IMS
15.1.0

Release Planning
(2024-08-30 edition)

GC27-6794-00

Note

Before you use this information and the product it supports, read the information in “Notices” on page 235.

2024-08-30 edition.

This edition applies to IMS 15 (program number 5635-A06), IMS Database Value Unit Edition, V15.01.00 (program number 5655-DS5), IMS Transaction Manager Value Unit Edition, V15.01.00 (program number 5655-TM4), and to all subsequent releases and modifications until otherwise indicated in new editions.

Contents

About this information

These topics provide general information to help you evaluate and plan for IMS 15. The following topics describe the new features and enhancements for IMS 15, the hardware and software requirements for these new features and enhancements, considerations for migration and coexistence for IMS 15, and an overview of the IMS Tools that are enhanced to work with IMS 15.

This information is available in IBM® Documentation.

For information about IMS 14, including its enhancements and considerations for migration and coexistence, see *IMS 14 Release Planning* .

When you install IMS, you will also need information from the following information units:

- *IMS Version 15 Installation*
- *IMS Version 15 System Definition*
- *IMS 15: Program Directory for Information Management System Transaction and Database Servers*

How to use the Release Planning information

Use the IMS 15 Release Planning information to learn about the new enhancements in IMS 15 and to plan your migration.

The Release Planning information is organized into the following parts:

- Part 1, “General planning information for IMS 15,” on page 1, which contains general information about the new release, including the following information:
  - A summary of the enhancements and changes to IMS 15
  - An overview of the hardware and software requirements
  - Migration considerations for IMS 15
  - Coexistence considerations between the supported versions of IMS
  - A listing of the changed, new, and deleted messages and abends for IMS 15
  - A listing of the new and changed log records for IMS 15
- Part 2, “IMS 15 enhancements,” on page 99, which describes each new enhancement in IMS 15.

  In the IBM Documentation, the description of each enhancement includes links to all of the topics that are new or changed for the enhancement. On the web, see IMS 15 enhancements.
- Part 3, “IBM IMS Tools support for IMS 15,” on page 187, which describes IBM IMS Tools and products that support IMS 15.
- Part 4, “Featured integration solutions for IMS 15,” on page 225, which contains overviews of some of the new ways that you can further integrate IMS 15 and the rest of your IT architecture.

Note: If you are migrating to IMS 15 from IMS 14 or earlier, you must refer to the *IMS Release Planning Guide* for each IMS release that you are skipping for complete information about the enhancements, the software and hardware requirements, and the migration and coexistence considerations that are specific to that release.

Prerequisite knowledge

Before using this information, you should have knowledge of either the IMS Database Manager (DB) or the IMS Transaction Manager (TM). You should also understand basic z/OS® and IMS concepts, your installation's IMS system, and have a general knowledge of the tasks involved in project planning.

To learn about z/OS, see z/OS Basic Skills. For more resources, see IBM Z Education and Training.

To learn about IMS, see the IBM Press publication *An Introduction to IMS*, the resources listed for IBM Information Management System, and the variety of options available in IBM Training.

How new and changed information is identified

New and changed information in most IMS library PDF publications is denoted by a character (revision marker) in the left margin. The first edition (-00) of *Release Planning*, as well as the *Program Directory* and *Licensed Program Specifications*, do not include revision markers.

Revision markers follow these general conventions:

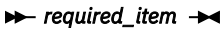
- Only technical changes are marked; style and grammatical changes are not marked.
- If part of an element, such as a paragraph, syntax diagram, list item, task step, or figure is changed, the entire element is marked with revision markers, even though only part of the element might have changed.
- If a topic is changed by more than 50%, the entire topic is marked with revision markers (so it might seem to be a new topic, even though it is not).

Revision markers do not necessarily indicate all the changes made to the information because deleted text and graphics cannot be marked with revision markers.

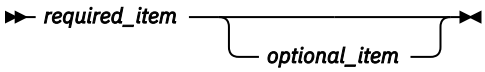
How to read syntax diagrams

The following rules apply to the syntax diagrams that are used in this information:

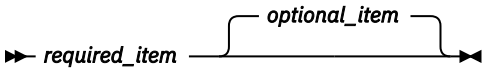
- Read the syntax diagrams from left to right, from top to bottom, following the path of the line. The following conventions are used:
  - The >>--- symbol indicates the beginning of a syntax diagram.
  - The ---> symbol indicates that the syntax diagram is continued on the next line.
  - The >--- symbol indicates that a syntax diagram is continued from the previous line.
  - The --->< symbol indicates the end of a syntax diagram.
- Required items appear on the horizontal line (the main path).

- Optional items appear below the main path.

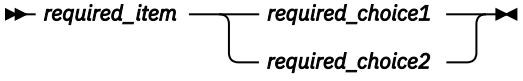
  

  If an optional item appears above the main path, that item has no effect on the execution of the syntax element and is used only for readability.

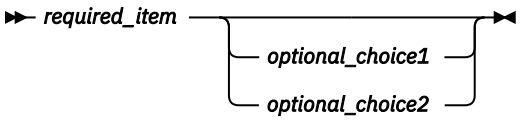
  

- If you can choose from two or more items, they appear vertically, in a stack.

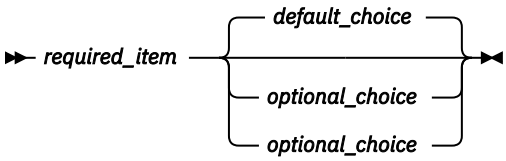
  If you *must* choose one of the items, one item of the stack appears on the main path.

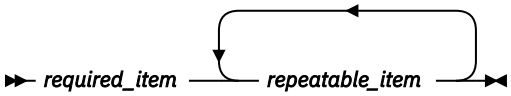
  If choosing one of the items is optional, the entire stack appears below the main path.



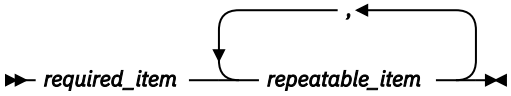
If one of the items is the default, it appears above the main path, and the remaining choices are shown below.



- An arrow returning to the left, above the main line, indicates an item that can be repeated.



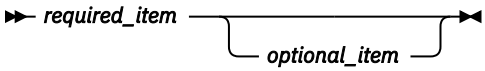
If the repeat arrow contains a comma, you must separate repeated items with a comma.



A repeat arrow above a stack indicates that you can repeat the items in the stack.

- Sometimes a diagram must be split into fragments. The syntax fragment is shown separately from the main syntax diagram, but the contents of the fragment should be read as if they are on the main path of the diagram.

fragment-name



- In IMS, a b symbol indicates one blank position.
- Keywords, and their minimum abbreviations if applicable, appear in uppercase. They must be spelled exactly as shown. Variables appear in all lowercase italic letters (for example, *column-name*). They represent user-supplied names or values.
- Separate keywords and parameters by at least one space if no intervening punctuation is shown in the diagram.
- Enter punctuation marks, parentheses, arithmetic operators, and other symbols, exactly as shown in the diagram.
- Footnotes are shown by a number in parentheses, for example (1).

Accessibility features for IMS 15

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

Accessibility features

The following list includes the major accessibility features in z/OS products, including IMS 15. These features support:

- Keyboard-only operation.
- Interfaces that are commonly used by screen readers and screen magnifiers.
- Customization of display attributes such as color, contrast, and font size.

Keyboard navigation

You can access IMS 15 ISPF panel functions by using a keyboard or keyboard shortcut keys.

For information about navigating the IMS 15 ISPF panels using TSO/E or ISPF, refer to the *z/OS TSO/E Primer*, the *z/OS TSO/E User's Guide*, and the *z/OS ISPF User's Guide Volume 1*. These guides describe how to navigate each interface, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

Related accessibility information

Online documentation for IMS 15 is available in IBM Documentation.

