrastructure User’s Guide.

Configuring Tools Base Version 1 Release 5 or later

Identify the Tools Base components that will be required in your environment and configure the components.

About this task

Many of the tools included in IMS Database Solution Pack integrate with the components that are included in Tools Base. The following Tools Base components might be used in your IMS Database Solution Pack environment.

**Autonomics Director**

Autonomics Director provides automation of IMS database monitoring based on an understanding of the current state of your IMS databases. Autonomics Director must be configured if you want Database Sensor to send a sensor data collection notification to Autonomics Director. Autonomic Director will use this notification as a trigger to start analyzing and generating recommendations for the database.

**Distributed Access Infrastructure**

Distributed Access Infrastructure acts as a gateway for communication between distributed platforms and z/OS. It operates in a z/OS environment and uses a TCP Server, the Tools Access Server (TAS), and the Subordinate TAS (SOT) to provide distributed clients access to IMS Tools through TCP/IP socket communication. Distributed Access Infrastructure also facilitates the message transmission between the DBD/PSB Map Viewer in Management Console and IMS Library Integrity Utilities installed on the z/OS system. Distributed Access Infrastructure must be configured to use Management Console.

**IMS Tools Common Services**

IMS Tools Generic Exits provides the ability to define multiple IMS exits and enable them to be called within the IMS control region. One of the exits supported is the Partner Product exit routine (DFSPPUE0). This exit is required to use IMS Tools Online System Interface.

IMS Tools Online System Interface is a command interface that allows IMS Tools to interface with all supported versions of IMS.

**IMS Tools Knowledge Base**

IMS Tools Knowledge Base is the foundational infrastructure that provides a centralized information management environment for IMS Tools products and Policy Services. IMS Tools Knowledge Base allows you to store, manage, and access resources (such as reports, sensor data, policies, rules, notification lists, and decoded DBDs) that are generated or used by any tool product that has been enabled and registered to participate in an IMS Tools Knowledge Base information management environment. IMS Tools Knowledge Base must be configured if you want to store reports and sensor data in central repositories, use autonomies capabilities provided by Autonomics Director, or use the graphical web interface of Management Console.

**Policy Services**

Policy Services is a core IMS Tools technology that can monitor specific database state by evaluating the sensor data collected by an IMS Tools product, and by providing a response to any conditions that exceed the threshold values specified for this state. Policy Services must be configured if you plan to use the Conditional Reorganization Support Service in Smart
Reorg utility jobs of IMS Database Reorganization Expert or IMS Online
Reorganization Facility jobs, or if you plan to use Database Sensor.

**Procedure**

1. Identify which Tools Base components will be used in your environment.
   The following table shows the Tools Base components and whether they are supported by each tool of IMS Database Solution Pack. Tools Base components that are not listed in the table are not used by the tools of IMS Database Solution Pack.

<table>
<thead>
<tr>
<th>IMS Tools</th>
<th>Autonomics Director</th>
<th>Distributed Access Infrastructure</th>
<th>IMS Tools Common Services</th>
<th>IMS Tools Knowledge Base</th>
<th>Policy Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMS Online Reorganization Facility</td>
<td>Optional</td>
<td>Optional</td>
<td>Required</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>IMS HALDB Toolkit</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IMS Database Reorganization Expert</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>IMS HP Unload</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
</tr>
<tr>
<td>IMS HP Load</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
</tr>
<tr>
<td>IMS HP Prefix Resolution</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
<td>Optional</td>
<td>-</td>
</tr>
<tr>
<td>IMS Index Builder</td>
<td>-</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>-</td>
</tr>
<tr>
<td>IMS HP Image Copy</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>IMS HP Pointer Checker</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>IMS Library Integrity Utilities</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IMS Library Integrity Utilities extension</td>
<td>-</td>
<td>Required</td>
<td>-</td>
<td>Required</td>
<td>-</td>
</tr>
<tr>
<td>Database Sensor</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Required</td>
<td>Optional</td>
</tr>
<tr>
<td>Database Repair Facility</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

2. Follow the instructions in the *Tools Base Configuration Guide for IMS* to configure the Tools Base components that you identified in step 1.

The following considerations and additional information help you configure the Tools Base components for use with IMS Database Solution Pack.

**IMS Tools Knowledge Base**

When you register the IMS Tools products and reports by using the product administration utility (HKTAPRA0) of IMS Tools Knowledge Base, refer to the product definition table names in the following table. These product definition table names are used for the ADDPROD statements of the HKTAPRA0 utility.
Table 14. Product definition tables and IDs for IMS Database Solution Pack tools

<table>
<thead>
<tr>
<th>Tool</th>
<th>Product definition table</th>
<th>Product ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Sensor</td>
<td>BBESITK2</td>
<td>DG</td>
</tr>
<tr>
<td>IMS Database Reorganization</td>
<td>HPSGITKB</td>
<td>DA</td>
</tr>
<tr>
<td>Expert</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMS HP Unload</td>
<td>HPSUITKB</td>
<td>DU</td>
</tr>
<tr>
<td>IMS HP Load</td>
<td>HPSRITKB</td>
<td>DL</td>
</tr>
<tr>
<td>IMS HP Prefix Resolution</td>
<td>FABYTITK</td>
<td>DH</td>
</tr>
<tr>
<td>IMS HP Pointer Checker</td>
<td>FABPITKB</td>
<td>DP</td>
</tr>
<tr>
<td>IMS HP Image Copy</td>
<td>FABJITKB</td>
<td>DI</td>
</tr>
<tr>
<td>IMS Index Builder</td>
<td>IIUITITK</td>
<td>DX</td>
</tr>
</tbody>
</table>

For example, you can use the following ADDPROD statements to register the reports of the Database Sensor component and IMS Database Reorganization Expert:

```
ADDPROD TABLE=BBESITK2,REPLACE=YES
ADDPROD TABLE=HPSGITKB,REPLACE=YES
```

**Autonomics Director**

While you configure Autonomics Director, you will be guided to create skeleton JCL for Database Sensor. You can use the sample skeleton JCL, BBESJCL2, in the SHPSSAMP library to do so.

**IMS Tools Common Services**

**Important:** If you plan to use IMS Online Reorganization Facility, instead of completing the steps in the *Tools Base Configuration Guide for IMS* to configure IMS Tools Generic Exits, complete the steps in “Configuring IMS Tools Generic Exits for IMS Online Reorganization Facility” on page 64.

**Configuring IMS Tools Generic Exits for IMS Online Reorganization Facility**

If you plan to use IMS Online Reorganization Facility, you must install and configure the IMS Tools Generic Partner Exit interface and the IMS Tools Generic Logger Exit interface. Both of them are distributed as part of the IMS Tools Generic Exits. The IMS Tools Generic Partner Exit interface allows multiple exit routines to be called during IMS initialization, while the IMS Tools Generic Logger Exit interface allows multiple exit routines to be called during IMS logger execution.

**About this task**

As part of the installation and configuration for the IMS Tools Generic Partner Exit, you might have already performed part of the following steps. If you have not completed some of these steps yet, complete them now.

In this task, you will configure the environment for the following exit routines:

- The Generic Partner exit routine that is provided by IMS Online Reorganization Facility (HRFOPPUE)
- The Generic Partner exit routine that is provided by the IMS Tools Online System Interface (FOIPPUE1)
• The Generic Logger exit routine that is provided by IMS Online Reorganization Facility (HRFFLGX0)

The executable load libraries of IMS Tools Generic Exits, the IMS Tools Online System Interface, and IMS Online Reorganization Facility must be APF-authorized. The APF-authorization procedures will be guided in the subsequent tasks.

Procedure

1. Create a unique GPRssid0 member for each IMS system in which you plan to use IMS Online Reorganization Facility. ssid is the 4-character IMS subsystem identifier.

   Add the following lines to each GPRssid0 member:

   EXITDEF(TYPE(PARTNER) EXITNAME(HRFOPPUE)
   LOADLIB(your_SHRFLOAD))

   EXITDEF(TYPE(PARTNER) EXITNAME(FOIPPUE1)
   LOADLIB(your_SFOILOAD))

   Where your_SHRFLOAD and your_SFOILOAD are the data set names of the SHRFLOAD and SFOLOAD libraries.

2. Create a unique GLXssid0 member for each IMS system in which you plan to use IMS Online Reorganization Facility. ssid is the 4-character IMS subsystem identifier.

   Add the following lines to each GLXssid0 member:

   EXITDEF(TYPE(LOGR) EXITNAME(HRFFLGX0)
   LOADLIB(your_SHRFLOAD))

   Where your_SHRFLOAD is the data set name of the SHRFLOAD library.

3. Update your IMS control region JCL to include in the //STEPLIB concatenation the executable load libraries for IMS Tools Generic Exits, the IMS Tools Online System Interface, and IMS Online Reorganization Facility.

What to do next

For detailed instructions on how to add GPRssid0 and GLXssid0 members, see the Tools Base IMS Tools Common Services User’s Guide.

Important:

• If you use any other user-defined or vendor partner exit that does not support IMS Tools Generic Exits, you must ensure that the libraries that contain the DFSPPUE0 and DFSFLGX0 exits are concatenated ahead of the SGLXLOAD and those exits must pass control to the next exit in the STEPLIB so that IMS Tools Generic Exits get control.

• The IMS Tools Generic Exits load library, SGLXLOAD, must be in front of the IMS Tools Online System Interface load library, SFOLOAD, in the IMS control region //STEPLIB concatenation.

• The IMS Online Reorganization Facility library, SHRFLOAD, must be in front of the IMS SDFSRESL in the IMS control region //STEPLIB concatenation.

• The same maintenance level of IMS Online Reorganization Facility must exist in the //STEPLIB concatenations of all IMS control regions that share the same RECON data sets.
Configuring Management Console

You must configure IBM Management Console for IMS and DB2 for z/OS (Management Console) if you want to view sensor data charts, database exceptions, reports, graphical view of database structures, and DBD source through a web browser.

About this task

You can install the web server for Management Console on Windows or on z/OS. The Management Console web server is a central server that consolidates information from various z/OS sources, so only a single server must be installed.

Procedure

For instructions for configuring the Management Console server, see the topic "Configuring Management Console" in the Management Console User’s Guide.

What to do next

To display graphical view of database structures, program specifications, and DBD and PSB source, you must also install the DBD/PSB Map Viewer, the IMS Library Integrity Utilities extension for Management Console. The instructions for installing the DBD/PSB Map Viewer are provided in subsequent topics.
APF authorizing the program libraries

You must make certain changes to your MVS system to allow IMS Database Solution Pack to operate with the required level of authority.

About this task

Before using any of the tools in IMS Database Solution Pack, you must ensure that all the authorizations are set up correctly for your environment. The following libraries require authorized program facility (APF) authorization:

- The library that contains the IMS Database Solution Pack executable modules
- All tools that are part of IMS Database Solution Pack that are not in the SHPSLMD0 library
- The libraries of related common tools of Tools Base
- The libraries that contain the user exit modules, site default table modules, and base configuration modules, if they exist

Procedure

1. Add the required libraries to your MVS APF list.
   Add the libraries in the following table to your MVS APF list and any other library that is specified in the STEPLIB of each batch utility job or IMS control region.

   Table 15. Load libraries to be APF-authorized

<table>
<thead>
<tr>
<th>Library</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAILINK</td>
<td>Distributed Access Infrastructure</td>
</tr>
<tr>
<td>SHPSLMD0</td>
<td>IMS Database Solution Pack</td>
</tr>
<tr>
<td>SIULMOD</td>
<td>IMS Index Builder</td>
</tr>
<tr>
<td>SHRFLOAD</td>
<td>IMS Online Reorganization Facility</td>
</tr>
<tr>
<td>SIHCLOAD</td>
<td>IMS HALDB Toolkit</td>
</tr>
<tr>
<td>SGLXLOAD</td>
<td>IMS Tools Generic Exits</td>
</tr>
<tr>
<td>SFOILOAD</td>
<td>IMS Tools Online System Interface</td>
</tr>
<tr>
<td>SHKTLOAD</td>
<td>Autonomics Director, IMS Tools Knowledge Base, Distributed Access Infrastructure, and Policy Services</td>
</tr>
</tbody>
</table>

2. Complete either of the following steps to activate the updated APF list:
   - To temporarily APF-authorize the libraries, use the SETPROG APF system command. For more information, see z/OS MVS System Commands.
   - To permanently APF-authorize the libraries, add the libraries to the APF statement in the PROGxx member of SYS1.PARMLIB and re-IPL the system. For more information, see the z/OS MVS Initialization and Tuning Reference.
Performing security-related tasks

IMS Database Solution Pack requires specific RACF and security settings. You must ensure that all products have the necessary security authorizations in order for them to operate correctly.

Data spaces

Data spaces are used by IMS HP Load and IMS HP Image Copy under certain conditions.

Your environment might restrict the use of data spaces. If your site restricts which tools can create and use data spaces, you must authorize the following two products to allow the tool to function properly.

The following information pertains to the tools that use data spaces and the parameters that you can use to control their use.

IMS HP Load

IMS HP Load uses data spaces to reorganize the database records in the overflow part of the DBDS and to resolve long synonym chains after the database is reorganized.

The minimum amount of space that is used is 128 KB for each database. If IMS HP Load needs more data spaces, it obtains an additional 128 KB each time.

IMS HP Image Copy

IMS HP Image Copy uses data spaces only when it is called within IMS Database Reorganization Expert jobs that process secondary index databases with Type-A Image Copy processing.

IMS HP Image Copy uses data spaces to share control data among address spaces. Specifically, it uses data spaces to hold data that is being processed or to pass data between multiple address spaces. IMS HP Image Copy keywords control the use of the data spaces.

The amount of space used is 128 KB plus an additional 8 KB for each DBDS that is being processed.

If your site restricts which tools can create and use data spaces, you must authorize the load module library of IMS HP Image Copy (SHPSLMD0) to allow the tool to function properly.

Address spaces

IMS Index Builder and IMS HP Image Copy use the multiple address space architecture.

A common example is the user or job scheduler initiating the master address space (MAS) by submitting a set of saved JCL. The MAS then initiates one or more subordinate address spaces (SAS) to perform the requested processing. In some cases, the SAS also initiates other subordinate address spaces.
IMS Index Builder address space considerations

IMS Index Builder executes in a multiple address space environment. The main job can be submitted by the user or a job scheduler, or initiated as a started task.

The job name is determined by the user. The authority is obtained from the user ID that is associated with the job. IMS Index Builder can then initiate either of the following subordinate address spaces types, depending on the processing that is being performed:

IIUSORTS

The IMS Index Builder sort subordinate address space that is initiated as a started task. The name of the started task, by default, is IIUSORTS. However, the name can be changed in the IIURPRMS customization module by using the IIURDFTL SORTP parameter.

By default, IMS Index Builder uses the IIUSBRT procedure, found in the system procedure library to create the JCL for this started task. This procedure name can be overridden in the IIURPRMS customization module using the IIURSORT parameter. However, changing this procedure affects all the created address spaces.

IIUSCANS

The IMS Index Builder scan address space which is initiated as a started task. The name of the started task, by default, is IIUSCANS. However, the name can be changed in the IIURPRMS customization module using the IIURDFTL SCAN parameter.

By default, IMS Index Builder uses the IIUSBRT procedure, found in the system procedure library to create the JCL for this started task. This procedure name can be overridden in the IIURPRMS customization module using the IIURSORT parameter. However, changing this procedure affects all the created address spaces.

IIUAPIFC

The IMS Index Builder API address space. This address space is initiated as a started task when the Parallel Reorganization Service of IMS Database Reorganization Expert initiates IMS Index Builder. The name of the started task, by default, is IIUAPIFC. However, the name can be changed in the IIURPRMS customization module by using the IIURDFTL APIP parameter.

IMS Index Builder uses the same procedure for creating both the IIUAPIFC and IIUSORTS address spaces.

All started tasks that are created by IMS Index Builder run with the same authority as the main job that was initiated. When IMS Index Builder initiates a started task, code that is executing in that address space creates a security control block that matches the one associated with the main job. This control block is swapped in the new address space so that it has the same level of authority as the main job. However, there is a short time in which the started task is running with default authority. For details on this situation and potential problems, see "Authorizing IMS Index Builder subordinate address space" on page 85.

The user ID that is associated with the IMS Index Builder job needs the following authority to the listed data sets:

- CONTROL access to the RECON data sets
- READ access to database data sets
- ALTER access to index data sets
IMS HP Image Copy address space considerations
IMS HP Image Copy executes in a multiple address space environment. The main job can be submitted by the user or a job scheduler, or initiated as a started task.

About this task

Advanced Image Copy Services of IMS HP Image Copy schedules the DFSMSdss program (server) and uses its application programming interface (API). The DFSMSdss server runs in a different address space from the address space of IMS HP Image Copy. When a batch job starts, it starts the DFSMSdss server address space. The server remembers which job started the server. While the server is running, it accepts other connections until the originating job ends. At the end of the originating job, the job notifies the server that it has finished and this notification alerts the server that it can stop. Until the DFSMSdss address space is stopped, the address space is reused by the DFSMSdss API.

You can also start the DFSMSdss server within IMS HP image Copy jobs. When the server is started, the server can be used by other applications that run in the same system.

Tip: The DFSMSdss server address space simplifies the running of multiple jobs. Therefore, consider starting the DFSMSdss server address space in the system whenever possible.