IBM and accessibility

See the *IBM Human Ability and Accessibility Center* at www.ibm.com/able for more information about the commitment that IBM has to accessibility.

How to send your comments

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

- Submit a comment by using the DISQUS commenting feature at the bottom of any IBM Documentation topic.
- Send an email to imspubs@us.ibm.com. Be sure to include the book title and the publication number.
- Click the **Contact Us** tab at the bottom of any IBM Documentation topic.

To help us respond quickly and accurately, please include as much information as you can about the content you are commenting on, where we can find it, and what your suggestions for improvement might be.

Part 1. General planning information for IMS 15

In addition to the new functions and enhancements that are available, IMS 15 has new hardware and software requirements, as well as new considerations for migration and coexistence between IMS systems.

These topics describe how the new IMS 15 functions might affect your installation, list new, changed, and deleted messages and codes, and describe the IBM IMS Tools that support IMS 15.

Chapter 1. Hardware requirements

IMS 15 has base hardware requirements. Some individual functions have additional hardware requirements.

Processor requirements

IMS 15 runs only in z/Architecture® mode on an IBM System z10® processor or later.

The following table lists the processors supported by IMS 15.

Table 1. Supported IBM processors for IMS 15

Machine name	Machine type
IBM System z10 Enterprise Class (z10 EC)	2097
IBM System z10 Business Class (z10 BC)	2098
IBM zEnterprise® 196 (z196)	2817
IBM zEnterprise 114 (z114)	2818
IBM zEnterprise EC12 (zEC12)	2827
IBM zEnterprise BC12 (zBC12)	2828
IBM z13®	2964
IBM z13s®	2965
IBM z14	3906
IBM z14 ZR1	3907
IBM z15®	8561
IBM z15 T02	8562
IBM z16™	3931
IBM z16 A02	3932

System console requirements

The console requirements of z/OS Version 2 Release 2 or later apply.

Tape unit requirements

IMS supports IBM 3590 and later tape units (or equivalent products) for installation and maintenance. IMS supports tape block sizes greater than 32760 bytes for the output of the Database Image Copy utility (DFSUDMP0) and the Online Database Image Copy utility (DFSUICP0).

Coupling facility requirements

IMS 15 has the following coupling facility requirements.

A coupling facility level of 15 or later is required for the following functions:

- Operations Manager (OM) Audit Trail, if a coupling facility log stream is used
- Parallel RECON access support
- Repository Server Audit Log, if a coupling facility log stream is used

- Resource Manager (RM), if a resource structure is used
- Shared-EMH support
- Shared queues
- Sysplex data sharing (including data caching and VSO data sharing) with Internal Resource Lock Manager (IRLM) V2.3

DASD requirements

IMS 15 hardware requirements include several requirements for DASD.

During the binding of the IMS control blocks load modules (specifically during the bind of the IMS VTAM® control blocks load monitoring module), both the binder work data set SYSUT1 and IMS data sets IMS.SDFSRESL and IMS.SDFSJLIB must reside on a device that supports a record size of 18 KB or greater. For all other system libraries and working storage space, any device that is supported by the operating system is allowed.

For IMS database storage, any device that is supported by the operating system is allowed within the capabilities and restrictions of Basic Sequential Access Method (BSAM), Queued Sequential Access Method (QSAM), Overflow Sequential Access Method (OSAM), and Virtual Storage Access Method (VSAM).

The fast replication function of the Database Image Copy 2 utility (DFSUDMT0) requires DASD controllers that support one of the following features:

- The concurrent-copy feature of DFSMS
- The FlashCopy® feature of the IBM Enterprise Storage Server® (ESS)
- The SnapShot feature of the IBM RAMAC Virtual Array (RVA) storage system

FlashCopy and SnapShot might require microcode from IBM to activate their functionality. Also, the source and target data sets (databases and image copies) must reside on the same ESS or RVA hardware.

The DASD storage requirements for the following items are described in the *Program Directory for Information Management System Transaction and Database Servers V15.01.00*:

- SMP/E system entries
- SMP/E data sets
- Target libraries
- Distribution libraries
- Install process
- Optional machine-readable material

The following types of data sets can be allocated in the extended addressing space (EAS) of an extended address volume (EAV):

- GSAM database data sets
- BPE external trace data sets
- OSAM database data sets
- VSAM database data sets
- Online log data sets (OLDSs), including large OLDS (for example, greater than 64 KB tracks)
- Write ahead data sets (WADSs)
- Restart data sets (RDSs)
- Message queue blocks data sets
- Long and short message data sets
- Terminal devices with UNITYPE = SPOOL or DISK
- RESLIB data sets (IMS.SDFSRESL)
- MODBLKS data sets for online change (IMS.MODBLKSA and IMS.MODBLKSB)

- Application control block library (ACBLIB) data sets
- DBRC RECON data sets (non-PRA)
- Database Image Copy utility (DFSUDMP0) data sets
- Database Image Copy 2 utility (DFSUDMT0) data sets
- Database Change Accumulation utility (DFSUCUM0) data sets
- Local online change data sets (IMS.MODSTAT)
- Global online change data sets (IMS.OLCSTAT)
- Partitioned data set extended (PDSE) data sets (IMS.SDFSJLIB, PGMLIB, SMPLTS, and External Subsystem Attach Facility (ESAF) load libraries)
- Time-controlled operations (TCO) data sets
- System log data sets (SLDSs)
- Recovery log data sets (RLDSs)
- HALDB Indirect List data sets (ILDSs)
- IMS Repository data sets
- MFS map library data sets produced by the MFS Language and Service utilities (IMS.FORMAT)
- IMS Trace facility external trace data sets
- IMS Monitor output data sets

Large sequential data set support hardware requirements

To take advantage of this support, hardware that has more than 65,535 tracks must be used.

Multiple Systems Coupling hardware requirements

When the physical link is channel-to-channel (CTC) and is dedicated to IMS, Multiple Systems Coupling (MSC) requires the System/370 CTC adapter or a logical channel on the IBM 3088, ESCON, or Fiber Channel connection (FICON®). MSC FICON CTC support requires that at least one IMS system be installed on an IBM zSeries machine with the FICON channel and FICON CTC microcode. The other side (IMS) can be any processor with a FICON channel.

Parallel RECON access hardware requirements

The parallel RECON access function requires a Parallel Sysplex® environment and DFSMS Transactional VSAM Services (DFSMStvs). Therefore, parallel RECON access requires Coupling Facility (CF) hardware in the System z® sysplex.

Terminals and equipment supported by IMS 15

IMS 15 supports SLU, LU, NTO, 3270, and Finance (3600) terminals, as well as other equipment such as printers and DASD devices.

The following tables list the terminals and other equipment supported by IMS 15.

In the table, the following abbreviations are used:

DSC
Data Stream Compatibility

ISC
Intersystem Communication

LU
Logical Unit

NTO
Network Terminal Option

PC
Personal Computer

PP
Program Product

SLU
Secondary Logical Unit

TTY
Teletypewriter equipment

VTAM
Virtual Telecommunications Access Method

Table 2. Terminals that are supported by IMS 15

Compatible product	SNA	Notes®
SLU 1 (for example, 3230, 3232, 3262, 3287, 3767, 3268, 3770, 3770P, 3790 (type 2 batch and bulk print), 4700, 5280, 5550, S/32, S/34, S/38, 8100)	VTAM	1, 2
SLU 2 (for example, 3179, 3180, 3276, 3278, 3279, 3290, 3790 (3270 DSC feature), 3600 Admin PP, 4700, 5280, 5520, 5550, 8100, 8775, S/34, Display writer)	VTAM	1, 2
SLU P (for example, 3600, 3630, 3650, 3680, 3770PC, 3790, 4700, 4730, 4736, 5520, 8100, S/34, Series/1)	VTAM	1, 2, 3, 4
LU 6.1 (ISC)	VTAM	1, 2
LU 6.2 (APPC)	VTAM	2
NTO (for example, 33/35, TTY, 2740, 2741, 3101, 3232, 3767, S/23)	VTAM	1, 2

Notes:

1. The IMS Message Format Service (MFS) is available for this device. MFS editing can be bypassed on a message-by-message basis.
2. IMS Fast Path supports the use of compatible terminals.
3. Although IMS provides sample code for this terminal, additional user coding is required.
4. IMS provides no device-resident code for this device. Additional user coding is required to attach it to IMS.

Table 3. Terminals that are supported by IMS 15, but withdrawn from IBM Marketing

IMS-supported product	Compatible product	Switched mode	Polled mode	Local mode	SNA	Notes
3270		VTAM	VTAM	VTAM	VTAM	1, 2
Finance (3600)	4700				VTAM	1, 2, 3

Notes:

1. The IMS Message Format Service (MFS) is available for this device. MFS editing can be bypassed on a message-by-message basis.
2. IMS Fast Path supports the use of compatible terminals.
3. Although IMS provides sample code for this terminal, additional user coding is required.

For the following table, refer to operating system descriptions for specific device types.

Table 4. Other equipment that is supported by IMS 15

IMS-supported product	Access
System console	MVS™ write-to-operator/write-to-operator-with-reply (WTO/WTOR)
Spool device	Basic Sequential Access Method (BSAM)
Card reader	BSAM
Printer	BSAM
Magnetic tape	BSAM
DASD devices	BSAM

Restriction: IMS 15 does not support BTAM devices (2740-1, 2740-2, 2741, 2780, System/3, and System/7).

zIIP utilization hardware requirements

One or more IBM System z Integrated Information Processors (zIIPs) must be online on the machine at the time an IMS Connect, IMS ODBM, or IMS CQS address space is started in order to have any threads zIIP eligible and executed on a zIIP for that execution instance.

If no zIIPs are online when the address space is started, no work will be moved to a zIIP.

Chapter 2. Software requirements

IMS 15 has base software requirements. Some individual functions have additional software requirements.

Operating software requirements

IMS 15 and its various functions have specific operating software requirements.

Before you install IMS 15, check with your IBM Support Center or check either Information/Access or Service Link for additional preventive service planning (PSP) information that you need to be aware of. The PSP upgrade name for IMS 15 is IMS1500.

The z/OS service levels that are required for installation and execution are described in the *Program Directory for Information Management System Transaction and Database Servers V15.01.00*.

IMS 15 base software requirements

The base IMS 15 system runs on z/OS Version 2 Release 2 or later. Certain features and functions have additional software requirements.

IMS 15 requires the following minimum version, release, or modification levels:

- z/OS Version 2 Release 2 (5650-ZOS) or later
  - The following z/OS V2R2 APARs must be installed:
    - OA47042
    - OA49728
    - OA51189
  - RACF®, or an equivalent product, if security is used. RACF is available with the IBM Security Server for z/OS (a separately orderable feature of z/OS V2R2).
  - IBM High-Level Assembler Toolkit, a separately orderable feature of z/OS V2R2.
  - DFSMS 2.2 or 2.3 APAR OA51385 for OLDS zHyperWrite support.
  - For z/OS data set encryption support, one of the following DFSMS versions:
    - DFSMS 2.2 with APAR OA50569 and its prerequisite and corequisite APARs installed.
    - DFSMS 2.3.
- IRLM Version 2.3 (5635-A06) or later, if data sharing is used. IRLM Version 2.3 is delivered with IMS 15.

  When using multiple IMS systems:
  - On the same z/OS system, you need only one IRLM.
  - Of different release levels on the same z/OS system, you can have one IRLM or you can use two or more IRLM address spaces. If two or more IMS systems share data and are running on the same z/OS system, they should use the same IRLM.
  - On different z/OS systems for inter-processor block-level data sharing, you must have one IRLM on each z/OS system.

IMS 15 also operates in a virtual machine (VM) under control of z/OS. This environment is intended for use in a program development, testing, and non-XRF production environment.

Restrictions: The VM environment has the following restrictions:

- The Log Analysis utilities might yield inaccurate time-stamp results.

- If you operate the IMS 15 Transaction Manager under VM for production purposes and have specific throughput or terminal response-time requirements, plan to benchmark under VM to ensure that the proposed configuration meets your performance needs.

Coexistence APARs

Certain functions of IMS 15 can coexist with IMS Version 13 and IMS 14 with the appropriate coexistence APARs applied.

See "Overview of coexistence APARs" on page 67 for an overview of the APARs that are needed for coexistence purposes.

Database Resource Adapter (DRA) software requirements

The version of the IMS DRA modules that are used by a DRA client must be the same version as the IMS with which the DRA client is communicating.

Recommendations:

- Concatenate the IMS.SDFSRESL library to the DRA client step library so the correct version of the DRA Startup/Router routine (DFSPRRC0) is loaded into the DRA client load library.
- Ensure that the DRA Startup Table (DFSPZPxx) points to the correct version of IMS.SDFSRESL.

Data sharing software requirements

For block-level data sharing, IRLM Version 2.3 (5635-A06) or later is required. The IRLM is an independent component that is shipped with IMS 15. The IRLM must be defined as a z/OS subsystem. Block-level data sharing of databases is supported between all in-service levels of IMS.

HALDB Index/ILDS Rebuild utility free space function software requirements

The HALDB Index/ILDS Rebuild utility (DFSPREC0) requires four 2 GB data spaces to store and sort the rebuilt indirect list entries (ILEs) before reloading them into the ILDS.

IMS callout function software requirements

To support the IMS callout function, OTMA must be enabled in IMS and IMS Connect configured for callout support.

You also need one of the following external components:

- The IMS Enterprise Suite SOAP Gateway
- The IMS TM Resource Adapter
- An IBM WebSphere® DataPower® appliance
- A user-written IMS Connect client (TCP/IP application)

Related concepts

IMS Enterprise Suite SOAP Gateway overview

IMS Connect software requirements

IMS Connect has software requirements in addition to those of the base IMS product.

The software requirements for IMS Connect include:

- z/OS Communications Server V2R2.0 or later (TCP/IP).

- To implement security, z/OS Security Server RACF or an equivalent product.
- To support the IMS Universal drivers or a user-written DRDA source server, an IMS Common Service Layer is required, including the Open Database Manager, the Operations Manager, and the Structured Call Interface.
- IMS Connect must have z/OS UNIX System Services superuser privileges, to ensure that IMS Connect can open ports.

IMS Connect XML Adapter support

The IMS Connect XML Adapter support in IMS 15, used with the IMS Enterprise Suite SOAP Gateway, requires IBM Developer for System z . Certain functions of the IMS Enterprise Suite SOAP Gateway might have additional software requirements.

Java application program support in IMS 15

Java™ applications that run in or access IMS 15 must meet specific software requirements.

Software requirements for Java application programs that use the IMS Universal drivers or JDR resource adapter

The IMS Universal drivers that Java application programs can use to access IMS data have software requirements.

IMS 15 requires the following software:

- z/OS UNIX System Services available at run time.
- Hierarchic File System (HFS) or zFS. For information on preparing HFS, see *z/OS UNIX System Services File System Interface Reference*.

In IMS 15, the IMS Universal drivers provide the IMS Java drivers and database resource adapters.