Procedure

To start the DFSMSdss server address space within an IMS HP Image Copy job, follow these steps:
1. Create the following started task procedure and add it to SYS1.PROCLIB.

```hll
//*******************************************************************************
//* THIS PROCEDURE WILL CREATE AN APPROPRIATE DFSMSDSS CROSS MEMORY SERVER TO USE,
//* ENTER THE FOLLOWING AT A CONSOLE:
//* START DFSMSDSS,PROG=ADRXMAIB
//* WHEN THE DFSMSDSS CROSS MEMORY SERVER IS NO LONGER REQUIRED
//* ISSUE THE FOLLOWING MODIFY COMMAND:
//* F DFSMSDSS,STOP
//*******************************************************************************

//DFSMSDSS PROC PROG=IEFBR14
//IEFPROC EXEC PGM=&PROG,REGION=0M,TIME=1440,DYNAMNBR=1635

//*******************************************************************************
```

2. Start the DFSMSdss server address space by using either of the following methods:
   - Issue the following command:
     `S DFSMSDSS,PROG=ADRXMAIB`
   - Add the procedure as a started task in your IPL procedure.
3. When the DFSMSdss server address space is started, run the IMS HP Image Copy jobs.
4. When your IMS HP Image Copy jobs end, and if you want to stop the server address space, issue the following command:
Defining RACF (or equivalent security) authorization for IMS commands

You must define RACF (or equivalent security software) authorizations for Database Sensor, IMS Database Reorganization Expert, IMS HP Image Copy, and IMS HP Pointer Checker to operate.

About this task

The Database Sensor, IMS Database Reorganization Expert, IMS HP Image Copy, and IMS HP Pointer Checker functions allow you to execute IMS commands through a batch job. IMS commands must be secured with RACF or other equivalent security software to control access to who can issue IMS commands. There are three different options for securing IMS commands through this feature. The information about IMS command authorization is defined in the Tools Base IMS Tools Knowledge Base RECONID record.

Procedure

In the IMSCMD Security field, which is located in the RECONID record, specify the type of security that you want to implement by entering one of these values:

NONE
No security authorization is performed. This value is intended for test environments only and should not be used in a secured environment. The security level of NONE allows anyone to issue any supported IMS command.

APPL
The RACF application (APPL) resource class is used for command security checking. This method uses the application resource class (APPL) to protect the IMS commands. The RACF Class field in the RECONID record indicates the specific application resource name, within the RACF APPL class, that is used for securing the IMS commands.

When you use the APPL resource class method, you must first define the application resource name (applname in the next example) to RACF. Define the application resource name to RACF by using the RDEFINE command, as shown in this example:

RDEFINE APPL applname UACC(NONE) AUDIT(NONE)

After you have defined the application resource name, your RACF administrator can permit users either READ or UPDATE levels of command authorization by using the PERMIT command, as shown in this example:

PERMIT applname CLASS(APPL) ID(userid) ACCESS(READ|UPDATE)

The userid specifies a particular RACF user or RACF group. ACCESS specifies either read-level access or update-level access. Read-level access allows a user to issue IMS commands that display IMS system information, and update-level access allows users to issue IMS commands that alter IMS system resources. The next table indicates which IMS commands are allowed and the corresponding level of access that is required to run them.

IMS
The IMS resource class is used for command security checking. This method uses the same IMS command security class that is used by the online IMS system. The RACF Class field in the RECONID record
indicates the RACF security class that is used for securing IMS commands. This value must match the one that you specified to IMS using the RCLASS= keyword on the SECURITY macro. This method allows you to use the same security class that is used by your online IMS control region.

**Commands and required access levels for RACF APPL resource class authority**

During the customization process, you will need to issue various commands. Make sure that your user ID has the required authority to issue these commands.

IMS commands and their corresponding required access levels for RACF APPL resource class authority are shown here.

**IMS commands**

The following table summarizes the IMS commands that are used in product jobs and the access levels that are required to issue the commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Access level required</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>/CHECKPOINT</td>
<td>Update</td>
<td>IMS Online Reorganization Facility</td>
</tr>
<tr>
<td>/DBDUMP</td>
<td>Update</td>
<td>• IMS Database Reorganization Expert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS Index Builder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS HP Image Copy</td>
</tr>
<tr>
<td>/DBRECOVERY</td>
<td>Update</td>
<td>• IMS HP Image Copy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS Online Reorganization Facility</td>
</tr>
<tr>
<td>/DISPLAY</td>
<td>Read</td>
<td>• IMS Database Reorganization Expert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS Index Builder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS HP Image Copy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS Online Reorganization Facility</td>
</tr>
<tr>
<td>/START</td>
<td>Update</td>
<td>• IMS Database Reorganization Expert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS Index Builder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS HP Image Copy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IMS Online Reorganization Facility</td>
</tr>
<tr>
<td>/STOP</td>
<td>Read</td>
<td>IMS Online Reorganization Facility</td>
</tr>
<tr>
<td>QUERY</td>
<td>Read</td>
<td>IMS HP Image Copy</td>
</tr>
<tr>
<td>UPDATE</td>
<td>Update</td>
<td>IMS HP Image Copy</td>
</tr>
</tbody>
</table>

**DBRC API requests and DBRC commands**

The following table summarizes the DBRC API requests and the DBRC commands that are used in product jobs.

<table>
<thead>
<tr>
<th>DBRC API request or command</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBRC API - AUTH</td>
<td>IMS Index Builder</td>
</tr>
<tr>
<td>DBRC API request or command</td>
<td>Product</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------</td>
</tr>
</tbody>
</table>
| DBRC API - QUERY           | • IMS Database Reorganization Expert  
                            • IMS Index Builder  
                            • IMS HP Image Copy  
                            • IMS HP Pointer Checker  
                            • IMS Library Integrity Utilities  |
| DBRC API - START/STOP      | • IMS Database Reorganization Expert  
                            • IMS Index Builder  
                            • IMS HP Image Copy  
                            • IMS HP Pointer Checker  |
| DBRC API - STARTDBRC/STOPDBRC | IMS Library Integrity Utilities  |
| DBRC API - RELBUF          | IMS Library Integrity Utilities  |
| DBRC command - CHANGE      | • IMS Database Reorganization Expert  
                            • IMS Index Builder  
                            • IMS HP Image Copy  |
| DBRC command - LIST        | • IMS Database Reorganization Expert  
                            • IMS Index Builder  
                            • IMS HP Image Copy  
                            • IMS HP Pointer Checker  
                            • IMS Library Integrity Utilities  |
| DBRC command - NOTIFY      | • IMS Database Reorganization Expert  
                            • IMS Index Builder  
                            • IMS HP Image Copy  |

For the access levels that are required to issue these requests and commands, see the following topics:

• Topics about DBRC security in *IMS System Administration*
• Topics about DBRC API security features in *IMS System Programming APIs*

To set RACF control information for these IMS commands, DBRC API requests, and DBRC commands, see *IMS Commands* for the version of IMS that you are using.

**Defining RACF authority to dynamically allocate and catalog data sets**

Set up the RACF authority to dynamically allocate and catalog data sets beginning with the high-level qualifier that you specified in the JCL and PROC members.

Here are some examples:

• Database data sets  
• Index data sets  
• Image copy data sets  
• Work data sets
Setting up security for IMS Index Builder

Setting up security for IMS Index Builder includes three tasks: Authorizing IMS Index Builder subordinate address space, granting READ access to the IMS Index Builder load library for the user ID, and granting ALTER work file access to the IMS Index Builder users.

Authorizing IMS Index Builder subordinate address space
You must authorize the IMS Index Builder subordinate address space to run under a security system. Before using the subordinate address space, make sure that you have established proper security authorization and access.

About this task

The subordinate address space's user ID is obtained in two phases, as described in the following steps:

Procedure

1. Before the IMS Index Builder code is dispatched in the subordinate address space and has the opportunity to set its security identity, the operating system attempts to use the user ID from the profile definitions in the security system's STARTED class as the user ID for these started tasks.
   
   If you use the IMS Index Builder default job names, you can use the following RDEFINE to specify the user ID. The STARTED class is RACLIST’ed and must be refreshed after you make updates.

   ```
   RDEFINE STARTED IIU*.* STDATA(USER(userid))
   SETROPTS RACLIST(STARTED) REFRESH
   ```
   
   You can also use the started procedures module ICHRIN03 to associate started procedures and jobs with user IDs, instead of using the RDEFINE STARTED command.

   If you use the IIURPRMS module to override the default job names, you must define the STARTED class profiles that correspond to the installation names.

2. After the IMS Index Builder code is dispatched in the subordinate address space, IMS Index Builder processing determines the user ID under which the master address space runs. The subordinate address space changes its own initial user ID to match that of the master address space. Once this change occurs, the subordinate address space runs with the same security authorities as the master.

Granting READ access to the IMS Index Builder load library for the user ID
You must grant READ access to the IMS Index Builder load library SIIULMOD for the user ID.

Defining the IMS Index Builder load library to the security system with UACC(READ) is recommended so that all user IDs have access to the STEPLIB. If you do not want to define UACC(READ), you must set READ access to the load library for the user ID or for the group associated with the STARTED class profile, and also for the user ID under which the master address space runs.

Granting ALTER work file access to the IMS Index Builder users
Depending on which processing mode IMS Index Builder uses, IMS Index Builder can use stripe data sets to pass records between its address spaces. The stripe data sets exist only for the duration of that particular IMS Index Builder run.
When stripe data sets are used, the user ID associated with the master address space requires ALTER access to these data sets. You associate ALTER access to the stripe data sets by defining an IIU.STRIPE.* DATASET profile with UACC(ALTER). If your installation security policies do not allow UACC(ALTER), you must add each user that executes IMS Index Builder to this DATASET profile's access list with ALTER access.

By default, stripe data sets are allocated with the high-level qualifiers IIU.STRIPE. You can override this default by using the IIURDFLT CLASS setting in the IIURPRMS parameter module. However, if you override the default high-level qualifiers, you must define a DATASET profile corresponding to the installation's qualifiers.
Obtaining XCF group names for Tools Base servers

You must obtain the XCF group names for the Tools Base server groups to set up JCL streams, cataloged procedures, and site default options for IMS Database Solution Pack tools.

XCF group name for the IMS Tools Knowledge Base servers

The XCF group name for the IMS Tools Knowledge Base servers must be specified in the JCL streams for IMS Database Solution Pack tools to use one of the following services of Tools Base directly from tools’ jobs:
- IMS Tools Knowledge Base report repository service
- Policy Services
- Autonomics Director

For example, specify the ITKBSRVR parameter in the PROC control statement of IMS HP Pointer Checker. You can set default values for the runtime options by using the Installation Default Option to make the specification applied to all the run of IMS HP Pointer Checker jobs, without specifying them in each JCL stream.

XCF group name for the Autonomics Director servers

The XCF group name for the Autonomics Director servers must be specified in the JCL streams for IMS Database Solution Pack tools to use the sensor data notification service from various database sensor functions of the tools.

For example, specify the ADXCFGRP parameter in the PROC control statement of IMS HP Pointer Checker. You can set default values for the runtime options by using the installation default option to make the specification applied to all the run of IMS HP Pointer Checker jobs, without specifying them in each JCL stream.

XCF group name for the IMS Tools Online System Interface server tasks

The XCF group name for the IMS Tools Online System Interface server tasks must be specified in the JCL streams for IMS Database Solution Pack tools to issue IMS commands from the tools’ jobs.

For example, specify the TOSIXCFGRP=grpname parameter in the HPSIN input of IMS Database Reorganization Expert, where grpname is the 5-character XCF group name.
Updating sample procedures and JCL

Update the required sample members in the SHPSSAMP library and sample PROC in the SIIUPROC library.

Updating the required sample members in the SHPSSAMP library

Create or modify the required sample members in the SHPSSAMP library for IMS Database Solution Pack.

Each sample member has instruction on how to customize each member.

Copy and modify the necessary PROC and JCLPDS members to your IMS PROCLIB, system PROCLIB, or JCLPDS data sets.

The following tables summarize the sample members that are used to implement each product distributed in the IMS Database Solution Pack sample library SHPSSAMP.

Subsections:
- “Database Sensor sample members”
- “IMS HP Unload sample members” on page 89
- “IMS HP Load sample members” on page 89
- “IMS HP Image Copy sample members” on page 89
- “IMS HP Pointer Checker sample members” on page 89
- “IMS Library Integrity Utilities sample members” on page 91

Database Sensor sample members

The following table summarizes the sample members for IMS Database Solution Pack Database Sensor.

Table 16. IMS Database Solution Pack Database Sensor sample members in the SHPSSAMP library

<table>
<thead>
<tr>
<th>Sample member</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
</table>
| BBESJCL1      | Stand-alone Database Sensor sample JCL  
**Note:** You can use this JCL to verify Database Sensor installation. | JCL |
| BBESJCL2      | Stand-alone Database Sensor sample skeleton JCL  
**Note:** You can use this JCL to run Database Sensor automatically by using the scheduling functions of Autonomics Director. See the topic “Creating skeleton JCL for the full-function stand-alone DB Sensor” in the *Tools Base Autonomics Director User’s Guide* for Tools Base V1.4 or in the *Tools Base Configuration Guide* for IMS for Tools Base V1.5. | JCL |
| BBESDFL1      | Database Sensor procedure to generate a site default table (Database Sensor Site Default Generation utility) | PROC |
| BBESDFL2      | Database Sensor procedure to report the contents of the site default table (Database Sensor Site Default Generation utility) | PROC |
IMS HP Unload sample members

The following table summarizes the sample members for IMS HP Unload.

Table 17. IMS HP Unload sample members in the SHPSSAMP library

<table>
<thead>
<tr>
<th>Sample member</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FABHDBB</td>
<td>IMS HP Unload DBB region procedure</td>
<td>PROC</td>
</tr>
<tr>
<td>FABHDB2</td>
<td>IMS HP Unload DLI region procedure</td>
<td>PROC</td>
</tr>
<tr>
<td>FABHDLI</td>
<td>IMS HP Unload DLI region procedure</td>
<td>PROC</td>
</tr>
<tr>
<td>FABHULU</td>
<td>IMS HP Unload ULU region procedure</td>
<td>PROC</td>
</tr>
<tr>
<td>FABIRGEN</td>
<td>IMS HP Unload Asm/Link procedure to generate</td>
<td>PROC</td>
</tr>
<tr>
<td></td>
<td>Sequential Subset Randomizer</td>
<td></td>
</tr>
</tbody>
</table>

IMS HP Load sample members

The following table summarizes the sample members for IMS HP Load.

Table 18. IMS HP Load sample members in the SHPSSAMP library

<table>
<thead>
<tr>
<th>Sample member</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FABSPSSI</td>
<td>IMS HP Load procedure to invoke Physical Sequence Sort</td>
<td>PROC</td>
</tr>
<tr>
<td></td>
<td>Sort Reload</td>
<td></td>
</tr>
<tr>
<td>FABSPSSR</td>
<td>IMS HP Load procedure to invoke Physical Sequence Sort</td>
<td>PROC</td>
</tr>
<tr>
<td></td>
<td>Sort Reload</td>
<td></td>
</tr>
</tbody>
</table>

IMS HP Image Copy sample members

The following table summarizes the sample members for IMS HP Image Copy.

Table 19. IMS HP Image Copy sample members in the SHPSSAMP library

<table>
<thead>
<tr>
<th>Sample member</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FABJICD1</td>
<td>Defaults for GENJCL.IC</td>
<td>Input</td>
</tr>
<tr>
<td>FABJICD2</td>
<td>Defaults for GENJCL.IC</td>
<td>Input</td>
</tr>
<tr>
<td>FABJICS0</td>
<td>Skeleton JCL for GENJCL.IC</td>
<td>JCLPDS</td>
</tr>
<tr>
<td>FABJRVGR</td>
<td>Skeleton JCL for GENJCL.RECOV</td>
<td>JCLPDS</td>
</tr>
</tbody>
</table>

IMS HP Pointer Checker sample members

The following table summarizes the sample members for IMS HP Pointer Checker.

Table 20. IMS HP Pointer Checker sample members in the SHPSSAMP library

<table>
<thead>
<tr>
<th>Sample member</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FABKSPMP</td>
<td>IMS HP Pointer Checker procedure to invoke Space Monitor.</td>
<td>PROC</td>
</tr>
<tr>
<td>FABPP</td>
<td>IMS HP Pointer Checker procedure to invoke HD Pointer</td>
<td>PROC</td>
</tr>
<tr>
<td></td>
<td>Checker to check pointers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This procedure uses a PSB. The work data sets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>are defined in the procedure.</td>
<td></td>
</tr>
<tr>
<td>Sample member</td>
<td>Description</td>
<td>Type</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>FABPPA</td>
<td>IMS HP Pointer Checker procedure to invoke HD Pointer Checker to check pointers.</td>
<td>PROC</td>
</tr>
<tr>
<td></td>
<td>This procedure uses a PSB. The job runs in the DBB region by using ACBLIB. HD Pointer Checker dynamically allocates the work data sets.</td>
<td></td>
</tr>
<tr>
<td>FABPPD</td>
<td>IMS HP Pointer Checker procedure to invoke HD Pointer Checker to check pointers.</td>
<td>PROC</td>
</tr>
<tr>
<td></td>
<td>This procedure uses a DBD. The work data sets are not defined in the procedure; HD Pointer Checker dynamically allocates them.</td>
<td></td>
</tr>
<tr>
<td>FABPPTA</td>
<td>IMS HP Pointer Checker procedure to invoke HD Pointer Checker and HD Tuning Aid to check pointers and root-segment locations.</td>
<td>PROC</td>
</tr>
<tr>
<td></td>
<td>This procedure uses a PSB.</td>
<td></td>
</tr>
<tr>
<td>FABPC</td>
<td>IMS HP Pointer Checker procedure to invoke HD Pointer Checker to check pointers.</td>
<td>PROC</td>
</tr>
<tr>
<td></td>
<td>This procedure uses a PSB. The work data sets are defined in the procedure.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use this procedure if you want Database Sensor to store sensor data or Space Monitor to monitor IMS online full-function databases while checking pointers.</td>
<td></td>
</tr>
<tr>
<td>FABPCD</td>
<td>IMS HP Pointer Checker procedure to invoke HD Pointer Checker to check pointers.</td>
<td>PROC</td>
</tr>
<tr>
<td></td>
<td>This procedure uses a DBD. The work data sets are not defined in the procedure; HD Pointer Checker dynamically allocates them.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use this procedure if you want Database Sensor to store sensor data or Space Monitor to monitor IMS online full-function databases while checking pointers.</td>
<td></td>
</tr>
<tr>
<td>FABPCTA</td>
<td>IMS HP Pointer Checker procedure to invoke HD Pointer Checker and HD Tuning Aid to check pointers and root-segment locations.</td>
<td>PROC</td>
</tr>
<tr>
<td></td>
<td>This procedure uses a PSB.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use this procedure if you want Database Sensor to store sensor data or Space Monitor to monitor IMS online full-function databases while checking pointers.</td>
<td></td>
</tr>
<tr>
<td>FABTIMS</td>
<td>IMS HP Pointer Checker procedure to invoke HD Tuning Aid under IMS.</td>
<td>PROC</td>
</tr>
<tr>
<td>FABTMVS</td>
<td>IMS HP Pointer Checker procedure to invoke HD Tuning Aid for MVS batch.</td>
<td>PROC</td>
</tr>
</tbody>
</table>
IMS Library Integrity Utilities sample members

The following table summarizes the sample member for IMS Library Integrity Utilities.