Note: The IMS Java dependent region (JDR) resource adapter reuses some of the interfaces and classes in the IMS Universal drivers. As a result, it is packaged as part of the IMS Universal drivers and has the same software requirements as the IMS Universal drivers.

The IMS Universal drivers have the following runtime software requirements:

- IBM SDK, Java Technology Edition, Version 8.0.2.10 or later (31-bit or 64-bit), available from IBM Support Fix Central.
- One or more of the following conditional requirements:
  - For CICS® applications, IBM CICS Transaction Server for z/OS Version 5.1 (5655-Y04) or later, as determined by the JDK version
  - For Db2® stored procedures, Db2 11 for z/OS (5615-DB2®) or later
  - For WebSphere applications, WebSphere Application Server for z/OS (5655-W65) or WebSphere Application Server for distributed platforms (5724-J08), Version 8.5.5 or later, as determined by the supported JDK level.
- RACF or an equivalent product
- The software requirements for the JDR resource adapter are the same as for the IMS Universal drivers.

Java application programs that use the IMS Universal drivers also require a way to generate the IMS database metadata, such as using the IMS Enterprise Suite Explorer for Development.

Note: Use binary-mode FTP to transfer the IMS Universal drivers JAR or RAR files to another system.

JAR and RAR files for type-4 connectivity

The following table describes the JAR and RAR files that provide type-4 connectivity for the IMS Universal drivers:

Table 5. Type-4 connectivity JAR and RAR files for Java applications that use the IMS Universal drivers

Driver	JAR or RAR file
IBM IMS Universal DL/I driver	*pathprefix*/usr/lpp/ims/ims15/imsjava/imsudb.jar
IBM IMS Universal JDBC driver	*pathprefix*/usr/lpp/ims/ims15/imsjava/imsudb.jar
IBM IMS Universal Database resource adapter	• For use within WebSphere Application Server (both z/OS and distributed platforms): • For JCA/JDBC local transaction processing only: *pathprefix*/usr/lpp/ims/ims15/imsjava/rar/imsudbJLocal.rar • For JCA/JDBC two-phase (XA) commit processing or local transaction processing: *pathprefix*/usr/lpp/ims/ims15/imsjava/rar/imsudbJXA.rar • For CCI local transaction support: *pathprefix*/usr/lpp/ims/ims15/imsjava/rar/imsudbLocal.rar • For CCI two-phase commit (XA) transaction support: *pathprefix*/usr/lpp/ims/ims15/imsjava/rar/imsudbXA.rar

JAR and RAR files for type-2 connectivity

The following table describes the JAR and RAR files that provide type-2 connectivity for the IMS Universal drivers:

Table 6. Type-2 connectivity JAR and RAR files for Java applications that use the IMS Universal drivers

Driver	JAR file
IMS Universal DL/I driver	*pathprefix*/usr/lpp/ims/ims15/imsjava/imsudb.jar
IMS Universal JDBC driver	*pathprefix*/usr/lpp/ims/ims15/imsjava/imsudb.jar
IMS Universal Database resource adapter	For use within WebSphere Application Server (both z/OS and distributed platforms): • For CCI programming interface to perform SQL or DL/I data operations: *pathprefix*/usr/lpp/ims/ims15/imsjava/rar/imsudbLocal.rar • For JDBC programming interface to perform SQL data operations: *pathprefix*/usr/lpp/ims/ims15/imsjava/rar/imsudbJLocal.rar

When **DriverType=***2*:

- The transaction scope is local (a unit of work is scoped to a particular connection). Multiple connections can have independent units of work associated with each connection.
- Application programs can issue local commit and rollback calls through either the JDBC Connection interface or the CCI LocalTransaction interface.
- ContainerManaged beans are supported, but require the following properties to be set in the EJB Deployment Descriptor:
  - In the Bean tab, specify the following properties under the LocalTransaction heading:
    - **`Boundary`** = *BeanMethod*
    - **`Resolver`** = *ContainerAtBoundary*
    - **`Unresolved action`** = *Rollback*
  - In the Assembly tab, set the transaction scope to *NotSupported*.

When **`DriverType=`***2_CTX*:

- Specifies a global scope transaction model in which a unit of work can span multiple bean methods. RRS-managed transaction applications use this driver type. The container coordinates commit and rollback processing through RRS.
- Application programs can use the UserTransaction interface for explicit commit and rollback calls.

Software requirements for Java applications that access IMS transactions

Java applications that access IMS transactions must meet specific software requirements.

- Java programs that run in Java message processing (JMP) and Java batch processing (JBP) regions require Java Development Kit (JDK) 8.0.2.10 or later (31-bit or 64-bit), available from IBM Support Fix Central.
- For programs that access transactions using the IMS TM Resource Adapter, see supported versions and software configurations.

The JAR file `imsudb.jar` is needed to support JMP and JBP regions.

Open Database solution software requirements

To use the Open Database solution, IMS must be configured as an IMSplex and IMS Connect is required.

The Open Database solution requires IMS Connect, as well as the following Common Service Layer (CSL) components:

- Operations Manager (OM)
- Structured Call Interface (SCI)
- Open Database Manager (ODBM)

Important: Open Database Manager (ODBM) can only connect to the IMS systems that are of the same version as ODBM itself. In a mixed-version IMSplex, to limit ODBM connection to the IMS systems of the same version, list the eligible IMS systems as data stores in the CSLDC*xxx* member of the IMS PROCLIB data set.

Parallel RECON access software requirements

To use the parallel RECON access function of Database Recovery Control (DBRC), you must configure IMS as an IMSplex and install DFSMS Transactional VSAM Services (DFSMStvs), a separately orderable feature of z/OS.

SQL support software requirements

For IMS to process SQL calls in the native host environment, COBOL Version 5 with IMS coprocessor support is required. With COBOL Version 5, all load modules must reside within a partitioned data set extended (PDSE). The IMS catalog must be enabled for this SQL support.

User exit enhancements software requirements

Exits to be queried or refreshed using type-2 commands must first be defined in the <USER_EXITS> section of the DFSDF*xxx* member of the IMS PROCLIB data set.

Some user exits are passed a standard user exit parameter list (SXPL), mapped by macro DFSSXPL. The SXPL contains a version number that can be used to identify what fields are present in the parameter list. If your user exit accesses a field that was added at a specific version of the parameter list beyond the base level for an IMS release, you should test the SXPL version number to ensure that the parameter list you were passed is at the correct version or higher before using the field.

In IMS 15, some older user exits are always passed a version 1 SXPL. All other user exits that are passed an SXPL receive a version 6 or later SXPL.

Related concepts

Refreshable exit routine types (Exit Routines)

Related reference

IMS standard user exit parameter list (Exit Routines)

IMS Enterprise Suite software requirements

IMS Enterprise Suite provides APIs, tools, and a web service solution for facilitating application development and extending access to IMS transactions and data.

IMS 15 can be used with the following versions of IMS Enterprise Suite, although some components or functions might have specific IMS requirements.

- IMS Enterprise Suite for Distributed Systems V3.3
- IMS Enterprise Suite V3.2

Related information

Release notes for IMS Explorer for Development

Software requirements for IMS Explorer for Development

IMS Enterprise Suite Distributed Systems V3.3 overview

IMS Enterprise Suite V3.2 overview

CICS subsystems supported

IBM CICS Transaction Server for z/OS can connect to IMS if minimum version requirements are met. Certain IMS 15 functions might include additional version requirements for CICS.

CICS Transaction Server for z/OS Version 4.2 (5655-S97) or later can connect to either the IMS 15 Database Manager (DB) or, using the appropriate TM interface, the IMS 15 Transaction Manager.

Db2 for z/OS subsystems supported

IMS 15 Transaction Manager can connect with Db2 for z/OS.

The IMS 15 Transaction Manager can be connected to any of the following Db2 products:

- Db2 11 for z/OS (5615-DB2) or later

IBM MQ subsystems supported

IMS 15 supports IBM MQ.

Intersystem Communication (ISC) subsystems supported

Using Intersystem Communication (ISC), the IMS 15 Transaction Manager can be connected to IMS 15 and earlier systems, to IBM CICS Transaction Server for z/OS, and to user-written software.

The IMS 15 Transaction Manager can be connected to the following products by using ISC:

- IMS 15 (5635-A06) at any IMS 15 release level
- IMS 14 (5635-A05)
- IMS Version 13 (5635-A04)
- IBM CICS Transaction Server for z/OS Version 4.2 (5655-S97) or later

  For the ISC TCP/IP function, IMS Connect is required.
- User-written software

Programming languages used to write IMS 15

IMS 15 is written in High Level Assembler Release 6, PL/X, C, C++, and JDK Version 8.

Programming languages supported

You can write IMS applications in the supported versions of many programming languages.

You can write IMS applications in the currently supported versions of the following languages:

- Ada
- COBOL for OS/390® & VM
- Enterprise COBOL for z/OS

  If you use Enterprise COBOL for z/OS Version 5.1, the data set that holds the output load modules of the compiler must be a PDSE.

  For the latest version of COBOL for z/OS that is supported for a particular version of z/OS, see COBOL Migration Concerns going to New Release of the Compiler or z/OS.
- Enterprise PL/I for z/OS
- IBM High Level Assembler for z/OS & z/VM® & z/VSE®
- Java, using the IBM SDK for z/OS, Java Technology Edition, V8.0.2.10 (31-bit or 64-bit), available from IBM Support Fix Central.
- PL/I for z/OS and OS/390
- TSO/E REXX
- VS Pascal
- z/OS C/C++

Application programs supported

IMS 15 supports application programs that are supported by IMS Version 13 and IMS 14 and all earlier releases of IMS 15.

All application programs that are supported under IMS Version 13 and IMS 14 and all earlier releases of IMS 15 are still supported under IMS 15. In general, you should not have to recompile, reassemble, or rebind an IMS application program to run under IMS 15.

Chapter 3. Packaging for IMS 15

The IMS product is packaged under several function modification identifiers (FMIDs). This packaging choice is in response to IMS internal requirements and is subject to change in the future.

The existence of an FMID does not imply that installation of the FMID is optional. Refer to the following table to determine which FMIDs are required, optional, or not applicable. Within the table the following notations are used:

R
FMID installation is required.

O
FMID installation is optional.

N
The FMID is not applicable to this environment.

All FMIDs are installed outside of the Installation Verification Program (IVP). See the *Program Directory for Information Management System Transaction and Database Servers V15.01.00* for installation instructions.

Table 7. FMID requirements in IMS 15

FMID	Description	DB batch	DBCTL	DB/DC	DB/DC with XRF (1)	DCCTL
HIR2230	Internal Resource Lock Manager V2R3	O	O	O	O	N
HMK1500(2)	System Services component IVP component Database Recovery Control Logging component IMS Connect	R	R	R	R	R
JMK1501	Database Manager function	R	R	R	R	N
JMK1502	Transaction Manager function	N	N	R	R	R
JMK1503	Extended Terminal Option feature	N	N	O	O	O
JMK1506	IMS Java On Demand features: IMS Universal drivers for access to IMS DB IMS TM Resource Adapter for access to IMS TM	O	O	O	O	O
JMK151Z	IMS Value Unit Editions: IMS Database Value Unit Edition V15.01.00 Program Number 5655-DS5 IMS Transaction Manager Value Unit Edition V15.01.00 Program Number 5655-TM4	O	O	O	O	O

Note:

1. Although DCCTL with XRF is a supported combination, it is not included as an IVP option.
2. FMID installation is required even if the primary function provided by this FMID is not used.

Chapter 4. Installation considerations

Before you migrate and prepare your own systems, complete both the SMP/E install and the entire IVP process.

The following sections list the programming considerations for installing IMS and activating its functions.

IMS 15 is a complex product to install and prepare for execution. The SMP/E install and the IVP processes are not completed as a single process.

Recommendation: Complete both the SMP/E install and the entire IVP process, documented in *IMS Version 15 Installation*, before proceeding with the migration and preparation of your own systems.

The following table lists the sample jobs that are shipped with IMS 15.

Table 8. Sample installation jobs that are shipped with IMS 15

Job name	Job type	Description
DFSALA	SMP/E	Sample job to allocate and initialize a new SMP/E CSI data set (optional)
DFSALB	SMP/E	Sample job to allocate SMP/E data sets (recommended, but optional)
DFSALOC1	ALLOCATE	Sample job to allocate target and distribution libraries
DFSALOC2	ALLOCATE	Sample job to allocate target and distribution libraries for the On Demand features
DFSJSMKD	MKDIR	Sample job to invoke the supplied DFSJMKDR EXEC to allocate paths for the On Demand Features
DFSDDEF1	DDDEF	Sample job to define SMP/E DDDEFs for IMS
DFSDDEF2	DDDEF	Sample job to define SMP/E DDDEFs for the IMS Java On Demand Features
DFSAPPLY	APPLY	Sample APPLY job
DFSACCEP	ACCEPT	Sample ACCEPT job
DFSPROCB	COPY	Sample job to copy IMS sample JCL procedures to site library

The IVP process:

- Can be used for setting up and demonstrating an IMS system, as well as the testing of selected functions.
- Provides materials that you can use as a guide for working with your own IMS systems.

The IVP process includes:

- Data set allocation
- Post-installation activities on target libraries
- System definition activities
- SVC considerations
- Authorization considerations
- IMS system preparation activities
- IMS application preparation activities
- IMS system and application execution activities

There are no system programming or special programming considerations for IMS 15.

Chapter 5. Migration to IMS 15

The objective of migration support is to enable an orderly migration from your current release of IMS to IMS 15.

These topics describe general migration considerations for IMS 15 and migration considerations for specific new features and functions of IMS 15.

Migrating to IMS 15 from IMS Version 13 or earlier

If you are migrating to IMS 15 from IMS Version 13 or earlier, your migration plan must take into account the requirements and enhancements that are introduced into IMS in the versions that you are skipping.

For example, if you are migrating to IMS 15 from IMS Version 13, in addition to the requirements and enhancements of IMS 15, your migration plan must also account for the requirements and enhancements that are introduced into IMS in IMS 14.

Review the Release Planning information specific to both the IMS version that you are migrating to and the IMS version that you are skipping.

Discontinuance of support

Support is discontinued for various utilities, macros, resource adapters, and functions.

Extended Recovery Facility (XRF) stabilized

Support for the IMS Extended Recovery Facility (XRF) function is stabilized. Enhancements made in IMS no longer include support for XRF.

LGEN system definition

As of July 1, 2017, support for LGEN system definition is discontinued in all versions of IMS. If the LGEN parameter is specified on the SYSTEM= parameter in the IMSCTRL macro, remove the LGEN parameter specification to use the standard IMS system definition.

If the LGEN parameter is specified, IMS issues message G123 and the stage-1 assembly fails with return code 4.

IMS XML DB support

Support for IMS XML DB was discontinued in IMS 14.

Remote Site Recovery (RSR)

IMS 15 and later systems do not support Remote Site Recovery (RSR). Installations that use RSR can instead use a multisystem IMSplex that includes geographically disperse cloned IMS systems for seamless failover protection and disaster recovery.