Table 21. IMS Library Integrity Utilities sample members in the SHPSSAMP library

<table>
<thead>
<tr>
<th>Sample member</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FABLPGEN</td>
<td>IMS Library Integrity Utilities procedure to generate LIU global option module</td>
<td>PROC</td>
</tr>
</tbody>
</table>

Updating the required sample PROC in the SIIUPROC library

Copy the required sample PROC in the SIIUPROC library to your IMS PROCLIB or system PROCLIB data sets and modify the member.

Table 22. Sample PROC in the SIIUPROC library

<table>
<thead>
<tr>
<th>Sample member</th>
<th>Product</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>IIUBSRT</td>
<td>IMS Index Builder</td>
<td>Sort address space procedure</td>
<td>PROC</td>
</tr>
</tbody>
</table>
Setting up IMS Online Reorganization Facility

IMS Online Reorganization Facility provides the function to reorganize databases with minimal downtime. If you want to use IMS Online Reorganization Facility, you must configure the base environment, and enable any pause features that you plan to use.

About this task

To configure IMS Online Reorganization Facility, complete the following tasks:
1. “Configuring the base environment for IMS Online Reorganization Facility”
2. “Enabling the BMP pause feature” on page 96
3. “Enabling the CICS and ODBA applications pause feature” on page 98

Configuring the base environment for IMS Online Reorganization Facility

To configure IMS Online Reorganization Facility, create the restart data set and the base configuration module.

About this task

To run IMS Online Reorganization Facility, you must create the following resources:

- The restart data set, which saves information for restarting jobs
- The base configuration module, which defines the base configuration parameters

The sample members in these steps are provided in the SHRFSAMP library.

Procedure

1. Edit the sample member HRFCINST.
   
   The following figure shows the HRFCINST job. This job creates the restart data set.
Modify the data set name and volume for the restart data set:

- Change all instances of `your_restart_data_set` to the name of your restart data set.
- Change `rstvol` to the volume serial number of your restart data set, or replace it with an asterisk (*) if you use SMS.

2. Run the HRFCINST job to create the restart data set.

3. Edit the sample member HRFCCNFG.
   The following figure shows the HRFCCNFG job. This job creates the base configuration module.
a. Define the information about the restart data set and the XCF group names to be used.

The following parameters specify these resources:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSTRTDSN</td>
<td>Required. Specifies the name of the restart data set to be used.</td>
</tr>
<tr>
<td></td>
<td>Specify the name of the restart data set that you created in steps 1 on page 92 and 2 on page 93.</td>
</tr>
<tr>
<td>TOIGROUP</td>
<td>Required. Specifies the XCF group name for the IMS Tools Online System Interface.</td>
</tr>
<tr>
<td></td>
<td>The group name must begin with TOI, and the rest of the name must be the same as the XCFGROUP name that is specified in the FOLSSID name that is created in &quot;Configuring IMS Tools Online System Interface&quot; on page 66.</td>
</tr>
</tbody>
</table>
b. Define the allocation information for the temporary RECON data set.
The following allocation parameters are used to create the temporary RECON data set:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XCFGROUP</td>
<td>Required. Specifies the XCF group name to use for communication between IMS control regions and IMS Online Reorganization Facility batch jobs. You can specify up to 8 characters of the group name. This name must be different from the TOIGROUP parameter value and unique within the sysplex.</td>
</tr>
<tr>
<td>RECON</td>
<td>Required. Specifies the temporary RECON data set name high-level qualifier. You can specify up to 26 characters of the data set name. This parameter will be appended internally with either a DBD or HALDB partition name plus a time stamp.</td>
</tr>
<tr>
<td>RCDATAAC</td>
<td>Optional. Specifies the DATACLAS for the temporary RECON data set.</td>
</tr>
<tr>
<td>RCMGMTTC</td>
<td>Optional. Specifies the MGMTCLAS for the temporary RECON data set.</td>
</tr>
<tr>
<td>RCSTORC</td>
<td>Optional. Specifies the STORCLAS for the temporary RECON data set.</td>
</tr>
<tr>
<td>RCVOL</td>
<td>Required for non-SMS environments. Specifies the volume serial number for the temporary RECON data set.</td>
</tr>
</tbody>
</table>

4. Run the HRFCCNFG job to create the base configuration module HRFSETOP.
5. Add the base configuration module to the STEPLIB DD concatenation of IMS control region JCL, then recycle all the affected control regions. You do not need to restart the systems.

You receive the following initialization messages from IMS Online Reorganization Facility and from the IMS Tools Online System Interface component in each IMS control region that shares the same RECON data sets.
What to do next

The base configuration parameters that are defined in the base configuration module can be changed later. For more information, see the topic “Customizing your base environment” in the IMS Database Solution Pack IMS Online Reorganization Facility User’s Guide.

Enabling the BMP pause feature

If you plan to use IMS Online Reorganization Facility for databases that are used by long-running BMPs, you must enable the BMP pause feature for any BMPs that access the databases during the reorganization process.

About this task

Based on your environment, you can select from the following configuration types when you enable the BMP pause feature:

- Changing BMP jobs and having IMS Online Reorganization Facility manage BMP pauses.
- Not changing BMP jobs and having IMS Online Reorganization Facility manage BMP pauses.
- Having IMS Program Restart Facility manage BMP pauses.

Important: IMS Program Restart Facility can also manage BMP pauses. If IMS Program Restart Facility is installed, complete the steps in “Enabling BMP pauses with IMS Program Restart Facility” on page 98.

For more information about the BMP pause feature, see the topic “BMP pause feature” in the IMS Database Solution Pack IMS Online Reorganization Facility User’s Guide.

Enabling BMP pauses by modifying BMP application jobs

If you can make changes in the JCL of the BMP jobs and you want IMS Online Reorganization Facility to manage BMP pauses, add the required module to the IMS SDFSRESL data set.

About this task

In this configuration, module DFSRRC99 is added to the IMS SDFSRESL data set.

The sample members in these steps are provided in the SHRFSAMP library.
**Procedure**

1. Follow the instructions in the sample member HRFCBPJ1 and submit the job. This JCL adds the DFSRRC99 module to the IMS SDFSRESL data set. This module is a clone of the DFSRRC00 module and is called by the HRFRRCCXX region controller of IMS Online Reorganization Facility.

2. Optional: If you want to maintain the DFSRRC99 module by using SMP/E, follow the instructions in the sample member HRFCBPM1 and apply it. This USERMOD installs the JCLIN input for linking DFSRRC99. After this USERMOD is applied, SMP/E applies maintenance to both modules, DFSRRC00 and DFSRRC99. If you do not apply this USERMOD, any IMS maintenance updates for DFSRRC00 are not applied to DFSRRC99.

3. Change the JCL of the BMP jobs to invoke the HRFRRCCXX region controller in the IMS Online Reorganization Facility library.

   Add the IMS Online Reorganization Facility library to the STEPLIB, and change the EXEC statements to invoke the HRFRRCCXX region controller module. For example:

   ```
   //BMP EXEC PGM=HRFRRCCXX,
   //     REGION=80M,PARM='BMP,...
   //STEPLIB DD DISP=SHR, DSN=DBSP.SHRFLOAD
   //     DD DISP=SHR, DSN=IMS.SDFSRESL
   ```

**Enabling BMP pauses without modifying BMP application jobs**

If you do not want to make changes in the JCL of the BMP jobs and you want IMS Online Reorganization Facility to manage BMP pauses, add the required modules to the IMS SDFSRESL data set.

**Before you begin**

**Important:** In this configuration, the DFSRRC00 region controller of IMS is replaced with the HRFRRCCXX region controller of IMS Online Reorganization Facility. Before you start this task, consider the effect on other applications.

**About this task**

In this configuration, the following modules are added to the IMS SDFSRESL data set:

- DFSRRC99
- HRFRRCCXX (as DFSRRC00)
- HRFRRCnn (nn is a numeric value)
- HRFOARC0
- HRFYOFnn (nn is a numeric value)

The sample members in these steps are provided in the SHRFSAMP library.

**Procedure**

1. Follow the instructions in the sample member HRFCBPJ2 and submit the job. This JCL adds the following modules to the IMS SDFSRESL data set:

   - DFSRRC99 module. This module is a clone of the DFSRRC00 module and is called by the HRFRRCCXX region controller of IMS Online Reorganization Facility.
   - HRFRRCCXX region controller module. This module is added as DFSRRC00.
   - Other required modules.
2. Optional: If you want to maintain the DFSRRC99 module by using SMP/E, follow the instructions in the sample member HRFCBPM1 and apply it. This USERMOD installs the JCLIN input for linking DFSRRC99. After this USERMOD is applied, SMP/E applies maintenance to both modules, DFSRRC00 and DFSRRC99. If you do not apply this USERMOD, any IMS maintenance updates for DFSRRC00 are not applied to DFSRRC99.

3. Optional: If you want to maintain the IMS Online Reorganization Facility modules that are added to IMS SDFSRESL data set by using SMP/E, follow the instructions in the sample member HRFCBPM2 and apply it. This USERMOD installs the JCLIN input for linking IMS Online Reorganization Facility modules. After this USERMOD is applied, SMP/E applies maintenance to the IMS Online Reorganization Facility modules and to the IMS Online Reorganization Facility modules that are added to the IMS SDFSRESL data set. If you do not apply this USERMOD, IMS Online Reorganization Facility maintenance updates are not applied to the IMS Online Reorganization Facility modules in the IMS SDFSRESL data set.

Enabling BMP pauses with IMS Program Restart Facility

If you want IMS Program Restart Facility to manage BMP pauses, add the required modules to the IMS SDFSRESL data set. Complete these steps only if IMS Program Restart Facility is installed.

About this task

In this configuration, the following modules are added to the IMS SDFSRESL data set:

- HRFOARC0
- HRFYOFnn (nn is a numeric value)

The sample members in these steps are provided in the SHRFSAMP library.

Procedure

1. Follow the instructions that are provided by IMS Program Restart Facility. See the topic "Configuring IMS Program Restart Facility" in the IMS Program Restart Facility User’s Guide.

2. Follow the instructions in the sample member HRFCBPJ3 and submit the job. This JCL adds the BMP pause API module of IMS Online Reorganization Facility (HRFOARC0) and other required modules to the IMS SDFSRESL data set. IMS Program Restart Facility dynamically detects the HRFOARC0 module and calls the module when the module is found in the IMS SDFSRESL data set.

3. Optional: If you want to maintain the IMS Online Reorganization Facility modules that are added to the IMS SDFSRESL data set by using SMP/E, follow the instructions in the sample member HRFCBPM3 and apply it. This USERMOD installs the JCLIN input for linking IMS Online Reorganization Facility modules. If you do not apply this USERMOD, IMS Online Reorganization Facility maintenance updates are not applied to the IMS Online Reorganization Facility modules in the IMS SDFSRESL data set.

Enabling the CICS and ODBA applications pause feature

If you plan to use IMS Online Reorganization Facility for databases that are used by CICS® or ODBA applications, you must enable the CICS and ODBA applications pause feature for any CICS and ODBA applications that access the databases during the reorganization process.
**About this task**

Based on your environment, you can select from the following methods to enable the CICS and ODBA applications pause feature:

- Creating the required module in a load library other than the IMS SDFSRESL data set.
- Modifying the IMS SDFSRESL data set.

The CICS and ODBA applications pause feature is independent of the BMP pause feature. You can use the CICS and ODBA applications pause feature even if you are using IMS Program Restart Facility or IMS Recovery Solution Pack: Database Recovery Facility: Extended Functions to pause BMP applications.

For more information about the CICS and ODBA applications pause feature, see the topic "CICS and ODBA applications pause feature" in the *IMS Database Solution Pack IMS Online Reorganization Facility User’s Guide*.

**Enabling CICS and ODBA applications pauses without modifying the IMS SDFSRESL data set**

If you do not want to modify the IMS SDFSRESL data set, generate the required module in a different load library in the STEPLIB of IMS control region.

**About this task**

In this configuration, the DFSDBCTG module that is customized by IMS Online Reorganization Facility is added to a load library that precedes the IMS SDFSRESL in the STEPLIB DD concatenation of IMS control region JCL.

**Procedure**

1. Edit the sample member HRFCAPJ1, which is in the SHRFSAMP library, by following the instructions in the JCL.
2. Run the HRFCAPJ1 job.
   - The DFSDBCTG module that is customized by IMS Online Reorganization Facility is created.
3. Add the DFSDBCTG module to a library that precedes the IMS SDFSRESL in the STEPLIB DD concatenation of IMS control region JCL, then recycle all the affected control regions. You do not need to restart the systems.

**Enabling CICS and ODBA applications pauses by modifying the IMS SDFSRESL data set**

If you can allow a modification in the IMS SDFSRESL data set, add the required module to the IMS SDFSRESL data set.

**Before you begin**

Use SMP/E to apply and accept IMS maintenance, and ensure that IMS is at the latest maintenance level.

**Important:** In this configuration, the DBCTL composite load module of IMS, DFSDBCTG, is replaced with the one customized by IMS Online Reorganization Facility. Before you start this task, consider the effects on other applications.
About this task

In this configuration, the DFSDBCTG module that is customized by IMS Online Reorganization Facility is added to the IMS SDFSRESL data set. In this task, you create a USERMOD by using IMS Online Reorganization Facility and apply that USERMOD to IMS.

Important: If you use this method to enable the CICS and ODBA applications pause feature, be aware of the following considerations:

• Never accept the USERMOD created by IMS Online Reorganization Facility.
• After the USERMOD is applied, you must follow these steps when you apply IMS maintenance:
  1. Remove the USERMOD by using the SMP/E RESTORE command.
  2. Apply IMS maintenance.
  3. Rerun from Step 3 to create a new USERMOD and apply that USERMOD.

The sample members in these steps are provided in the SHRFSAMP library.

Procedure

1. If you have ever added the required module for CICS and ODBA applications pauses to the IMS SDFSRESL data set, follow the instructions in the sample member HRFCAPJ3 to remove the old USERMOD from IMS.
2. Edit the sample member HRFCAPJ2 by following the instructions in the JCL.
3. Run the HRFCAPJ2 job.
   The job creates a USERMOD for the DBSDBCTG module, and then performs SMP/E RECEIVE and APPLY for the generated USERMOD. The DFSDBCTG module that is customized by IMS Online Reorganization Facility is added to the IMS SDFSRESL data set.
4. Recycle all the affected control regions. You do not need to restart the systems.
Setting up IMS HALDB Toolkit

IMS HALDB Toolkit provides functions to maintain HALDBs and to convert IMS full-function databases to HALDBs. If you want to use IMS HALDB Toolkit, you must create the base configuration module for IMS HALDB Toolkit.

About this task

IMS HALDB Toolkit uses temporary RECON data sets and a temporary DBD library for some functions. The base configuration module defines the allocation parameters for creating these resources when IMS HALDB Toolkit is started.

Procedure

1. Edit the sample member, IHCCSET, which is provided in the SIHCSAMP library.

   The following figure shows the IHCCSET job. This job creates the base configuration module for IMS HALDB Toolkit.

   ```
   //IHCCSET JOB
   //EXEC PGM=ASMA90,
   //   PARM='LIST,RENT,DECK,N00BJ'
   //SYSPRINT DD SYSOUT=* 
   //SYSLIB DD DSN=SYS1.MACLIB,DISP=SHR
   //   DD DSN=DBSP.SIHCSAMP,DISP=SHR
   //SYST1 DD SPACE=(CYL,(2,2)),UNIT=SYSDA
   //SYSPUNCH DD DSN=&&OBJ,SPACE=(CYL,(1,1)),
   //   UNIT=SYSDA,DISP=(MOD,PASS),
   //   DCB=(BLKSIZE=2400,LRECL=80,RECFM=FB)
   //SYSS IN DD *
   WSET0 IHCCSET0 RECON=your.TEMP.RECON,
   RCVOL=rcvol,
   RCDATAC=*,
   RCSTORC=*,
   DBDSN=your.TEMP.DBDLIB,
   DBDVOL=dbdvol,
   DBDCLAS=*,
   DBSCLAS=*
   END
   //EXEC PGM=HEWL,PARM='XREF,LIST',COND=(4,LE,C)
   //SYSPRINT DD SYSOUT=* 
   //SYSLIB DD DISP=SHR,DSN=DBSP.SIHLOAD
   //SYSLMOD DD DISP=SHR,DSN=DBSP.SIHLOAD
   //SYST1 DD SPACE=(CYL,(5,2)),
   //   UNIT=SYSDA
   //SYSLIN DD DSN=&&OBJ,DISP=(OLD,DELETE)
   //   DD *
   //   NAME IHCWSET0(R)
   //
   ```

   a. Define the allocation information for the temporary RECON data set.

   The following allocation parameters are used to create the temporary RECON data set. Depending on your SMS definition, you might use only a subset of these parameters. However, if you are not using SMS, you must specify a volume serial number.
b. Define the allocation information for the temporary DBD library.

The following allocation parameters are used to create the DBD library:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECON</td>
<td>Required. Specifies the temporary RECON data set name high-level qualifier. You can specify up to 26 characters of the data set name. This parameter will be appended internally with the DBD name plus a time stamp.</td>
</tr>
<tr>
<td>RCVOL</td>
<td>Required for non-SMS environments. Specifies the volume serial number for the temporary RECON data set.</td>
</tr>
<tr>
<td>RCDATA</td>
<td>Optional. Specifies the DATACLAS for the temporary RECON data set.</td>
</tr>
<tr>
<td>RCASTORC</td>
<td>Optional. Specifies the STORCLAS for the temporary RECON data set.</td>
</tr>
</tbody>
</table>

2. Run the IHCCSET job.

HLASM and the LINKAGE editor create the base configuration module.

3. Add the base configuration module to the STEPLIB DD concatenation of IMS HALDB Toolkit runtime JCL. Ensure that the executable load libraries of IMS HALDB Toolkit are APF-authorized.
Setting up the Integrity Checker utility of IMS Library Integrity Utilities

The Integrity Checker utility of IMS Library Integrity Utilities prevents accidental misuse of ACBs or DBDs in your production environment. If you want to use the Integrity Checker utility, you must configure the utility.

Before you begin

Before you set up the Integrity Checker utility, see the topic "Integrity Checker overview" in the IMS Library Integrity Utilities User’s Guide and learn how the utility prevents database corruptions and how it works.

Planning for Integrity Checker configuration

Before you activate the DMB verification function of Integrity Checker, you must understand the resources used by Integrity Checker and design the most suitable Integrity Checker configuration for your IMS environment.

After you design your Integrity Checker configuration, activate Integrity Checker by completing the instructions in "Activating Integrity Checker" on page 117.

Use the following topics to design the Integrity Checker configuration:

- “LIU load module library customization”
- “LICON data sets and global option modules” on page 104
- “Integrity Checker configuration requirements” on page 105
- “Runtime options and environments” on page 111
- “Historical data maintained in LICON data sets” on page 112
- “Considerations for activating Integrity Checker” on page 114

LIU load module library customization

The IMS Library Integrity Utilities load module library (also referred to as LIU load module library) must be customized to use Integrity Checker.

The DMB verification function of Integrity Checker is triggered by IMS jobs (IMS online, application, IMS standard utility, and IMS Tools utility jobs) that access databases. Therefore, unlike other IMS Tools programs that run with JCL in which the EXEC PGM= parameter specifies the utility program name to execute, Integrity Checker must be customized to automatically start DMB verification when a database is accessed.

The DMB verification process runs as part of the DBRC authorization process. Therefore, instead of coding JCL statements, you must customize the LIU load module data set (SHPSLMD0 data set) to work with DBRC module DSPCRR0.

Important: In IMS Library Integrity Utilities Version 2 Release 1 and earlier, alias name DSPCRR0 was assigned for the FABLRTR0 module by default, but in IMS Library Integrity Utilities Version 2 Release 2 and later, the alias name is not assigned. You must customize the LIU load module library.

Methods for customizing the LIU load module library

Integrity Checker supports two methods for customizing the LIU load module data set. Compare the two methods and determine the best method for your environment.
Method 1: Defining alias name DSPCRTR0 for FABLRTR0 (recommended method)

Module FABLRTR0 is the program load module that is stored in the LIU load module library. Module DSPCRTR0 is the DBRC router module, which is one of the DBRC authorization modules.

If alias name DSPCRTR0 is defined for the FABLRTR0 module, and the LIU load module library precedes the IMS resident library (SDFSRESL data set) in the STEPLIB DD in JCL and procedures of IMS jobs, when a database is accessed by such jobs, instead of the DBRC module DSPCRTR0, the FABLRTR0 module starts and activates DMB verification. To apply this method, the LIU load module library must be APF-authorized.

- **Advantage:** You can use the standard SMP/E methods to apply program temporary fixes (PTFs) for both IMS Library Integrity Utilities and IMS.
- **Disadvantage:** You must modify the STEPLIB DD statement in JCL and procedures of all IMS jobs that access databases.

Method 2: Merging Integrity Checker load modules into the IMS resident library (SDFSRESL)

If all the Integrity Checker modules (FABL* members) in the LIU load module library are merged into the IMS SDFSRESL data set, when a database is accessed, the FABLRTR0 module, which is link-edited to the DBRC module DSPCRTR0 module, starts and activates DMB verification. Before the modules are merged, the FABLRTR0 module and DBRC module DSPCRTR0 must be link-edited to create one DSPCRTR0 module, and the module entry point must be set to FABLRTR0. Before the modules are merged, a backup of the IMS SDFSRESL data set must be created.

- **Advantage:** You do not need to modify the STEPLIB DD statement in each JCL and procedure of IMS jobs that access databases.
- **Disadvantage:** When you apply PTFs for IMS Library Integrity Utilities and IMS, the following additional steps are required:
  - For IMS Library Integrity Utilities, after you apply a PTF, you must merge the members again.
  - For IMS, if the PTF updates the DSPCRTR0 module, you must restore the DSPCRTR0 module before you apply the PTF. After you apply the PTF, create a backup of the SDFSRESL data set, and then link-edit FABLRTR0 and DSPCRTR0 again.

Integrity Checker supports multiple versions of IMS with one module. Therefore, with either method, if the version of IMS is supported by IMS Library Integrity Utilities, the same LIU load module data set can be used.

**LICON data sets and global option modules**

LICON data sets and global option modules are unique resources that are required by Integrity Checker.

**LICON data sets**

**LIU Integrity control data sets** (LICON data sets) are KSDS data sets that are the repositories for registered DMB entries (RDEs). RDEs contain database management block (DMB) information that is used in DMB verification. In the LICON data sets, RDEs are stored as KSDS records. At least one LICON data set must be defined and initialized.

Integrity Checker obtains the DMB information that IMS used to load the database, stores the information in the RDE as the correct DMB information, and refers to
that DMB information to verify the DMB information obtained from the DBDLIB or ACBLIB that is referenced by IMS jobs.

In addition to the DMB information, RDEs contain the following information:

- Runtime options that are applied to DMB verification.
- Time stamp of the last database access made by load utility programs, unload utility programs, and utilities or application programs with an update intent in the PSB.

When a DBD is updated, Integrity Checker updates the corresponding RDE accordingly.

In addition to the RDE that contains the latest DMB information, Integrity Checker also maintains historical copies of RDEs. You can use those copies to review the DBD information before a DBD change, or when you restore DBDs, you can use the copies to restore RDEs.

Global option modules

Global option modules are the configuration definition modules of Integrity Checker. Each global option module defines the LICON data set and the runtime options that are applied to DMB verification. IMS Library Integrity Checker does not provide global option modules, so you must create at least one global option module.

IMS Library Integrity Utilities provides the FABLPGEN program for creating global option modules. The LICON data set name and runtime options are defined through FABLPGIN macro control statements of the FABLPGEN program.

After running the FABLPGEN program, the source code must be assembled and link-edited to a load module. The created global option module must be stored in the LIU load module library.

Integrity Checker configuration requirements

Because DMB verification works within DBRC authorization processing, DBRC must be active in your IMS environment. The number of LICON data sets and global option modules in an Integrity Checker configuration depends on how the DBRC environment is configured.

The basic rules for designing an Integrity Checker configuration are as follows:

- One LICON data set must be created for each set of RECON data sets. (A set consists of RECON1, RECON2, and RECON3.)
- Global option modules contain the names of the LICON data sets. Therefore, if your environment requires multiple LICON data sets, you must prepare the same number of global option modules.
- Global option modules must be named using the following naming convention:

  LIU@INST
  The default name for the global option module. If your environment requires only one LICON data set, use this name.

  LIU@imsid
  If your environment requires multiple LICON data sets, use this format. For imsid, use the IMS ID of each IMS subsystem.
When multiple global option modules exist, Integrity Checker determines the global option module to use from the IMS ID. If no corresponding global option module is found for an IMS ID, Integrity Checker uses the default module LIU@INST. Even if the corresponding global option module is found, if some options are not defined in that module, the options that are defined in LIU@INST are applied. If LIU@INST is not found or some options are not defined in the LIU@INST, the system default values are used.

**Tip:** At sign (@) is a code-page-dependent character. If you are working in an environment where you cannot use the at sign (@), name the modules LIUGINST or LIUGimsid.

Use the following examples to design an Integrity Checker configuration for your environment.

- “Single IMS subsystem configuration example”
- “Multiple IMS subsystems configuration example: Data-sharing environment” on page 107
- “Multiple IMS subsystems configuration example: Non-data-sharing environment” on page 108
- “Multiple IMS subsystems configuration example: Multiple data-sharing environments” on page 109
- “Multiple IMS subsystems configuration example: XRF complex” on page 110

As a rule, the same runtime options must be defined for each LICON data set. To simplify the explanations, these examples are cases where one global option module refers to one LICON data set.

**Tip:** Certain runtime options can have different values within one LICON data set. To define different runtime option values, instead of assigning alias names for global option modules as shown in the examples, create one global option module for each IMS ID. For more information about the runtime options, see “Global option module generation macro” on page 129.

For IMS environments that are not explained in these examples, such as IMSplex, the basic rules are the same. For any IMS environment, you can follow these basic rules to design Integrity Checker configuration:

- One LICON data set for one set of RECON data sets
- One global option module for one LICON data set

**Single IMS subsystem configuration example**

The following figure shows the simplest configuration.

In this environment, one IMS subsystem is used and one set of RECON data sets is used, so the Integrity Checker resources that are required in this environment are as follows:

- Number of LICON data sets: 1
- Number of global option modules: 1

Because only one global option module is required, the name of the global option module is LIU@INST.
Multiple IMS subsystems configuration example: Data-sharing environment

The following figure illustrates a configuration where two IMS subsystems share databases.

In this environment, two IMS subsystems are used and one set of RECON data sets is used, so the Integrity Checker resources that are required in this environment are as follows:

- Number of LICON data sets: 1
- Number of global option modules: 1

Because only one global option module is required, the name of the global option module is LIU@INST.

Figure 8. Integrity Checker configuration for a single IMS subsystem
Multiple IMS subsystems configuration example: Non-data-sharing environment

The following figure illustrates a configuration where two IMS subsystems use a different set of databases. In such an environment, a LICON data set must be created for each IMS subsystem. Each LICON data set requires one global option module.

In this environment, two IMS subsystems are used and two sets of RECON data sets are used, so the Integrity Checker resources that are required in this environment are as follows:

- Number of LICON data sets: 2
- Number of global option modules: 2

Because two global option modules are required, the names of the global option modules are LIU@IMSA for IMS subsystem IMSA, and LIU@IMST for IMS subsystem IMST.

Figure 9. Integrity Checker configuration in a data-sharing environment
Multiple IMS subsystems configuration example: Multiple data-sharing environments

The following figure illustrates a configuration for multiple data-sharing environments. In each data-sharing environment, two IMS subsystems use the same set of databases. In such environments, a LICON data set must be created for each data-sharing environment.

Generally, when four IMS subsystems exist, four global option modules are required. However, as shown in the figure, if you create a global option module for each LICON data set and define an alias name for each global option module, you can design the Integrity checker configuration with two global option modules.

Create global option module LIU@IMSA for IMS subsystem IMSA, and then define alias name LIU@IMSB for LIU@IMSA so that IMS subsystem IMSB can also use LIU@IMSA. Do the same for IMS subsystems IMSC and IMSD.

**Tip:** If you create two global option modules (LIU@IMSA and LIU@IMSB), the LICON data set names and the runtime options must be the same between the two global option modules. By assigning an alias name and sharing a global option module, the same values are automatically applied; you can prevent errors that might be caused by inconsistency.

---

*Figure 10. Integrity Checker configuration in a non-data-sharing environment*
Multiple IMS subsystems configuration example: XRF complex

To use Integrity Checker in an XRF complex, the active IMS subsystems and the alternate IMS subsystems must use the same LICON data set. If they use different LICON data sets, the change log of the DMB is not inherited during takeover, and Integrity Checker might not detect the DMB inconsistency or might deny DBRC authorization even though the correct DBDLIB or ACBLIB is used.

If the number of active IMS subsystems is one, the number of required LICON data set is also one. The name of the global option module is LIU@INST.

If multiple active IMS subsystems exist, define a LICON data set for each set of RECON data sets, and create one global option module for each LICON data set.

For example, in an XRF complex shown in the following figure, create a global option module for each active IMS subsystem. Create LIU@IMS1 and LIU@IMS3, and then assign alias name LIU@IMS4 for LIU@IMS3.

Then, to apply the same runtime options to the active IMS subsystems and the alternate IMS subsystems, assign alias to the global option modules so that the alternate IMS subsystems can also use the same global option modules.

Specifically, IMS subsystems IMS1 and IMS2 are in a same XRF complex, so the two subsystems must use the same LICON data set. Therefore, assign alias name LIU@IMS2 for LIU@IMS1. IMS subsystems IMS5 and IMS6 are alternate IMS subsystems for IMS3 and IMS4, so all these subsystems must use the same LICON data set. Therefore, assign alias names LIU@IMS5 and LIU@IMS6 for LIU@IMS3.
Runtime options and environments
RDEs contain runtime options for DMB verification. Some runtime options can be defined differently for each IMS processing environment.

How the runtime options are specified

The runtime options are commonly used across the environment that uses the global option module. The global default values that are applied to the options when creating new RDEs can be specified for each database.

The runtime options are defined in the global option module. You can specify the following runtime options:

- The data set name of the LICON data set
- DMB verification method (single-step or double-step)
- Routing codes and descriptor codes of Integrity Checker messages
- Option values to control the processing of Integrity Checker
- Global default values for the options used in creating new RDEs:
  - DMB verification option
  - Database access record option
  - Number of expired RDEs to maintain

You specify the option values in the global option module by using the global option module generation macro. The option values that you specify are copied to the RDE when an RDE is created.
Generally, you can use the option values without changing them, but by using the LICON utility, you can change the option values in RDEs after they are created. By changing the values, you can apply different options for each database. For more information about these options, see "Global option module generation macro" on page 129.

How the runtime options are applied

Some runtime options can be set differently for each environment that Integrity Checker operates. Such options are referred to as DMB verification options.

DMB verification options control the processing and the action taken when a DMB mismatch is found. You can specify the options for each of the following IMS processing environments:

- Online IMS subsystem
- Batch program
- User load program
- Batch image copy utility
- Database recovery utility

For each environment, you can specify:

- Whether to activate DMB verification.
- Whether DMB verification sets a nonzero return code for the database authorization request to deny it, or only issues a warning message and registers the DMB to the LICON data set.

Using these options, you can control the behavior of DMB verification differently in each environment.

Recommendation: In all environments, set the option to deny the database authorization request when a DMB mismatch is found. By setting this option, you can prevent database corruption when an incorrect DBDLIB or ACBLIB is used.

Attention: Use the option Only issue a warning message and register the DMB to the LICON data set with caution. Use this option only when you intend to change the DBD, and you want the updated DBD reflected in the RDE so that the new DMB information is used in future DMB verifications. When this option is used, database corruption caused by use of an incorrect DBDLIB or ACBLIB cannot be prevented.

For example, if you want to use the DBD that is specified by a user load program for future DMB verifications, but you want to restrict DBD changes in other environments, you can have Integrity Checker issue a warning message and update the RDE in the user load program jobs, but deny database authorization when a DMB mismatch is found in other environments.

Historical data maintained in LICON data sets

Integrity Checker stores historical copies of RDEs in the LICON data sets. RDEs record database access logs for database update, load, and unload applications.

Historical copies of DBD definition

Integrity Checker maintains historical copies of RDEs. Each of these copies contains a part of the database description (DBD) that is used in DMB verifications.
Whenever a DBD is changed, Integrity Checker creates a new RDE that contains the latest DMB information. The historical copies of RDEs can be used to track the changes made to DBDs.

The content of the current RDE and historical copies of RDEs can be printed in reports. You can use the reports to examine the information in DBDs, review the changes made to DBDs, or to compare the difference between the current DBD and the DBDs used in the past.

To print the content of an RDE in a report, use the LIST.DB command of the LICON utility. For more information, see the following topics:

- To print a report, see the topic “LIST.DB command” in the IMS Library Integrity Utilities User’s Guide.
- For report field descriptions, see the topic “Output from Integrity Checker” in the IMS Library Integrity Utilities User’s Guide.

### Database access recording option

Integrity Checker records the time stamp of the last database access that is made by update, load, and unload applications in the RDE together with the IMS subsystem name. Such information can be printed in a report, which can be used as evidence in database auditing.

To record database accesses, make the specifications in the RDE by using the global option module or the LICON utility. To use the database access recording option, specify the option for each of the following database access types:

<table>
<thead>
<tr>
<th>Database access</th>
<th>Access type identified by Integrity Checker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load utility</td>
<td>Load access</td>
</tr>
<tr>
<td>Reorganization utility</td>
<td>Load access</td>
</tr>
<tr>
<td>Unload utility</td>
<td>Unload access</td>
</tr>
<tr>
<td>Recovery utility</td>
<td>Update access</td>
</tr>
<tr>
<td>Utility or application program with the PCB processing option (PROCOPT) of A, I, R, or D</td>
<td>Update access</td>
</tr>
</tbody>
</table>

For instructions to specify these options, see the following topics:

- To set the options in the global option module, see “Global option module generation macro” on page 129.
- To update the options in RDEs, see the topic “INIT.DB command” in the IMS Library Integrity Utilities User’s Guide.

When Integrity Checker is activated in an IMS online environment, Integrity Checker records access information only for the first database authorization request, and the recorded time is not updated while the IMS online environment is active. To have the recorded information updated while the IMS online environment is active, the ACCESS parameter of the DATABASE macro statement must specify UP or EX (during the system definition stage), or the parameter for the /START DB ACCESS= command must specify UP or EX.