The RSRMBR= control region startup parameter is no longer valid and is ignored. You can remove it from your IMS JCL, and can also delete any DFSRSRxx members from your IMS PROCLIB data set.

Updates to IMS PDFs in the IBM Publications Center

The IBM Publications Center is discontinued.

To download IMS PDFs, see PDF files of IMS documentation.

IMS Classic Java APIs

IMS 14 systems and later do not support the IMS Classic Java APIs. If you used these APIs, you must migrate to the IMS Universal drivers.

In addition, support for Db2 stored procedures to IMS through Java is no longer provided. You can use the JDBC drivers to direct Java access to IMS instead of through a Db2 stored procedure. Or, use Db2 stored procedures in COBOL applications to access IMS through ODBA.

IMS Connect support for SSL

IMS 15 and later subsystems do no support the IMS Connect SSL function. Installations that use this function should migrate to using IBM z/OS Communications Server Application Transparent Transport Layer Security (AT-TLS) to set up Secure Socket Layer (SSL) on TCP/IP connections to IMS Connect.

IMS Connect support for LOCAL option connections from IMS TM Resource Adapter

IMS 15 and later systems do not support the IMS Connect LOCAL option for connections between IMS Connect and IMS TM Resource Adapter. Reconfigure any connections that currently use the LOCAL option to use either TCP/IP or the WebSphere Optimized Local Adapter.

IMS Enterprise Suite Version 2.1

IMS Enterprise SuiteVersion 2.1 is the last release of IMS Enterprise Suite that includes the DLIModel utility plug-in. Customers using the IMS Enterprise Suite DLIModel utility plug-in should migrate to using the IMS Enterprise Suite Explorer for Development instead. Although IMS Explorer for Development includes enhancements to most IMS Enterprise SuiteDLIModel utility plug-in functions, it does not provide support for IMS database web services or IMS XML DB. You can obtain this support through the following options:

- For IMS database web services, you can generate web-enabled IMS database queries by shell sharing IMS Explorer for Development with IBMData Studio.
- The XML data support in IMS databases is discontinued in IMS 14. For earlier versions of IMS, the support is discontinued when IMS Version 12 is out of service.

MFS SOA support

IMS Message Format Service support for service-oriented architecture (MFS SOA) is discontinued in IMS 15 and later systems.

Users should migrate to IBM Rational® Host On Demand.

MFS Web Enablement

IMS 14 systems and later do not support IMS MFS Web Enablement.

Support for MFS Web Enablement in IMS Version 13 extends only to current users of the function.

Current® users should migrate to IBM Rational Host Access Transformation Services (HATS), which provides capabilities similar to those provided by MFS Web Enablement.

Specific migration considerations

Specific migration considerations apply when you are migrating from IMS Version 13 or IMS 14 to IMS 15.

The information about the IMS features and enhancements that were introduced in the previous versions or releases are not documented in the IMS 15 Release Planning information. If you are skipping one or more IMS versions or releases when you migrate to IMS 15, review the Release Planning information of each IMS release or version that you are skipping.

For example, if you are migrating to IMS 15 from IMS 14, also review the migration considerations in the following information:

- Migration to IMS 14

The Release Planning information for the IMS releases or versions that are currently supported by IBM is available in the IBM IMS documentation.

Other IMS documentation is available in PDF format. To learn more, see PDF files of IMS documentation ().

If a new function does not have any migration considerations, it is not discussed in the following topics.

Migrating to IMS 15: DB

Specific migration considerations apply when you are migrating from the IMS Version 13 or IMS 14 Database Manager to the IMS 15 Database Manager.

These topics describe the IMS considerations for migrating to the IMS 15 Database Manager.

Database recovery utilities migration considerations

The IMS 15 Database Recovery (DFSURDB0) and Database Change Accumulation (DFSUCUM0) utilities accept as input log, image copy, and change accumulation data sets created by IMS Version 13 or later.

Database versioning migration considerations

Database versioning introduces some specific considerations for migration.

If you are migrating an IMS system that uses database versioning to IMS 15, you must preserve in the catalog the DBD segment instances that define the prior version of any DBD version in use.

CAUTION: If the segment instances for the prior version of a DBD are not preserved, any application programs that use that prior version of the DBD can no longer access the database.

For example, if your IMS system uses version 0 and version 1 of DBD DBD1A in IMS 14, both versions of the DBD1A DBD are stored as separate segment instances in the same DBD1A record in the IMS catalog. Version 1 of DBD1A reflects the actual physical structure of the database. Version 0 of DBD1A is a "virtual" structure that exists only in the IMS catalog.

In this case, when you migrate to IMS 15:

- You regenerate version 1 of DBD1A by using the IMS 15 generation utilities. When you populate the IMS catalog, version 1 of DBD1A gets inserted as a new set of segments in the same record as all of the segment instances of DBD1A from IMS 14. The IMS 15 instance of version 1 now becomes the active version of the DBD and the IMS 14 instance of version 1 is no longer used.
- You do not regenerate version 0 of DBD1A. Instead, you preserve the IMS 14 instance of the DBD1A version 0 in the IMS catalog. Application programs that use version 0 in IMS 15 continue to use the segment instances that were generated in IMS 14.

DEDB Alter enhancement migration considerations

The DEDB Alter utility has requirements for migration to IMS 15.

If you are invoking the DEDB Alter utility for an IMS 15 function, such as ALTERDB, the DEDB Alter utility detects the version of the IMS system and terminates if the IMS version does not support the particular change.

IMS catalog migration considerations

The IMS catalog is a HALDB PHIDAM database that can require special consideration when migrating to a new version, depending on changes to the IMS catalog itself or on changes made to other IMS functions that use the IMS catalog.

Normally, migrating an HALDB database requires that you unload the original database, change its DBD to the new version, reload the database with the new DBD, and then run the new version of the ACB Maintenance utility on the new DBDs and PSBs of the HALDB database.

However, when migrating the IMS catalog, you only need to run the new version of the ACB maintenance utility on the new DBDs and PSBs of the IMS catalog because the catalog DBD structures are identical across versions.

Storage use by the IMS catalog

In IMS 14, the IMS catalog supports new segment types and can store new types of metadata about changes that are made to the IMS catalog and about the IMS systems that use the IMS catalog. Consequently, the IMS catalog data sets can require more storage space than in previous versions of IMS.

When you enable the IMS management of ACBs, the new system data sets that are required to manage the ACBs can use slightly more storage than the ACB libraries. However, IMS manages these system data sets, so you do not need to allocate the storage or the data sets.

The IMS management of ACBs and the IMS catalog

In IMS 14, the IMS management of application control blocks (ACBs) introduces migration considerations for users of the IMS catalog.

When IMS manages ACBs, which are the runtime control blocks for active databases and program views, the IMS catalog replaces ACB libraries as the repository of the active ACBs. Consequently, backup and recovery procedures for the IMS catalog are critical. Create image copies of the IMS catalog and use them with the logs to recover the IMS catalog. In previous releases of IMS, you might have been able to rebuild the IMS catalog from your ACB libraries. However, when IMS manages ACBs, you can use SQL DDL to add or modify database and program views. Changes made by using DDL would not be contained in an ACB library.

The default access level of the IMS catalog changes from ACCESS=READ to ACCESS=UPDATE when the IMS management of ACBs is enabled.

Migration steps for an existing IMS catalog in systems that use ACB libraries

Like other IMS databases, the IMS catalog is defined by a DBD and accessed through PSBs. The migration procedure for the IMS catalog differs depending on which version of IMS you migrate from, and if you are migrating multiple IMS systems that share the catalog. If you are migrating from IMS Version 13, the ACBs for the catalog must be generated from the DBDs and PSBs that IMS 15 supports. If you are migrating from IMS 14, you do not need to re-generate the catalog ACBs. Additionally, when the ACBs for the other databases and program views in the IMS system are re-generated for the new IMS release, the IMS catalog must be updated with those ACBs to keep the IMS catalog in sync with the active ACBs in use by the IMS system.