**Restrictions:** The database access recording option can be used for the utilities or the application programs that are supported by Integrity Checker. However, the following restrictions apply:
• This option is not effective for online reorganization functions or online reorganization utilities that are provided by IMS or IMS Tools.

• For a database access through the High-Speed DEDB Direct Reorganization utility, Integrity Checker identifies the database access type as a database update.

• Database access for load or unload operations is recorded only when the operations are done by IMS standard utilities or IMS Tools utilities.

• If a utility or an application program ends with an error after the Integrity Checker DMB verification process ends successfully, the database access information that is recorded in the RDE is updated in the same way as when the utility or the application program ended successfully, even though the utility or application program ended with an error.

• For index databases or secondary index databases that have no PCBs, Integrity Checker does not record database access information in the RDEs except when the database operation is done by IMS Database Reorganization Expert.

**Considerations for activating Integrity Checker**

Before you activate Integrity Checker, review these considerations.

**Cases where DMB verification is not done**

DMB verification is not done in certain environments or for certain application jobs.

For more information, see the topic "Restrictions: Cases where DMB verification is not done" in the *IMS Library Integrity Utilities User’s Guide*.

**Size of the LICON data sets**

Before creating LICON data sets, you can estimate the required storage for the LICON data sets.

For more information, see "Estimating the size of the LICON data set" on page 115.

**LICON data set serialization consideration**

If you want more than one MVS system to access the LICON data set, you must serialize the LICON data set. To access the LICON data set from more than one MVS system, Global Resource Serialization (GRS) or a similar global enqueue product must be installed.

For more information, see "Serializing the LICON data set” on page 120.

**RACF security considerations**

If you want to protect the LICON data sets with RACF or if you plan to use Integrity Checker in IMS Database Recovery Facility jobs, you must modify RACF security.

For more information, see “Setting up RACF security” on page 121.

**Considerations when you alter the definition of an online HALDB or an online DEDB**

When you alter the definition of an online HALDB database or an online DEDB database with the following IMS command or IMS utility, you must temporarily stop the DMB verification process.

• Use the INITIATE OLREORG command (with the ALTER option) and the online change (OLC) function to alter the definition of an online HALDB database.

• Use the DEDB Alter utility (DBFUDA00) to alter the definition of an online DEDB database.

After you alter the definition, restart the DMB verification process with new RDEs. Without these steps, the DMB verification process uses the old
definitions to verify the DMBs. Therefore, the DMB verification process might deny database authorization requests that use correct IMS control blocks.

For detailed instructions, see the following topics in the *IMS Library Integrity Utilities User’s Guide*:

- "Altering the definition of a DMB verification-enabled online HALDB by using the HALDB alter function"
- "Altering the definition of a DMB verification-enabled online DEDB by using the DEDB Alter utility (DBFUDA00)"

**Consideration when you change the maximum size of OSAM data sets for a HALDB**

When you change the maximum size of OSAM data sets for a HALDB from 4 GB to 8 GB or 8 GB to 4 GB, you must use the LICON utility and manually create RDEs to reflect the change for the DMB verification process.

For more information, see the topic "Changing the maximum OSAM data set size for a DMB verification-enabled HALDB" in the *IMS Library Integrity Utilities User’s Guide*.

**Estimating the size of the LICON data set:**

Before you create LICON data sets, you can estimate the required storage for the LICON data sets.

**About this task**

Two methods are available for estimating the LICON data set size. The first method is more complicated but results in a precise data set size. The other method is simpler, but results in only an approximate data set size. You can use the simpler estimation method if the number of database segments is less than 20.

**Tips:**

- To accommodate any future increase in the number of databases, partitions, or DEDB areas, make the LICON data set size larger than the value that you calculate. For example, when you allocate a LICON data set, increase the calculated primary allocation size by 10% to 20%, and increase the secondary allocation size by approximately 10% of the primary allocation size.
- When you create multiple LICON data sets, you can create them on the same volume or on different volumes.

**Procedure**

For each LICON data set, use one of the following methods to estimate the data set size:

**Estimating the precise LICON data set size**

Use the following formula to calculate the precise LICON data set size:

\[
\text{LICON data set size} = \text{total size required for full-function databases} + \text{total size required for HALDBs} + \text{total size required for DEDBs}
\]
total_size_required_for_full-function_databases
The total size of all the full-function databases that are to be processed.

For each full-function database, calculate the required size by using the following formula:

\[
(450 + 32 \times \text{number of DSGs} + 52 \times \text{number of segments} + 180 \times \text{access_info_size}) \times 16
\]

Note: DSG stands for data set group.

total_size_required_for_HALDBs
The total size of all the HALDB partitions that are to be processed.

For each HALDB partition, calculate the required size by using the following formula:

\[
(450 + 32 \times \text{number of DSGs} + 52 \times \text{number of segments} + 180 \times \text{access_info_size}) \times 16
\]

total_size_required_for_DEDBs
The total size of all the DEDB areas that are to be processed.

For each DEDB area, calculate the required size by using the following formula:

\[
(220 + 48 \times \text{number of segments} + 180 \times \text{access_info_size}) \times 16
\]

Notes:
- If you do not enable the database access recording option (activated by the RECUPD, RECLD, or RECUL keyword in the global option module), access_info_size is 0. When this option is enabled, access_info_size increases by 1 for each keyword that you specify. For example, if you enable the RECUPD option (one keyword), access_info_size is 1. If you enable RECUPD and RECLD options (two keywords), access_info_size is 2.

Related reading: For instructions to activate this option, see “Global option module generation macro” on page 129.

- For these formulas, the units are in bytes.
- Each formula is multiplied by 16 for storing histories of database definitions.

Estimating the approximate LICON data set size

Use the following formula to calculate the approximate LICON data set size:

\[
\text{LICON data set size} = (32 \times \text{number of full-function databases} + 32 \times \text{number of HALDB partitions} + 16 \times \text{number of DEDB areas}) \text{ KB}
\]

number_of_full-function_databases
The number of full-function databases (excluding HALDBs) that are to be processed.

number_of_HALDB_partitions
The number of HALDB partitions that are to be processed.

number_of_DEDB_areas
The number of DEDB areas that are to be processed.
Activating Integrity Checker

Activating Integrity Checker involves preparing the global option modules, LICON data sets, and LIU load modules, and other steps.

Before you begin

Before you activate Integrity Checker, plan an Integrity Checker configuration for your environment, as described in “Planning for Integrity Checker configuration” on page 103.

About this task

To activate Integrity Checker, you first prepare the global option modules and the LICON data sets. Then, by using the DBD or ACB library, register the DMB information for your databases in the LICON data set. When this registration is done, customize the LIU load modules by using either of the following methods:

- Create an alias of the DSPCRTR0 module and add DD statements to JCL or procedures of DBRC, IMS batch application, IMS utility, and IMS Tools (recommended method).
- Merge load modules into the IMS SDFSRESL library.

Finally, activate Integrity Checker by restarting IMS online and running IMS batch applications, IMS utilities, and IMS Tools jobs.

In both IMS batch and online environments, the steps to activate Integrity Checker are the same. These steps can be applied when you reactivate Integrity Checker after Integrity Checker is deactivated.

Procedure

To activate Integrity Checker, complete the following steps:

1. “Setting up the global option modules”
2. “Setting up the LICON data sets” on page 118
3. “Setting up RACF security” on page 121
4. “Customizing LIU load modules” on page 123
5. “Configuring for a BPE-based DBRC environment” on page 127
6. “Verifying that Integrity Checker is activated” on page 128
7. “Restarting IMS online and running IMS batch application, IMS utility, and IMS Tools jobs” on page 129

Setting up the global option modules

Create global option modules and, optionally, assign alias names to the global option modules. At least one global option module must be present when Integrity Checker is started because Integrity Checker uses it to obtain the name of the LICON data set that it uses.

Before you begin

See “Integrity Checker configuration requirements” on page 105 and determine the number of global option modules to create. Also, determine whether to share a global option module across multiple IMS subsystems.
Procedure

1. Create global option modules.

To create global option modules, use the FABLPGEN procedure and provide the control statements by using the SYSIN input stream. The FABLPGEN procedure is in the SHPSSAMP data set. For an instruction, see “Global option module generation macro” on page 129.

Tip: To avoid activating Integrity Checker until all of your installation activities are complete, have no global option modules created.

Related reading: The topic “Options applied to RDEs when multiple global option modules exist with different effective ranges” in the IMS Library Integrity Utilities User’s Guide.

2. If you want more than one IMS subsystems to use a set of options that are defined in a single global option module, use the linkage editor to assign an alias name to the global option module.

In a database sharing environment where multiple IMS subsystems share databases, the LICON data set and option values that are defined in the global option module must be the same across the IMS subsystems. Assigning aliases is beneficial in such an environment as well as in XRF environments.

Use the following job to assign an alias name to the global option module.

```
//LKED JOB
//L EXEC PGM=IEWL,PARM='XREF,LIST'
//SYSPRINT DD SYSPUT**
//SYSPUT DD UNIT=(SYSDA,SEP=(SYSLMOD,SYSLIN)),
// SPACE=(1024,(100,10),RLSE),DISP=(,DELETE)
//SYSLMOD DD DISP=SHR,DSN=HPS.SHPSLMD0
//SYSLIN DD *
INCLUDE SYSLMOD(LIU@IMSA) /* Global option module for IMSID=IMSA */
   ALIAS LIU@IMSB /* Alias for IMSID=IMSB */
   NAME LIU@IMSA /* Original name for IMSID=IMSA */
/*
```

Setting up the LICON data sets

Define and initialize LICON data sets, create RDEs to register the correct DMB information, and serialize the LICON data sets. At least one LICON data set must be present to activate Integrity Checker.

Before you begin

See “Integrity Checker configuration requirements” on page 105 to determine the number of LICON data sets to create.

Procedure

The following steps describe how to set up a single LICON data set. If more than one LICON data set is required for your environment, complete the following steps for each LICON data set.

1. “Defining and initializing the LICON data set” on page 119
2. “Creating an RDE to register DMB information” on page 119
3. “Serializing the LICON data set” on page 120
Defining and initializing the LICON data set:

Define the LICON data set by using the DEFINE cluster command, and initialize it by using the INIT.LICON command of the LICON utility.

Procedure

1. Define the LICON data set by using the DEFINE CLUSTER command.

   Sample JCL is in the SHPSJCL0 library, member FABLINIT. The following figure shows the DEFLICON step of the sample JCL, which defines the LICON data set.

   Specify the values for the following parameters. For the CYL parameter, specify the size that you calculated in "Estimating the size of the LICON data set" on page 115.

   ```
   //DEFLICON EXEC PGM=IDCAMS
   //SYSPRINT DD SYSOUT=* 
   //SYSIN DD *
   DELETE (imshlq.licondsn) CLUSTER ERASE PURGE
   SET MAXCC=0
   DEFINE CLUSTER (NAME(imshlq.licondsn) -
   INDEXED -
   KEY (44 0) -
   SHR(3 3) -
   NOREUSE -
   VOL (liconvol) -
   CYL (pri sec) -
   RECSZ (4096 32760) -
   FREESPACE (xx xx)) -
   DATA(NAME(imshlq.licondsn.DATA)) -
   INDEX(NAME(imshlq.licondsn.INDEX))
   /*
   ```

2. Initialize the LICON data set by using the INIT.LICON command of the LICON utility.

   Sample JCL is in the SHPSJCL0 library, member FABLINIT. The following figure shows the INILICON step of the sample JCL, which initializes the LICON data set.

   Add the load module data sets that contain the global option module and the LIU load module library to the STEPLIB concatenation.

   ```
   //INILICON EXEC PGM=FABLIU00
   //STEPLIB DD DISP=SHR,DSN=HPS.SHPSSLMD
   // DD DISP=SHR,DSN=IMSVS.SDFSRESL
   //FABLPRINT DD SYSOUT=* 
   //FABLIN DD *
   INIT.LICON
   /*
   ```

Creating an RDE to register DMB information:

Create an RDE to register the correct DMB information by using the LICON utility.
About this task

This task is optional because if you do not create an RDE with the LICON utility, Integrity Checker creates an RDE automatically when the database is accessed for the first time after Integrity Checker is activated. In this case, Integrity Checker creates an RDE for each database that is accessed while IMS is online. Therefore, the performance of IMS online processing might decline depending on the number of databases. Consider creating RDEs manually by using the LICON utility to avoid performance degradation.

If you want Integrity Checker to create RDEs automatically, you can skip this task.

Procedure

Use the LICON utility to create an RDE.

Ensure that you provide the following information with the JCL statements:

- Specify the DBD library or the ACB library that contains the DMB information to be used in DMB verifications.
- To verify the user exit routine, add the data set that contains the user exit routine to be used in DMB verifications to the STEPLIB concatenation.

Provide the INIT.DB command in the FABLIN input stream. The RDE is created in the LICON data set that is specified by the global option module found in the STEPLIB concatenation.

The following JCL example is for the LICON utility. INIT.DB DBD(*) specifies that an RDE is created for every DBD member in the DBD library IMSVS.DBDLIB.

```
//LICJOB JOB
// EXEC PGM=FABLIU00
//STEPLIB DD DISP=SHR,DSN=HPS.SHPSLMD0
// DD DISP=SHR,DSN=IMSVS.SDFSRESL
//DBDLIB DD DISP=SHR,DSN=IMSVS.DBDLIB
//FABLPRNT DD SYSOUT=* 
//FABLIN DD *
  INIT.DB DBD(*)
/*
```

Serializing the LICON data set:

This step is optional. If you want more than one MVS system to access the LICON data set, you must serialize the LICON data set.

Procedure

To access the LICON data set from more than one MVS system, you must install Global Resource Serialization (GRS) or a similar global enqueue product. GRS processes the resource as a global resource. The global enqueue product must propagate the enqueues to all MVS hosts. If the enqueues are not propagated to all hosts that have access to the LICON data set, the data set becomes corrupted and unusable.

The LICON data set is enqueued with the following parameters at the SYSTEMS level:
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>QNAME</td>
<td>'FABLICON'</td>
</tr>
<tr>
<td>RNAME</td>
<td>The name of the LICON data set</td>
</tr>
</tbody>
</table>

### Setting up RACF security

You can optionally set up RACF security to protect LICON data sets. If you plan to activate Integrity Checker in IMS Database Recovery Facility jobs and if DBRC command and API request authorization support is enabled with RACF, ensure that appropriate permission is given to users.

#### Procedure

Complete the following steps to set up RACF security:

- "Setting up security for LICON data sets"
- "Setting up security for IMS Database Recovery Facility jobs" on page 122

#### Setting up security for LICON data sets:

This step is optional. If you want to protect the LICON data sets with RACF, complete this step.

#### About this task

The following procedure provides a brief overview of the security setting for LICON data sets.

For more information about the security setting of the started tasks, see the topics that describe how to associate started procedures and jobs with user IDs in the z/OS Security Server RACF System Programmers Guide and in the z/OS Security Server RACF Security Administrators Guide.

#### Procedure

To use RACF to protect the LICON data sets, define data set profiles for the LICON data sets. Also, because LICON data sets are accessed in each environment, consider the following requirements in both IMS online environment and batch environment.

#### IMS online environment

For IMS online processing, access to the LICON data set is done by the DBRC region. In this case, the DBRC region must be assigned a user ID, preferably by using the RACF STARTED class. This assignment can also be done by using the RACF started task table (ICHRIN03) or the USER= and PASSWORD= values on the DBRC job or the task JCL. Give UPDATE access authority to the LICON data set for the user ID assigned to the DBRC region.

The following list contains an example of the statements that are used to create and enable LICON data set protection by using RACF.
AG licongrp
AU liconusr DFLTGRP(licongrp)
RDEF STARTED dbrcrgn.* STA(Data( USER(liconusr) GROUP(licongrp)))
ADDSD liuhlq.licon UACC(NONE)
PE liuhlq.licon ID(licongrp) ACCESS(UPDATE)

Batch environment

The user ID created for the DBRC online region cannot be used because
jobs can be submitted by many different users. The user ID will be used if
the ID is correctly assigned through the use of the RACF STARTED class
by coding entries for job names in the STARTED class and associating
those entries with the user ID. However, the STARTED class is used only
when the batch jobs are started with the MVS START command. Jobs
submitted to a JES reader will not invoke a call to the STARTED class.
Therefore, they might not be assigned a user ID that allows appropriate
access to the LICON data set. In this case, all users authorized to run batch
jobs must be identified and connected to a group that has UPDATE access
to the LICON data set.

Setting up security for IMS Database Recovery Facility jobs:

If you plan to activate Integrity Checker in IMS Database Recovery Facility jobs,
complete this step.

Procedure

When you activate Integrity Checker in an IMS Database Recovery Facility job,
Integrity Checker uses the DBRC command utility and the DBRC API. If you
protect the DBRC command and DBRC API request authorization support with
RACF by permitting appropriate user access to the profiles, you must permit
appropriate users of jobs to use the following DBRC commands and DBRC API
requests:

DBRC command
LIST.RECON

DBRC API requests
• STARTDBRC
• STOPDBRC
• RELBUF
• QUERY,TYPE=DB
• QUERY,TYPE=PART

For more information about the RACF settings for DBRC commands and DBRC API requests, see the topic "DBRC security" in IMS System Administration.

**Customizing LIU load modules**

Customize the LIU load modules to activate Integrity Checker.

**Before you begin**

See “LIU load module library customization” on page 103 to determine which method you use to customize the LIU load modules.

**Procedure**

Customize the LIU load modules by using either of the following methods:

- “Method 1. Customizing LIU load modules by creating alias name DSPCRTR0”
- “Method 2. Customizing LIU load modules by merging into the IMS SDFSRESL library” on page 126

**Method 1. Customizing LIU load modules by creating alias name DSPCRTR0**

Create an alias name DSPCRTR0, APF-authorize the LIU load module library, and add DD statements to JCL and procedures of DBRC, IMS batch applications, IMS utilities, and IMS tools.

**Procedure**

1. Create alias name DSPCRTR0 by link-editing the FABLRTR0 load module.
   
   Complete this step if either of the following conditions apply:
   
   - You are activating Integrity Checker for the first time.
   - You removed the alias name DSPCRTR0 by completing the steps in the topic "Deactivating Integrity Checker when IMS Library Integrity Utilities is installed as a component of IMS Database Solution Pack or IMS Fast Path Solution Pack" in the IMS Library Integrity Utilities User’s Guide and you want to reactivate Integrity Checker.

   If you are reactivating Integrity Checker and the DSPCRTR0 alias that was created in the last activation still exists, you can skip this step.

   You can use the following JCL example to create alias name DSPCRTR0. This JCL is in the SHPSJCL0 library, member FABLALSC.

   When the job ends, confirm that the return code is 0.
2. APF-authorize the LIU load module library.
   The LIU load module library and the load module data sets that contain the
   global option modules must be APF-authorized.
   Use the z/OS SETPROG commands to APF-authorize the load libraries:
   SETPROG APF,ADD,DSNAME=LIU.SHPSLMD0,VOLUME=volume
   For more information about the SETPROG command, see z/OS MVS System
   Commands.

3. Add DD statements to JCL and procedures of DBRC, IMS batch applications,
   IMS utilities, and IMS tools.
   You must add DD statements to JCL and cataloged procedures for all the jobs
   that you want to activate Integrity Checker in. These JCL and procedures
   include those for DBRC, IMS batch applications, IMS utilities, and IMS Tools
   jobs that update IMS databases.

   Important: For integrity, ensure that all JCL and procedures that might change
   databases meet the following STEPLIB DD requirements.
   Add the following DD statements:

   STEPLIB DD
   Add the load module data sets that contain the global option module
   and the LIU load module library to the STEPLIB concatenation.
   The LIU load module library must be concatenated before the IMS load
   module library and must be APF-authorized.
   If you want Integrity Checker to detect changes in the logic of IMS user
   exits, which include randomizing routines, segment edit/compression
   exit routines, and HALDB or DEDB partition selection exit routines,
   also include the exit load modules in the STEPLIB concatenation.
   Integrity Checker does not check the user exit load modules in the LPA,
   ELPA, or LNKLST.

   FABLPRNT DD
   Optionally, you can specify the FABLPRNT DD statement in your
   procedures. This statement causes Integrity Checker to generate
   messages in the DD.
If this statement is specified, Integrity Checker writes messages into this DD in addition to issuing the WTO macro. Each message contains a time stamp in its prefix, and you can easily identify the messages in relation to the authorization request from your application programs.

**FABLSNAP DD**

Optionally, you can specify the FABLSNAP DD statement in your online DBRC procedure. This statement causes Integrity Checker to generate diagnostic information for the VSAM control blocks when Integrity Checker gets a VSAM error. For DL/I batch jobs, you do not need to specify this DD statement because the jobs issue an abend dump when they get a VSAM error.

**Example**

The following figures show examples of the procedures.

```
// PROC RGN=64M,DPTY='(14,15)',SOUT=A,
// IMSID=SYS3,SYS2=,IMSPLEX=
// EFPROC EXEC PGM=DFSMVRCO,REGION=&RGN,
// DPTY=DPTY,PARM='DRC,IMSID,IMSPLEX=IMSPLEX'
//*******************************************************************************
// STEPLIB DD DSN=HPS.SHPSLMD0,DISP=SHR <----- STEPLIB DD
// DSN=HPS.SHPSLMD0,DISP=SHR
// PROCLIB DD DSN=IM.SYS2.PROCLIB,DISP=SHR
// JCLOUT DD SYSOUT=(A,INTRDR)
// JCLPDS DD DSN=IM.SYS2.PROCLIB,DISP=SHR
// SYSDUMP DD SYSOUT=&SOUT
// SYSABEND DD SYSOUT=&SOUT
// FABLPRNT DD SYSOUT=&SOUT <<----- FABLPRNT DD
// FABLSNAP DD SYSOUT=&SOUT <<----- FABLSNAP DD
```

*Figure 13. Example of DBRC procedure for a non-BPE-based DBRC region*

```
// DBRC PROC RGN=0M,SOUT=A,
// RESLIB='IM.SDFSRESL',
// BPECFG=BPECONFG,
// DBRCINIT=000,
// IMSID=IMSI,
// PARM1='BPEINIT=DSPBINI0'
//*******************************************************************************
// DBRCPROC EXEC PGM=BPEINIO0,REGION=&RGN,
// PARM='BPECFG=BPECFG,IMSID=IMSID,IMSPLEX=IMSPLEX'
//*******************************************************************************
// STEPLIB DD DSN=HPS.SHPSLMD0,DISP=SHR <----- STEPLIB DD
// DSN=HPS.SHPSLMD0,DISP=SHR
// PROCLIB DD DSN=IM.SYS2.PROCLIB,DISP=SHR
// SYSPRINT DD SYSOUT=&SOUT
// SYSDUMP DD SYSOUT=&SOUT
// JCLPDS DD DSN=IM.SYS2.PROCLIB,DISP=SHR
// SYSAEND DD SYSOUT=&SOUT
// FABLPRNT DD SYSOUT=&SOUT <<----- FABLPRNT DD
// FABLSNAP DD SYSOUT=&SOUT <<----- FABLSNAP DD
```

*Figure 14. Example of DBRC procedure for a BPE-based DBRC region*
Method 2. Customizing LIU load modules by merging into the IMS SDFSRESL library:

Back up the IMS SDFSRESL library, and then merge the LIU load modules into the IMS SDFSRESL library.

Procedure

1. Back up the IMS SDFSRESL library.

When program temporary fixes (PTFs) are released for the DSPCRTR0 module, you must restore the DSPCRTR0 module from the backup to apply the PTFs. Therefore, before merging LIU load modules, you must create a backup of the IMS SDFSRESL library. The backup is also required to deactivate Integrity Checker.

2. Use SMP/E to apply and accept IMS and IMS Library Integrity Utilities maintenance, and ensure that both are at the latest maintenance level.

3. Run the FABLUMD1 job that is in the SHPSJCL0 JCL library.

This job updates the SMP/E CSI of IMS. It runs SMP/E RECEIVE/APPLY of USERMOD to install the FABLRTR0 module into the IMS SDFSRESL library.

Figure 15. Example of DLIBATCH procedure

```plaintext
// PROC MBR=TEMPNAME,PSB=,BUF=7, // SPIE=0,TEST=0,EXCPVR=0,RST=0,PRLD=, // SRCH=0,CKPTID=,MON=N,LOGA=0,FMTO=T, // IMSID=,SWAP=,DBRC=,IRLM=,AIRLMM=, // BKO=N,IOB=,SSM=,APARM=, // RGN=4M, // SOUT=A,LOGT=2400,SYS2=, // LOCKMAX=,SSGNAME=,TMINAME=, // IMSPLEX= // EXEC PGM=DFSRRC00,REGION=&RGN, // PARM=(DLI,&MBR,&PSB,&BUF, // SPIE&TEST&EXCPVR&RST,PRLD, // SRCH,CKPTID,&MON,&LOGA,&FMTO, // IMSID,SWAP,DBRC,IRLM,IRLMNM, // BKO,&IOB,&SSM,&APARM, // LOCKMAX,SSGNAME,&TMINAME, // IMSPLEX) //STEPLIB DD DSN=HPS.SHPSLMD0,DISP=SHR <<---- STEPLIB DD // DD DSN=IMS.&SYS2.SDFSRESL,DISP=SHR // DD DSN=IMS.&SYS2.PGMLIB,DISP=SHR //DFSRESLB DD DSN=IMS.&SYS2.SDFSRESL,DISP=SHR // IMS DD DSN=IMS.&SYS2.PBBLIB,DISP=SHR // DD DSN=IMS.&SYS2.OBBLIB,DISP=SHR //PROCLIB DD DSN=IMS.&SYS2.PROCLIB,DISP=SHR //IEFRDER DD DSN=IMSLLOG,DISP=(,KEEP),VOL=(,,99), // UNIT=(&LOGT,,DEFER), // DBC=(RECFM=VB,BKLSIZE=4096, // LRECL=4092,BUFNO=2) //IEFRDER2 DD DSN=IMSLLOG2,DISP=(,KEEP),VOL=(,,99), // UNIT=(&LOGT,,DEFER,SEP=IEFRDER), // DBC=(RECFM=VB,BKLSIZE=4096, // LRECL=4092,BUFNO=2) //SYSUDUMP DD SYSOUT=&SOUT, // DBC=(RECFM=FBA,LRECL=121,BKLSIZE=605), // SPACE=(605,(500,500),RLSE,,ROUND) //IMSMON DD DUMMY //FABLPRNT DD SYSOUT=&SOUT <<---- FABLPRNT DD```

---

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The FABLUMD1 job is shown in "JCL example to install the FABLRT0 module into the IMS SDFSRESL library."

4. Merge the LIU load modules (FABL* members) in the target library SHPSLMD0 into the IMS SDFSRESL library.
   If this step is not done, when Integrity Checker is activated, an ABENDU0109 load failure occurs for the required LIU load modules.

**JCL example to install the FABLRT0 module into the IMS SDFSRESL library**

```plaintext
//FABLUMD1 JOB
//*--------------------------------------------------------------------
//* STEP1: SMP/E RECEIVE/APPLY usermod ZZLIU01 to IMS CSI
//*--------------------------------------------------------------------
//STEP1 EXEC procedure name of IMS SMP/E job
//*
//*
//AHPSMOD0 DD DISP=SHR,DSN=LIU.AHPSMOD0
//*
//SMPTFIN DD DATA,DLM=@@
++USERMOD(ZZLIU01) /* LIU R2 USERMOD */
   REWORK(2004058) /* */
/* OPTIONAL LIU USERMOD FOR IMS-DBRC FMIDS. */
/* APPLY THIS USERMOD TO IMS-DBRC SMP/E CSI ONLY IF YOU WANT */
/* INSTALL LIU-MODIFIED VERSION OF DSPCRTR0 INTO YOUR IMS SMP/E */
/* CSI. */
/*
/* BEFORE APPLYING THIS USERMOD, ALL MAINTENANCE FOR IMS-DBRC */
/* DSPCRTR0 MUST BE ACCEPTED OR RESTORED. */
/*
++VER(P115) /* IMS SYSTEM ID/FMID */
   FMID(FMID of IMS)
/* */
++JCLIN CALLLIBS /* JCL FOR LIU MODULES */
/* */

//LINK EXEC PGM=IEWL,REGION=OM,
// Parm='SIZE=(880K,64K),LET,LIST,NCAL,RENT,REFR,XREF'
//SYSPRINT DD SYSOUT=A
//AHPSMOD0 DD DISP=OLD,DSN=LIU.AHPSMOD0
//ADFSLOAD DD DISP=OLD,DSN=IMS.ADFSLOAD
//SYSMLMOD DD DISP=OLD,DSN=IMS.SDFSRESL
//SYSUT1 DD UNIT=SYSDA,SPACE=(CYL,(10,1))
//SYSLIN DD *
   INCLUDE AHPSMOD0(FABLRT0)
   INCLUDE ADFSLOAD(DSPCRTR0)
ENTRY FABLRT0
NAME DSPCRTR0(R)
/*
++MOD (FABLRT0) LKLIB(AHPSMOD0) /* LIU MODULE MOD ENTRY */.
@*
//SMPCNTL DD *
   SET BDY (GLOBAL).
   RECEIVE S (ZZLIU01) SYSSMODS.
   SET BDY (TZONE name of IMS).
   APPLY S (ZZLIU01).
/*
```

**Configuring for a BPE-based DBRC environment**
To activate Integrity Checker in an IMS online environment that has a BPE-based DBRC region, you must configure the members of the IMS PROCLIB data set. This step is required only when a BPE-based DBRC is used.
Procedure

1. Set up the BPE configuration parameter member.

   Specify the DBRC user exit list member by using the EXITMBR statement in the
   BPE configuration parameter member. The BPE configuration parameter
   member is specified by the BPECFG= keyword in the DBRC procedure that is
   used for the BPE-based DBRC region in which you want to activate Integrity
   Checker.

   You can skip this step if the EXITMBR statement for the DBRC user exit list
   member already exists.

   The following example specifies the EXITMBR statement in a BPE configuration
   parameter member:

   ```
   # User exit list PROCLIB member specification
   #
   EXITMBR=(member_name, DBRC) /* DBRC user exit list member */
   ```

   For more information about the EXITMBR statement, see the topic "BPE
   configuration parameter member of the IMS PROCLIB data set" in IMS System
   Definition.

2. Set up the DBRC user exit list member.

   Specify the Integrity Checker load module FABLBIN0 on the EXITDEF
   statement. The FABLBIN0 module must be specified as a DBRC Request exit in
   the DBRC user exit list member. The DBRC user exit list member is specified
   by the EXITMBR statement for DBRC in the BPE configuration parameter
   member.

   - When you have two or more DBRC user exits, the FABLBIN0 module must
     be specified as the first member on the EXITDEF statement.
   - Do not specify the ABLIM parameter on the EXITDEF statement.

   The following example specifies the Integrity Checker load module on the
   EXITDEF statement:

   ```
   ********************************************************************
   *  DBRC USER EXIT LIST PROCLIB MEMBER
   ********************************************************************
   *-----------------------------------------------------------------#
   # DEFINE a DBRC request user exit.
   *-----------------------------------------------------------------#
   EXITDEF(TYPE=REQUEST, EXITS=(FABLBIN0), COMP=DBRC)
   ```

   For information about the EXITDEF statement, see the topic "BPE exit list
   members of the IMS PROCLIB data set" in IMS System Definition.

Verifying that Integrity Checker is activated

IMS Library Integrity Utilities provides sample JCL for verifying successful
activation of Integrity Checker. You can modify the sample JCL and then use it to
ensure that Integrity Checker is running correctly.

About this task

This task is optional. Complete this task only if you want to ensure that Integrity
Checker is activated.
Procedure

In the SHPSJCL0 library, locate sample JCL member FABLIVP3. Modify the sample JCL by following the instructions in the sample JCL and submit the JCL. Ensure that the job ends without errors.

Restarting IMS online and running IMS batch application, IMS utility, and IMS Tools jobs

When you have done all the steps, you are ready to restart IMS online to activate the DMB verification process.

Procedure

1. Restart IMS online and run IMS batch application jobs, IMS utility jobs, and IMS Tools jobs.
2. Confirm that the DMB verification process is activated by locating the following WTO message:
   FABL0114I LIU INTEGRITY CHECKER ACTIVATED. IMS VERSION IS version

Global option module generation macro

Use the global option module generation macro to create global option modules.

Creating global option modules

To activate Integrity Checker, create at least one global option module that contains the name of the LICON data set. If you want to change the default options of Integrity Checker globally, specify them when you create this module.

About this task

IBM does not supply global option modules. You must create at least one global option module before invoking Integrity Checker.

Procedure

To create a global option module, determine the type of the global option module, then use the FABLPGEN procedure (provided in the SHPSSAMP data set) to create it. Runtime options can be defined by using the SYSIN control statements. There are two levels of global option modules that can be categorized by their effective range: installation level and IMS subsystem level.

Installation level

To set values that will be effective at the installation level, create a global option module named LIU@INST. The values in this module apply to all the databases that are defined in the IMS environment.

IMS subsystem level

To set values that will be effective at the IMS subsystem level, create a global option module named LIU@insid, where insid is the 4-character ID of the IMS subsystem. The values that you set in this module apply to all the databases that are defined to that IMS subsystem. In accordance with the options assignment rule, they override the values that are set in the LIU@INST module.

Tip: If you want more than one IMS subsystems to use a set of options that are defined in a single global option module, create a global option module for the IMS subsystem level and use the linkage editor to assign an alias to that global option module.
In a database sharing environment where more than one IMS subsystem shares databases, the LICON data set and option values defined in the global option module must be the same across the IMS subsystems. Assigning an alias is beneficial in such a case as well as in XRF environments. For information about how to assign an alias name, see “Setting up the global option modules” on page 117.

In environments where a LICON data set is used across multiple IMS subsystems, assigning an alias name for the global option module to apply the same runtime options for all IMS IDs is a good practice. However, if you want to set runtime options for each IMS ID, instead of assigning an alias name to the global option module, you can create one global option module for each IMS ID. In such a case, except for certain control statement keywords, the keyword parameters must be the same. You can set different parameters for the following control statement keywords:

- VERIFY=
- MSGROUT=
- MSGDESC=
- VERIFYLMT=
- RDEBUILD=
- INITERR=

When you create global option modules, name the modules LIU@xxxx. At sign (@) is a code-page-dependent character. If you are working in an environment where you cannot use the at sign (@), name the modules LIUGxxxx. Use either format for all the global option modules consistently because maintaining both LIU@xxxx and LIUGxxxx modules can cause confusion. If Integrity Checker finds both LIU@imsid and LIUGimsid in the same effective range level, Integrity Checker ignores LIUGimsid and uses LIU@imsid.

### JCL requirements for the FABLPGEN program

The following JCL requirements must be met to create a global option module with the FABLPGEN program.

#### Subsections:
- “EXEC statement”
- “DD statements”
- “Control statement keywords” on page 131
- “Example” on page 135

#### EXEC statement

The EXEC statement must be in the following form.