Ensure that enough storage is allocated to the IMS catalog to accommodate the insertion of a complete IMS 15 set of the existing DBD and PSB resources.When migrating from IMS Version 13, the IMS catalog holds a complete set of your existing resources and a complete set of IMS 15 resources.

Updating an IMS catalog for a new release can take a long time. Before you populate the IMS catalog, consider tuning your buffer pools based on the number and types of segments in the IMS catalog so that the utility you use for population doesn't do many buffer steals.

If you are migrating from IMS Version 13, you must generate the catalog ACBs from the DBDs and PSBs that IMS 15 supports by using the IMS 15 ACB Generation and Catalog Populate utility (DFS3UACB). The DBDs and PSBs for the catalog changed between IMS Version 13 and IMS 15. Step 3 is required.

If you are migrating from IMS 14, you do not need to generate new catalog ACBs from the DBDs and PSBs. The DBDs and PSBs for the catalog did not change between IMS 14 and IMS 15. Skip step 3.

The following steps update an existing IMS catalog for a new version of IMS.

Attention: Do not delete and rebuild the IMS catalog if the IMS catalog contains metadata that cannot be restored from the new version of the ACB library. Metadata that cannot be restored from the ACB library includes metadata that is required for database versioning, remarks, or metadata stored by non-IMS products.

1. If necessary, increase the amount of storage that is allocated to the IMS catalog.
2. Shut down IMS 15 if it is running.
3. If you are migrating from IMS Version 13, install the IMS 15 DBDs and PSBs for the IMS catalog from the IMS.SDFSRESL data set to the IMS.DBDLIB and IMS.PSBLIB data sets. You do not need to unload and reload the IMS catalog database, even though the IMS catalog DBD might have changed in the new release.

   The catalog DBDs are called DFSCD000 and DFSCX000. The PSBs are called DFSCPL00, DFSCP000, DFSCP001, DFSCP002, and DFSCP003. These are reserved names and cannot be changed or used for other resources.

   If the IMS catalog is shared by multiple systems and you are migrating from IMS Version 13, you must create a temporary DBDLIB that you will install the IMS 14 DBDs into. This DBDLIB is used to hold the IMS 14 catalog DBDs until migration is complete.

   If you are migrating from IMS Version 13 and you assigned an alias to the IMS Version 13 catalog, run the IMS Catalog Alias Names utility (DFS3ALI0) after you install the IMS 15 catalog DBDs from the IMS.SDFSRESL data set to the IMS.DBDLIB. You must run the DFS3ALI0 utility after you install the IMS 15 catalog DBDs to the IMS.DBDLIB so that the IMS catalog alias references the IMS 15 catalog DBD instead of the IMS Version 13 catalog DBD.
4. Use the IMS 15 ACB Generation and Populate utility (DFS3UACB) to generate the ACBs for all your application PSBs and database DBDs and add them to the IMS catalog.

   The DFS3UACB utility generates the ACBs and updates the IMS catalog in a single job step, ensuring that the IMS catalog is in sync with the latest ACBs.

   If the IMS catalog is shared by multiple systems, you must run the IMS 14 DFS3UACB utility as data sharing DL/I batch job with IRLM. If the utility cannot be run with IRLM, you must take the IMS Version 13 catalog offline with a /DBR BD command while performing this step.

   As an alternative to using the ACB Generation and Catalog Populate utility (DFS3UACB), you can run both the IMS 15 ACB Maintenance utility and the IMS Catalog Populate utility. The ACB Maintenance utility builds the ACBs. The IMS Catalog Populate utility populates the IMS catalog with the new versions of PSBs and DBDs.
5. Activate the ACB library.
6. Restart the IMS 15 system.

If you have any application programs that read the IMS catalog, review the structure of the IMS catalog to ensure that the application programs can handle any changes appropriately.

After testing is complete and you are certain that you do not need to fall back to the previous version of IMS, you can remove the DBD and PSB resource instances for the past IMS version from the IMS catalog by using the IMS Catalog Record Purge utility (DFS3PU10).

Related reference

IMS Catalog Record Purge utility (DFS3PU10) (System Utilities)

ACB Generation and Catalog Populate utility (DFS3UACB) (System Utilities)

Migrating an existing IMS catalog in systems that manages ACBs

If you are migrating from IMS 14 with managed ACBs enabled to IMS 15, you can enable IMS 15 to support IMS directory ACBs that are currently being used by an IMS 14 system and load ACBs from the same IMS directory that the IMS 14 system is using. Install APAR PI79314 for IMS 15 to allow an IMS 15

system to support directory ACBs generated from an IMS 14 system. After installing both IMS 14 APAR PI82331 and IMS 15 APAR PI79314, IMS 14 and IMS 15 systems can share the same directory.

Before you begin

ACBSHR=Y must be specified for coexistence between IMS 14 and IMS 15 in a managed ACB environment, even if you are migrating a single IMS 14 system. If the IMS 14 directory was created in an ACBSHR=N environment, you must specify ACBSHR=Y in the IMS 14 system and re-create the IMS directory before the IMS 14 and IMS 15 systems can coexist with managed ACBs enabled.

The migration procedure for the IMS catalog differs depending on whether you are migrating a single IMS system or multiple IMS systems that share a catalog:

- If you are migrating a single IMS system to IMS 15, the installation of the IMS 14 APAR PI82331 in step 4 is not required.
- If you are migrating multiple IMS systems, or if you plan to have IMS 14 and IMS 15 systems coexist in a data sharing environment, the installation of the IMS 14 APAR PI82331 in step 4 is required.

If you require an ACBLIB in your IMS 15 managed ACB environment for the use of tools, utilities, batch jobs, or for any other reason, you must regenerate the ACBs in the ACBLIB by using the IMS 15 Catalog Library Builder utility (DFS3LU00).

The following steps show how you can migrate an existing IMS catalog in systems that manages ACBs:

1. If IMS 15 is running, shut it down.
2. Install the IMS 15 APAR PI79314 on your system to allow to use an IMS directory that contains ACBs generated by an IMS 14 system.
3. Restart the IMS 15 system with the same catalog and ACB management definitions as your IMS 14 system.
4. Install the IMS 14 APAR PI82331 on your IMS 14 system to allow IMS 14 to support directory ACBs generated by an IMS 15 system, and to make changes to the IMS directory from IMS 15.

   Optional: If you do not need to use your IMS 15 system to create or modify any ACBs while the IMS directory is shared with an IMS 14 system, APAR PI82331 is not required.

Related reference

IMS Catalog Library Builder utility (DFS3LU00) (System Utilities)

IMS management of ACBs migration considerations

When you enable the IMS management of runtime application control blocks (ACBs) for the first time, there are a number of considerations to take into account.

Initial load of the IMS Catalog by using the IMS Catalog Populate utility (DFS3PU00)

You must load the IMS catalog before enabling IMS management of ACBs. Use the IMS Catalog Populate utility (DFS3PU00) to populate the IMS catalog if you are using it for the first time with MANAGEDACBS=SETUP specified in the SYSINP DD statement in the utility JCL. For more information, see Loading the IMS catalog with the DFS3PU00 utility (System Definition).

Migrating from a shared IMS catalog with multiple ACBLIBs

When the IMS management of ACBs is enabled, an IMS catalog functions like an ACB library for all of the IMS systems that use that IMS catalog. So, if you are migrating a multi-system environment in which the IMS systems share an IMS catalog but each system has its own ACB library, enabling the IMS management of ACBs effectively converts your IMS systems from using multiple, independent ACB libraries to sharing a single set of ACBs.