```
//stepname  EXEC  FABLPGEN,MBR=module,SOUT=x
```

- **MBR=** Specifies the name of the global option module. `module` is LIU@INST, LIUGINST, LIU@imsid, or LIUGimsid.
- **SOUT=** Specifies the SYSOUT class to be used for SYSPRINT DD.

#### DD statements

Code the following DD statements to identify the source of input and the placement of output information:
**SYSLIB DD**
This statement specifies the macro library (SHPSMAC0) provided by IMS Library Integrity Utilities, IMS Database Solution Pack, or IMS Fast Path Solution Pack. This library contains the FABLPGIN macro.

**SYSIN DD**
This statement specifies the input control statement stream.

**SYSLMOD DD**
This statement specifies the output data set for global option modules. If you merge the Integrity Checker load modules into the IMS SDFSRESL library, specify the IMS SDFSRESL library for this DD statement. Otherwise, specify the Integrity Checker load module library for this DD statement.

You can create global option modules in a different library. If you do so, concatenate that library to the STEPLIB DD in JCL and cataloged procedures for all the jobs from which you want to activate Integrity Checker.

**Control statement keywords**

The control statement formats are as follows:

**FABLPGIN**
The IBM supplied macro for use in defining the global option module. The syntax of the parameter specifications of this macro is the same as the syntax of an ordinary assembler macro statement.

You must specify the statement label for the FABLPGIN macro. For the statement label, specify the name of the global option module, which is LIU@INST, LIUGINST, LIU@imsid, or LIUGimsid (in the example in Figure 16 on page 135 LIU@INST beginning at column 1.)

**LICON=**
Specifies the name of the LICON data set. No system default value is provided for this parameter.

**VERIFY=**
Specifies the method for verifying the DMBs; either SNGL or DBLE. SNGL specifies single-step verification and DBLE specifies double-step verification. The system default value for this parameter is SNGL.

You can choose either of the following two options for how Integrity Checker verifies the DMB of a full-function database against the DMB information registered in the RDE. Specify your choice in the global option module.

**Single-step verification**
Integrity Checker verifies all elements at once. This method is more reliable than the double-step method, but slower.

**Double-step verification**
Integrity Checker verifies the version ID of the DMB in the first step. Version ID is the 13-character time stamp of when the DBD was created or the character string that is specified on the VERSION= keyword of the DBD statement that was supplied for DBDGEN. If the version IDs are not the same, Integrity Checker proceeds to the next step to verify other elements. This method is faster than the single-step method, but less reliable.
For DEDBs, single-step verification is always applied.

**Recommendation:** Specify single-step verification. If you experience a performance problem, consider using double-step verification.

**MSGROUT=**
Specifies the message routing codes for write-to-operator (WTO) messages issued by Integrity Checker. You can specify values in the range of 1 - 16. The system default value for this parameter is (2,7,11).

**MSGDESC=**
Specifies the message descriptor codes for write-to-operator (WTO) messages issued by Integrity Checker. The system default value for this parameter is (7).

**VERIFYLMT=**
Specifies the maximum number of the mismatch messages to be issued for a DMB. For example, specifying 3 means Integrity Checker does not issue more than three mismatch messages for a DMB.

You can specify any number in the range of 0 - 99. 0 specifies that verification is to be done but no mismatch message issued. 99 specifies that the number of messages is unlimited. The system default value for this parameter is 10.

**RDEBUILD=**
Specifies whether Integrity Checker automatically creates an RDE. The system default value for this parameter is Y.

- **Y** If no current RDE exists for a DEDB area, a non-HALDB full-function database, or a HALDB partition, Integrity Checker automatically creates an RDE during the first access to it.
- **N** Even when no current RDE exists for a DEDB area, a non-HALDB full-function database, or a HALDB partition, Integrity Checker does not create an RDE during the first access to it.

**INITERR=**
Specifications whether Integrity Checker abnormally ends, or issues a warning message and stops its processing, when the initialization of Integrity Checker fails. The system default value for this parameter is A.

This option is not effective in an IMS online subsystem that has a BPE-based DBRC region. If you specify this option for such an environment, Integrity Checker stops processing, and the IMS online subsystem continues processing.

- **A** If the initialization of Integrity Checker fails, it ends abnormally together with the IMS online subsystem that has a non-BPE-based DBRC region or the IMS batch job.
- **W** If the initialization of Integrity Checker fails, it issues a warning message and stops its processing. The IMS online subsystem or the IMS batch job continues processing without the Integrity Checker function. However, Integrity Checker ends abnormally if errors occur before the effective value for this option is decided. Such errors are load failures of the following modules:
  - FABLRTRx (x: 8, 9, A, B, C, or D)
  - FABLWM0
  - FABLA10
• Global option module

**CHECKON**=
Specifies the verification option for online IMS subsystems. The system
default value for this parameter is (Y,D). You can specify the following options:

Y Check. If you specify Y, you can specify either of the following parameters:
   D If a mismatch is found, deny authorization to use the database.
   W Issue a warning message and create a new RDE.

N Do not check.

**CHECKBAT**=
Specifies the verification option for batch jobs. The system default value for this parameter is (Y,D). You can specify the following options:

Y Check. If you specify Y, you can specify either of the following parameters:
   D If a mismatch is found, deny authorization to use the database.
   W Issue a warning message and create a new RDE.

N Do not check.

**CHECKLD**=
Specifies the verification option for user load program jobs. The system default value for this parameter is (Y,D). You can specify the following options:

Y Check. If you specify Y, you can specify either of the following parameters:
   D If a mismatch is found, deny authorization to use the database.
   W Issue a warning message and create a new RDE.

N Do not check.

**CHECKIC**=
Specifies the verification option for batch image copy jobs. The system default value for this parameter is (Y,D). You can specify the following options:

Y Check. If you specify Y, you can specify either of the following parameters:
   D If a mismatch is found, deny authorization to use the database.
   W Issue a warning message and create a new RDE.

N Do not check.

**CHECKRV**=
Specifies the verification option for database recovery jobs. The system default value for this parameter is (Y,D). You can specify the following options:
Y Check. If you specify Y, you can specify either of the following parameters:

D If a mismatch is found, deny authorization to use the database.

W Issue a warning message and create a new RDE.

N Do not check.

CHKRAND= Specifies whether to verify changes in randomizing routines by checksum. The system default value for this parameter is N. You can specify the following options:

Y Check.

N Do not check.

If CHECKON, CHECKBAT, CHECKLD, CHECKIC, or CHECKRV is set to Y, this specification is effective in each IMS environment.

CHKCOMP= Specifies whether to verify changes in segment edit/compression routines by checksum. The system default value for this parameter is N. You can specify the following options:

Y Check.

N Do not check.

If CHECKON, CHECKBAT, CHECKLD, CHECKIC, or CHECKRV is set to Y, this specification is effective in each IMS environment.

CHKPSEL= Specifies whether to verify changes in HALDB partition selection exit routines by checksum. The system default value for this parameter is N. You can specify the following options:

Y Check.

N Do not check.

If CHECKON, CHECKBAT, CHECKLD, CHECKIC, or CHECKRV is set to Y, this specification is effective in each IMS environment.

CHKFPSSEL= Specifies whether to verify changes in DEDB partition selection exit routines by checksum. The system default value for this parameter is N. You can specify the following options:

Y Check.

N Do not check.

If CHECKON, CHECKBAT, CHECKLD, CHECKIC, or CHECKRV is set to Y, this specification is effective in each IMS environment.

GENMAX= Specifies the maximum number of expired RDEs to be kept in the LICON data set for use in recoveries. The system default value for this parameter is 0 (do not keep expired RDEs). A maximum of 15 RDE copies can be kept.
RECUPLD=
Specifies whether to record database update access information. The system default value for this parameter is N. You can specify the following options:
Y Record.
N Do not record.

RECLD=
Specifies whether to record database load access information. The system default value for this parameter is N. You can specify the following options:
Y Record.
N Do not record.

RECUL=
Specifies whether to record database unload access information. The system default value for this parameter is N. You can specify the following options:
Y Record.
N Do not record.

Example
Sample JCL is in the SHPSJCL0 library, member FABLINIT. The following figure shows the CREGOM step of the sample JCL, which creates global option module LIU@INST.

The name of a global option module can be LIU@INST, LIU@imsid, LIUGINST, or LIUGimsid. Replace LIU@INST in the JCL example to create a module with one of these names.

```
//CREGOM EXEC FABLPGEN,MBR=LIU@INST,SOUT=A
//C.SYSLIB DD DISP=SHR,DSN=HPS.SHPSMAC0
//C.SYSIN DD *
LIU@INST FABLPGIN VERIFY=SNGL, single step verification X
MSGROUT=(2,7,11), WTO message routing codes X
MSGDESC=(7), WTO message descriptor codes X
VERIFYLMT=5, max number of mismatch messages X
CHECKON=(Y,D), verification option - online X
CHECKBAT=(Y,D), verification option - batch X
CHECKLD=(Y,D), verification option - load X
CHECKIC=(Y,D), verification option - image copy X
CHECKRV=(Y,D), verification option - recovery X
GENMAX=3, max number of expired RDE kept X
LICON=imshlg.licondsn
END
/*
//L.SYSLMOD DD DISP=SHR,DSN=HPS.USERLIB(AMBR)
```

Figure 16. JCL for creating a global option module LIU@INST
Setting up the DBD/PSB Map Viewer for Management Console

You can use the DBD/PSB Map Viewer to view the database structures, program specifications, and DBD and PSB source through the Management Console web user interface and visually analyze DBDs and PSBs. Complete the following tasks only if you want to use the DBD/PSB Map Viewer in Management Console.

Procedure

Complete the following steps to set up the DBD/PSB Map Viewer.

1. Install the DBD/PSB Map Viewer on a Windows system or a z/OS system where Management Console is installed:
   - “Installing the DBD/PSB Map Viewer on Windows”
   - “Installing the DBD/PSB Map Viewer on z/OS” on page 137
2. Set up the DBD/PSB Map Viewer by completing the instructions in “Configuring the DBD/PSB Map Viewer environment” on page 139.

Installing the DBD/PSB Map Viewer on Windows

Use Installation Manager to install the IMS Library Integrity Utilities extension to the Management Console server that is running on Windows.

Before you begin

• Ensure that Installation Manager for Windows 1.7.3 or later is installed. If it is not installed, you can download it from the IBM Support Portal at http://www.ibm.com/support
  Download either of the following files:
  – agent.installer.win32.win32.x86
  – agent.installer.win32.win32.x86_64
• Ensure that the following Tools Base components are installed and configured:
  – IMS Tools Knowledge Base (APAR PI50759 must be applied to Tools Base V1.5)
  – Distributed Access Infrastructure
• Ensure that the following requirements are satisfied:
  – Management Console is installed with the feature that includes capabilities for managing IMS environments. This feature is installed by the Management Console for IMS Management Base Feature option during installation.
  – Management Console is at the latest maintenance level.
  – Management Console server is configured on Windows.
• Ensure that IMS Library Integrity Utilities for z/OS is installed and that APAR PI50732 is applied. The DBD/PSB Map Viewer is provided by IMS Library Integrity Utilities as an extension to Management Console.

About this task

During the SMP/E installation of IMS Library Integrity Utilities for z/OS, the IMS Library Integrity Utilities extension installation package is delivered in the file liu220mc.zip. This file is placed in the Installation Manager package directory.

You must use Installation Manager to install the IMS Library Integrity Utilities extension with this package.
Procedure

To install the DBD/PSB Map Viewer on Windows:

1. Stop the Management Console server by clicking Start > IBM Management Console for IMS and DB2 for z/OS > Stop Management Console Web Server.

2. Mount the zFS file system that contains the Installation Manager package on z/OS.
   The default mount point is /usr/lpp/InstallationManagerRepository/H27P220.

   **Tip:** You can make sure that the zFS file system is mounted by issuing the `DISPLAY OMVS,FILE` command from the MVS console.

3. Use FTP to transfer the IMS Library Integrity Utilities extension installation package (liu220mc.zip) from z/OS to your preferred location on Windows. This package is placed in the Installation Manager package directory during the SMP/E installation of IMS Library Integrity Utilities for z/OS.

   **Important:** Transfer the file in binary mode. Otherwise, the package cannot be used by Installation Manager.


5. Add the file liu220mc.zip as a repository in Installation Manager by clicking File > Preferences and then clicking Add Repository. Specify the .zip file and click OK. Close the Preferences dialog by clicking OK.
   If you receive a failed to connect repository error, ensure that you transferred the file in binary mode during FTP transfer.

6. Click Install.

7. Select IMS Library Integrity Utilities for z/OS and click Next.

8. Complete the installation by following the directions in Installation Manager.


What to do next

After the installation is complete, configure the DBD/PSB Map Viewer environment. See “Configuring the DBD/PSB Map Viewer environment” on page 139.

**Tip:** Later, you might use the panel in step 6 to update or uninstall the extension.

- To update the IMS Library Integrity Utilities extension by using a new Installation Manager package provided by a PTF, click Update.
- To uninstall the IMS Library Integrity Utilities extension, click Delete. When you uninstall Management Console, you must delete the IMS Library Integrity Utilities extension before you uninstall Management Console.

Installing the DBD/PSB Map Viewer on z/OS

Use Installation Manager to install the IMS Library Integrity Utilities extension to the Management Console server that is running on z/OS.

Before you begin

- Ensure that Installation Manager for z/OS 1.7.3 or later is installed. Installation Manager is delivered with IBM Management Console for IMS and DB2 for...
z/OS. For more information, see the Program Directory for IBM Management Console for IMS and DB2 for z/OS, GI10-9007.

- Ensure that the following Tools Base components are installed and configured:
  - IMS Tools Knowledge Base (APAR PI50759 must be applied to Tools Base V1.5)
  - Distributed Access Infrastructure

- Ensure that the following requirements are satisfied:
  - Management Console is installed with the feature that includes capabilities for managing IMS environments. This feature is installed by the imbase.feature parameter on the install command during installation.
  - Management Console is at the latest maintenance level.
  - Management Console server is configured on z/OS.

- Ensure that IMS Library Integrity Utilities for z/OS is installed and that APAR PI50732 is applied. The DBD/PSB Map Viewer is provided by IMS Library Integrity Utilities as an extension to Management Console.

### About this task

During the SMP/E installation of IMS Library Integrity Utilities for z/OS, the IMS Library Integrity Utilities extension installation package is delivered in the file liu220mc.zip. This file is placed in the Installation Manager package directory.

You must use Installation Manager to install the IMS Library Integrity Utilities extension with this package.

### Procedure

To install the DBD/PSB Map Viewer on z/OS:

1. If the Management Console server is started, stop the started task DYWZSRV.
2. Mount the zFS file systems that contain the following resources.
   - Installation Manager package
     - Default mount point: /usr/lpp/InstallationManagerRepository/H27P220
   - Installation directory of Management Console
     - Default mount point: /usr/lpp/IBM/mgmtconsole/v110

   **Tip:** You can make sure that the zFS file systems are mounted by issuing the `DISPLAY OMVS,FILE` command from the MVS console.

3. Customize and run the Installation Manager job, HPSAIINS, which is located in the SHPSBASE data set. The HPSAIINS job starts Installation Manager to install the IMS Library Integrity Utilities extension.

   The following conditions must be satisfied to run the HPSAIINS job:
   - The required privileges of user ID depend on the Installation Manager mode that is being used:
     - If you are using administrator mode, the user ID must be a superuser.
     - If you are using nonadministrator mode, the user ID must be the one that owns the instance of Installation Manager that you are using. The user ID must also have read permission to the Installation Manager package and write permission to the installation directory of Management Console.
     - If you are using group mode, you must run the HPSAIINS job under a user ID that belongs to the UNIX System Services group that is associated
with Installation Manager. The user ID must also have read permission to the Installation Manager package and write permission to the installation directory of Management Console.

- The user ID must have access to the SAF profiles that are specified in the Installation Manager sample job GIN2ADMN.
- The user ID must be capable of running a job that requires more than 600 MB region size.

4. Verify that the job ends with return code 0.
5. Start the Management Console server by running the started task DYWZSRV.

**What to do next**

After the installation **is complete**, configure the DBD/PSB Map Viewer environment. See “Configuring the DBD/PSB Map Viewer environment.”

**Tips:**

- You can also use the HPSAIINS job to update the IMS Library Integrity Utilities extension by using a new Installation Manager package provided by a PTF.
- To uninstall the IMS Library Integrity Utilities extension, use the HPSAIUNI member in the SHPSBASE data set. Before you run the job, you must change the installation directory in the JCL to /usr/lpp/IBM/mgmtconsole/v110 or the directory where Management Console is installed. When you uninstall Management Console, you must delete the IMS Library Integrity Utilities extension before you uninstall Management Console.

**Configuring the DBD/PSB Map Viewer environment**

To set up the DBD/PSB Map Viewer, you must first work on the z/OS system and then through the Management Console web interface.

**About this task**

The following figure shows the required configuration setup for the DBD/PSB Map Viewer.
The DBD/PSB Map Viewer uses Distributed Access Infrastructure to communicate with the graphical DBD/PSB Map generator (FABXGMAP), which is provided by IMS Library Integrity Utilities. When the generator receives a request message, it decodes the binary data in the load modules in the IMS.DBDLIB and IMS.PSBLIB libraries and sends the result back to Management Console. All the control statements that were used for defining the database, data sets, and segments can be viewed with the DBD/PSB Map Viewer.

Complete the following procedure to set up the DBD/PSB Map Viewer configuration.

**Procedure**

1. Start the IMS Tools Knowledge Base server, the Distributed Access Interface TCP server and TAS, and, if not started yet, the Management Console server.
2. Add your RECON environment to IMS Tools Knowledge Base.
   For instructions, see the topic "RECON ID (locale) administration" in the Tools Base Configuration Guide for IMS.
   For the Add IMS Datasets field in the Add Recon Information panel, specify the IMS DBDLIB and PSBLIB data sets.
3. Submit the IMS Tools Discovery Utility batch job.
   For instructions, see the topic "IMS Tools Discovery Utility" in the Tools Base IMS Tools Knowledge Base User’s Guide.

**What to do next**

When you finish the configuration steps on the z/OS system, complete the configuration steps through the Management Console web interface.
Log in to the web interface and click **Help**. Locate the topic "Getting started with DBD/PSB Map Viewer" and complete the configuration steps.
Setting up the DBD Map Viewer for Administration Console

You can use the DBD Map Viewer to view the database structure and DBD source through the Administration Console web user interface and visually analyze the DBD. Complete the following tasks only if you want to use the DBD Map Viewer in Administration Console.

About this task

In Tools Base Version 1.5 and later, Administration Console is replaced by IBM Management Console for IMS and DB2 for z/OS. If you installed Tools Base Version 1.5 or later, instead of completing the steps in this topic, complete the steps in “Setting up the DBD/PSB Map Viewer for Management Console” on page 136.

Procedure

To set up the DBD Map Viewer:

1. Install the DBD Map Viewer on a Windows system or a z/OS system where Administration Console is installed:
   - “Installing the DBD Map Viewer on Windows”
   - “Installing the DBD Map Viewer on z/OS” on page 143
2. Set up the DBD Map Viewer by completing the instructions in “Configuring the DBD Map Viewer environment” on page 145.

Installing the DBD Map Viewer on Windows

Use Installation Manager to install the IMS Library Integrity Utilities extension to the Administration Console server that is running on Windows.

Before you begin

- Ensure that Installation Manager for Windows 1.6.2 or later is installed. If it is not installed, you can download it from the IBM Support Portal at [http://www.ibm.com/support](http://www.ibm.com/support).
  Download the following file: agent.installer.win32.win32.x86

  **Important:** Even if Windows is a 64-bit operating system, install the 32-bit Installation Manager. The Installation Manager package is for 32-bit systems.

- Ensure that the following Tools Base components are installed and configured:
  - IMS Tools Knowledge Base
  - Distributed Access Infrastructure
  - Administration Console (on Windows)
- Ensure that Administration Console is at the latest maintenance level.
- Ensure that IMS Library Integrity Utilities for z/OS is installed. The DBD Map Viewer is provided by IMS Library Integrity Utilities as an extension to Administration Console.

About this task

During the SMP/E installation of IMS Library Integrity Utilities for z/OS, the IMS Library Integrity Utilities extension installation package is delivered in the file liu220.zip. This file is placed in the Installation Manager package directory.
You must use Installation Manager to install the IMS Library Integrity Utilities extension with this package.

**Procedure**

To install the DBD Map Viewer on Windows:

1. Stop the Administration Console server by clicking **Start > IBM Tools Base Administration Console for z/OS > Stop Administration Console Web Server**.
2. Mount the zFS file system that contains the Installation Manager package on z/OS.
   The default mount point is `/usr/lpp/InstallationManagerRepository/H27P220`.

   **Tip:** You can make sure that the zFS file system is mounted by issuing the `DISPLAY OMVS,FILE` command from the MVS console.

3. Use FTP to transfer the IMS Library Integrity Utilities extension installation package (liu220.zip) from z/OS to your preferred location on Windows. This package is placed in the Installation Manager package directory during the SMP/E installation of IMS Library Integrity Utilities for z/OS.

   **Important:** Transfer the file in binary mode. Otherwise, the package cannot be used by Installation Manager.

4. Start Installation Manager from the Windows Start menu by clicking **Start > IBM Installation Manager > IBM Installation Manager**.

5. Add the file liu220.zip as a repository in Installation Manager by clicking **File > Preferences** and then clicking **Add Repository**. Specify the .zip file and click **OK**. Close the Preferences dialog by clicking **OK**.

   If you receive a failed to connect repository error, ensure that you transferred the file in binary mode during FTP transfer.

6. Click **Install**.

7. Select IMS Library Integrity Utilities for z/OS and click **Next**.

8. Complete the installation by following the directions in Installation Manager.

9. Start the Administration Console server by clicking **Start > IBM Tools Base Administration Console for z/OS > Start Administration Console Web Server**.

**What to do next**

After the installation is complete, configure the DBD Map Viewer environment. See “Configuring the DBD Map Viewer environment” on page 145.

**Tip:** Later, you might use the panel in step 6 to update or uninstall the extension.

- To update the IMS Library Integrity Utilities extension by using a new Installation Manager package provided by a PTF, click **Update**.
- To uninstall the IMS Library Integrity Utilities extension, click **Delete**. When you uninstall Administration Console, you must delete the IMS Library Integrity Utilities extension before you uninstall Administration Console.

**Installing the DBD Map Viewer on z/OS**

Use Installation Manager to install the IMS Library Integrity Utilities extension to the Administration Console server that is running on z/OS.
Before you begin

- Ensure that Installation Manager for z/OS 1.6.2 or later is installed. Installation Manager is delivered with IBM Tools Base for z/OS. For more information, see the Program Directory for IBM Tools Base for z/OS, GH10-8819.
- Ensure that the following Tools Base components are installed and configured:
  - IMS Tools Knowledge Base
  - Distributed Access Infrastructure
  - Administration Console (on z/OS)
- Ensure that Administration Console is at the latest maintenance level.
- Ensure that IMS Library Integrity Utilities for z/OS is installed. The DBD Map Viewer is provided by IMS Library Integrity Utilities as an extension to Administration Console.

About this task

During the SMP/E installation of IMS Library Integrity Utilities for z/OS, the IMS Library Integrity Utilities extension installation package is delivered in the file liu220.zip. This file is placed in the Installation Manager package directory.

You must use Installation Manager to install the IMS Library Integrity Utilities extension with this package.

Procedure

To install the DBD Map Viewer on z/OS:

1. If the Administration Console server is started, stop the started task AIIGSRV.
2. Mount the zFS file systems that contain the following resources:
   - Installation Manager package
     Default mount point: /usr/lpp/InstallationManagerRepository/H27P220
   - Installation directory of Administration Console
     Default mount point: /usr/lpp/toolsbase/adminconsole140

   Tip: You can make sure that the zFS file systems are mounted by issuing the DISPLAY OMVS,FILE command from the MVS console.
3. Customize and run the Installation Manager job, HPSAIINS, which is located in the SHPSBASE data set. The HPSAIINS job starts Installation Manager to install the IMS Library Integrity Utilities extension.

   The following conditions must be satisfied to run the HPSAIINS job:
   - The required privileges of user ID depend on the Installation Manager mode that is being used:
     - If you are using administrator mode, the user ID must be a superuser.
     - If you are using nonadministrator mode, the user ID must be the one that owns the instance of Installation Manager that you are using. The user ID must also have read permission to the Installation Manager package and write permission to the installation directory of Administration Console.
     - If you are using group mode, you must run the HPSAIINS job under a user ID that belongs to the UNIX System Services group that is associated with Installation Manager. The user ID must also have read permission to the Installation Manager package and write permission to the installation directory of Administration Console.
• The user ID must have access to the SAF profiles that are specified in the Installation Manager sample job GIN2ADMN.
• The user ID must be capable of running a job that requires more than 600 MB region size.

4. Verify that the job ends with return code 0.
5. Start the Administration Console server by running the started task AIIGSRV.

What to do next

After the installation is complete, configure the DBD Map Viewer environment. See “Configuring the DBD Map Viewer environment.”

Tips:
• You can also use the HPSAIINS job to update the IMS Library Integrity Utilities extension by using a new Installation Manager package provided by a PTF.
• To uninstall the IMS Library Integrity Utilities extension, use the HPSAIUNI member in the SHPSBASE data set. When you uninstall Administration Console, you must delete the IMS Library Integrity Utilities extension before you uninstall Administration Console.

Configuring the DBD Map Viewer environment

To set up the DBD Map Viewer, you must first work on the z/OS system and then through the Administration Console web interface.

About this task

The following figure shows the required configuration setup for the DBD Map Viewer.
The DBD Map Viewer uses Distributed Access Infrastructure to communicate with the graphical DBD Map generator (FABXGMAP), which is provided by IMS Library Integrity Utilities. When the generator receives a request message, it decodes the binary data in the load module in the IMS.DBDLIB library and sends the result back to Administration Console. All the control statements that were used for defining the database, data sets, and segments can be viewed with the DBD Map Viewer.

Complete the following procedure to set up the DBD Map Viewer configuration.

**Procedure**

1. Start the IMS Tools Knowledge Base server, the Distributed Access Interface TCP server and TAS, and, if not started yet, the Administration Console server.
2. Add your RECON environment to IMS Tools Knowledge Base.
   For instructions, see the topic "RECON ID (locale) administration" in the *Tools Base IMS Tools Knowledge Base User’s Guide*.
   For the **Add IMS Datasets** field in the Add Recon Information panel, specify the IMS DBDLIB data set.
3. Submit the IMS Tools Discovery Utility batch job.
   For instructions, see the topic "IMS Tools Discovery Utility" in the *Tools Base IMS Tools Knowledge Base User’s Guide*.

**What to do next**

When you finish the configuration steps on the z/OS system, complete the configuration steps through the Administration Console web interface.
Log in to the web interface and click **Help**. Locate the topic "Getting started with DBD Map Viewer" and complete the configuration steps.
Setting up the ISPF interfaces

Three components of IMS Database Solution Pack provide ISPF interfaces: IMS HALDB Toolkit, IMS HP Pointer Checker (DB Historical Data Analyzer utility), and Database Repair Facility.

About this task

- If you want to use IMS HALDB Toolkit as an ISPF application or use the ISPF interface of IMS HALDB Toolkit, you must set up the ISPF interface. For instructions, see “Setting up the ISPF interface for IMS HALDB Toolkit” on page 149.

- If you want to use the DB Historical Data Analyzer utility in the TSO/ISPF environment, you must set up the ISPF interface of IMS HP Pointer Checker. For instructions, see “Setting up the ISPF interface for DB Historical Data Analyzer for IMS HP Pointer Checker” on page 152.

The ISPF interface of Database Repair Facility can be used without customization.
Setting up the ISPF interface for IMS HALDB Toolkit

If you want to run IMS HALDB Toolkit as an ISPF application, you must define a VSAM KSDS data set to prepare the ISPF environment definition data set, and then configure your CLIST file to start the ISPF panel of IMS HALDB Toolkit.

Procedure

1. Locate the sample JCL, IHCCKSDS, in the SHICSAMP data set and modify the JCL statements.

This sample JCL creates and initializes a VSAM KSDS data set for the ISPF environment definition data set, and creates an ISPF base environment module that defines the name of the ISPF environment definition data set.

a. To create and initialize the VSAM KSDS data set, change your_ksds_data_set to the VSAM KSDS data set name for your environment.

```assembly
//***************************************************************
// Define Environment KSDS data set
//***************************************************************
//S1 EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*  
//SYSIN DD *
DELE your_ksds_data_set  
SET MAXCC=0
DEFINE CLUSTER(NAME(your_ksds_data_set) -  
INDEXED KEYS(16,0) RECSZ(2026,4080) -  
CISZ(4096) VOL(vvvvv) CYLINDER(3 1) )

//***************************************************************
// Initialize Environment KSDS data set
//***************************************************************
//S2 EXEC PGM=IHCYUTIL
//STEPLIB DD DISP=SHR,DSN=$dbsp.SIHCLOAD
//TRACE DD DUMMY
//MSGPRINT DD SYSOUT=*  
//KSDSDD DD DISP=SHR,DSN=your_ksds_data_set  
//IHCYSIN DD *
RUN PGM(IHCKYSDS)
```

b. To create an ISPF base environment module that defines the name of the ISPF environment definition data set, modify the JCL statements as follows:

- Change ISPF_environment_definition_data_set to your ISPF environment definition data set name, which is the name of the VSAM KSDS data set that you specified in Step.
- Change your_program_library to the program library that you want the ISPF base environment module to be created in.
c. Submit the job.

2. Make sure that all users who work with IMS HALDB Toolkit have update authority for the ISPF environment definition data set.

3. Configure the CLIST file so that it starts the ISPF panel interface of IMS HALDB Toolkit.
   
The sample CLIST file is provided as IHCCHAL in SIHSSAMP.
   
Copy the sample CLIST file to your ISPF CLIST library and modify it.
4. Issue the following command to ensure that the IMS HALDB Toolkit ISPF main panel starts:
   
   `ex 'your_ISPF_CLIST_data_set_name(IHCCHAL)'`
Setting up the ISPF interface for DB Historical Data Analyzer for IMS HP Pointer Checker

The ISPF interface of the DB Historical Data Analyzer utility must be customized before it can be used. To use the ISPF interface, complete the following steps.

Procedure

Complete these steps to set up the DB Historical Data Analyzer ISPF interface:

1. Modify the logon procedure.
   a. Ensure that the Graphical Data Display Manager (GDDM) library can be accessed as a PDS library by the TSO terminal user.
      Unless the GDDM target library is specified as a link library, you must change the existing, or define a new, TSO logon procedure to contain a STEPLIB DD statement that refers to the GDDM program library (GDDMLOAD). For more information, see the GDDM products documentation.
   b. Concatenate the IMS HP Pointer Checker data sets for panels and messages with the corresponding ISPF/PDF data sets. Also, allocate the IMS HP Pointer Checker data set for programs in the ISPF link library (ddname ISPLLIB) in your TSO logon procedure.
      For example, specify as follows:
      ```
      //ISPMLIB DD DSN=HPS.SHPSMLIB,DISP=SHR
      //                  DSN=ISP.ISPMENU,DISP=SHR
      //ISPPLIB DD DSN=HPS.SHPSPLIB,DISP=SHR
      //              DSN=ISP.ISPMENU,DISP=SHR
      //ISPLLIB  DD DSN=HPS.SHPSLMD0,DISP=SHR
      ```
   c. If you use ISPSPALT and ISPMALT for DBCS, allocate the IMS HP Pointer Checker data set to ISPSPALT and ISPMALT.
      For more information about ISPF, see the z/OS ISPF User’s Guide, Volume 1.
      You can also allocate these data sets by coding appropriate TSO ALLOCATE commands. By using this method, you do not need to modify your TSO logon procedure. In this case, you must allocate the data sets before you invoke ISPF.

2. Modify the command list (CLIST).
   DB Historical Data Analyzer provides a sample command list (CLIST) to allocate data sets and to invoke DB Historical Data Analyzer. This sample CLIST is named FABGCMD0 and is provided in the SHPSCLIB data set. You might need to copy this sample CLIST to your command procedure data set, and modify it to meet your installation requirements.

3. Modify the ISPF/PDF Primary Option Menu panel.
   You can modify the ISPF Primary Option Menu panel (ISR@PRIM) to add an entry so that you can invoke DB Historical Data Analyzer by a selection code.
   The following sample ISPF Primary Option Menu has been modified to invoke DB Historical Data Analyzer by selecting option D. This option starts processing by invoking a command procedure. The FABGCMD0 CLIST can be used to start the dialog processing.
Chapter 6. Customizing IMS Database Solution Pack

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%--------------------------------------- ISPF/PDF PRIMARY OPTION MENU ---------------------------------------
%OPTION ===> MCMD
% 0 +ISPF PARMS - Specify terminal and user parameters
% 1 +BROWSE - Display source data or output listings
% 2 +EDIT - Create or change source data
% 3 +UTILITIES - Perform utility functions
% 4 +FOREGROUND - Invoke language processors in foreground
% 5 +BATCH - Submit job for language processing
% 6 +COMMAND - Enter TSO command or CLIST
% 7 +DIALOG TEST - Perform dialog testing
% 8 +LM UTILITIES - Perform library administrator utility functions
% 9 +IBM PRODUCTS - Additional IBM program development products
% C +CHANGES - Display summary of changes for this release
% D +DBHDA - Invoke DB Historical Data Analyzer dialog
% T +TUTORIAL - Display information about ISPF/PDF
% X +EXIT - Terminate ISPF using log and list defaults
%+Enter%END+command to terminate ISPF.

)INIT
  .HELP = ISR00003
  &ZPRIM = YES /* ALWAYS A PRIMARY OPTION MENU */
  &ZHTOP = ISR00003 /* TUTORIAL TABLE OF CONTENTS */
  &ZHINDEX = ISR91000 /* TUTORIAL INDEX - 1ST PAGE */
  VPUT (ZHTOP,ZHINDEX) PROFILE
)PROC
  &ZQ = &Z
  IF (&ZCMD = '
    &ZQ = TRUNC(&ZCMD,'.')
    IF (&ZQ = "
      .MSG = ISR0000
      &ZSEL = TRANS(&ZQ
        0,'PANEL(ISPOPTA)'  1,'PGM(ISRBRO) PARM(ISRBRO01)'  2,'PGM(ISREDIT) PARM(P,ISREDM01)'  3,'PANEL(ISRUTIL)'  4,'PANEL(ISRFPA)'  5,'PGM(ISRJPA) PARM(ISRJPA) NOCHECK'  6,'PGM(ISRPTC)'  7,'PGM(ISRYXDR) NOCHECK'  8,'PANEL(ISRLPRIM)'  9,'PANEL(ISRDIIS)'  C,'PGM(ISPTUTOR) PARM(ISR00005)'  D,'CMD(FABGCMDO)'  T,'PGM(ISPTUTOR) PARM(ISR00000)'  X,'EXIT'
      '*','?' )
    &ZTRAIL = .TRAIL
  )END

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Chapter 7. Troubleshooting

Use these topics to diagnose and correct problems that you experience with IMS Database Solution Pack.

While you customize IMS Database Solution Pack, IMS Database Solution Pack components issue messages to help you track progress and to inform you when errors occur. For an explanation of the messages, refer to the corresponding product's user guide. See “Product publications” on page 26.

Topics:
- “How to look up message explanations” on page 156
- “Gathering diagnostic information” on page 157
How to look up message explanations

You can use several methods to search for messages and codes.

**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 are presented with links to the message information in IBM Knowledge Center.
Gathering diagnostic information

Before you report a problem with IMS Database Solution Pack to IBM Software Support, you need to gather the appropriate diagnostic information.

Procedure

Provide the following information for all IMS Database Solution Pack problems:

- A clear description of the problem and the steps that are required to re-create the problem.
- The version of IMS and the version of the operating system that you are using.
- A complete log of the job.
- The maintenance level of the product or the component.

If the product in error supports the Diagnostics Aid program, run the Diagnostics Aid program to generate a Load Module/Macro APAR Status report. Provide the report when you contact IBM Software Support. For information about creating a Load Module/Macro APAR Status report, see the documentation of the individual products.
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