An IMS catalog supports only a single active instance of an ACB for each version of IMS that uses the IMS catalog. In the IMS catalog, each instance of an ACB is identified by the time stamp that is taken when the ACB was created. When you set up an IMS catalog to manage ACBs for multiple IMS systems that each used their own ACB library, if different instances of the same ACB appear in different ACB libraries, only

one instance of the ACB is loaded into the IMS directory data set, a system-managed data set that is an extension of the IMS catalog. Usually, the instance that is loaded into the IMS directory is the instance with the most recent time stamp.

Before you enable the IMS management of ACBs, if multiple IMS systems use separate ACB libraries that contain common ACBs, make sure that all of the common ACBs in the separate libraries were built from the same DBD and PSB libraries.

After the IMS management of ACBs is enabled, any changes to an active ACB in the IMS catalog potentially impacts all IMS systems that share the IMS catalog.

Although it is not recommended to do so, you can enable a dedicated IMS catalog for each IMS system that needs separately maintained ACBs. However, the benefits of sharing an IMS catalog would be lost.

DBRC and IMS managed ACBs

DBRC requires access to your database definitions to process certain DBRC commands. In IMS systems that use ACB, DBD, and PSB libraries, DBRC retrieves the database definitions from the DBDLIB data set.

In an IMS system that manages ACBs, DBRC can retrieve the database definitions from the IMS catalog, if the name of the IMS catalog is entered in the RECON header or is specified when a DBRC command is entered.

You enter the IMS catalog name into the RECON header by using either DBRC command INIT.RECON or CHANGE.RECON.

The following DBRC commands are enhanced to either specify the name of an IMS catalog to use or to display the current default IMS catalog:

- CHANGE.DBDS
- CHANGE.PART
- CHANGE.RECON
- INIT.DB
- INIT.DBDS
- INIT.PART
- INIT.RECON
- LIST.RECON
- NOTIFY.REORG

IMS Catalog Definition exit routine (DFS3CDX0)

Existing IMS Catalog Definition exit routines (DFS3CDX0) must be updated when the IMS management of ACBs is enabled so that the specification for ACBMGMT in the exit routine matches the specification for ACBMGMT in the CATALOG section of the DFSDF*xxx* PROCLIB member.

IMS 14 updates the sample Catalog Definition exit routine with a flag that indicates whether the IMS management of ACBs is enabled.

Online processing impact

When the IMS management of ACBs is enabled and DDL statements are used to define or modify databases or program views, the online IMS system processes the DDL statements, updates the IMS catalog, and builds the runtime control blocks. So, the costs that are associated with this processing are incurred by the online IMS system.

This processing cost is avoided during the initial migration to IMS-managed ACBs because the batch DBD and PSB generation utilities are used to create the IMS 14 DBD and PSB control blocks. Also the IMS Catalog Populate utility can be run in batch mode when it updates the IMS catalog and sets up the IMS system to manage ACBs.

After the IMS management of ACBs is enabled, if your installation uses DDL heavily to define or modify databases and program views, you might see an increase in DL/I processing over the processing in IMS systems that are not enabled for the IMS management of ACBs.

Related tasks

Enabling IMS management of ACBs (System Definition)

Related reference

IMS Catalog Definition exit routine (DFS3CDX0) (Exit Routines)

Migrating to IMS 15: TM

IMS considerations for migrating from IMS Version 13 or IMS 14 Transaction Manager to IMS 15 Transaction Manager include how the enhancements to IMS affect migration, as well as how major IMS functions are affected by migration.

These topics describe the IMS considerations for migrating to the IMS 15 Transaction Manager.

APPC/IMS flood control migration considerations

In IMS 14, the new APPC/IMS flood control function is active by default and the IMS system will take action if the default flood thresholds are reached unless you change the default thresholds or disable the function.

The default thresholds were 5,000 and 1,000,000 in IMS 14. In IMS 15.1 and later versions, the default thresholds are changed to 5,000 and 10,000. If the number of active APPC conversations exceeds the default threshold of 5,000, subsequent APPC requests are queued in 64-bit storage until IMS can accept them for processing. If the number of APPC requests that are queued in 64-bit storage exceeds 10,000, IMS stops all APPC input from z/OS. When the number of conversations gets close to the flood thresholds, IMS issues warning messages.

You can modify or disable APPC/IMS flood control by specifying the **APPCMAXC=** parameter in the DFSDCxxx PROCLIB member. To disable the function, specify **APPCMAXC=**0.

The **/DISPLAY ACT** command output is modified to include a **MAXC=** output field that shows the maximum number of APPC conversations that can be active before APPC requests are queued in 64-bit storage.

JVM 64-bit support migration considerations

Specify JVM=64 in the EXEC job control statement to enable the JVM 64-bit support. The JVM= parameter is valid only for Java batch processing (JBP) and Java message processing (JMP) regions.

By default, Java dependent regions load and run with a 31-bit Java virtual machine (JVM). You can modify the JVM addressing mode to 64-bit by specifying the JVM=64 parameter in the DFSJBP and DFSJMP procedure EXEC statement. The new JVM= parameter is valid only for the JBP and JMP regions.

When you specify the JVM= parameter on the EXEC PGM=DFSRRC00 card for the JMP region, you must specify all positional parameters, PRLD=, SSM=, PARDLI=, MINTHRD= and MAXTHRD=, before the JVM= parameter. MAXTHRD= and MINTHRD= are two positional parameters that are hidden when the JVM= parameter is not provided.

By specifying JVM=64, Language Environment®, the infrastructure that supports a 64-bit JVM, is also changed to the 64-bit addressing mode.

You can change to the default 31-bit addressing mode by specifying JVM=31.

To determine which addressing mode a JVM in a Java dependent region is using, you can check the JVM= parameter, the environment file, or the status messages in the job output.

Example

The following sample output shows status messages of a job that uses 31-bit JVM. In the 31-bit addressing mode, the DFSJVM00 module is used, and the LIBPATH points to a 31-bit JVM directory.

```
DFSJVM00: ENVIRON member name is DFSJVMEV
DFSJVM00: LIBPATH=/usr/lpp/java170/J7.0/bin/
DFSJVM00: JVMOPMAS member name is DFSJVMMS
```

In the following sample output of a job that uses 64-bit JVM, the DFSJVM64 module is used, and the LIBPATH points to a 64-bit JVM directory.

```
DFSJVM64: ENVIRON member name is DFSJVMEV
DFSJVM64: LIBPATH=/usr/lpp/java170/J7.0_64/bin/
DFSJVM64: JVMOPMAS member name is DFSJVMMS
```

Java environment scripting migration considerations

When the //STDENV DD statement is used, only the parameters in the shell scripts that are referenced by the //STDENV DD statement are used. Move the JVM configuration parameters from the DFSJVMMS and DFSJVMEV members of the IMS.PROCLIB data set to the shell scripts.

Before you use the //STDENV DD statement, ensure that you move the parameter configurations that were specified in the DFSJVMEV and DFSJVMMS members of the IMS.PROCLIB data set to the shell scripts that are referenced by the DD statement.

If the //STDENV DD statement is present, both the DFSJVMEV and DFSJVMMS PROCLIB members are ignored.

In the shell script, you must use the `export` shell command to export the environment variables.

APAR PI84302 introduces two variables under the //STDENV DD statement, **JZOS_ENABLE_OUTPUT_TRANSCODING** and **JZOS_OUTPUT_ENCODING**, that can be used to specify the encoding options for `stdout` and `stderr`. APAR PI84302 also increases the length limit of classpath under the //STDENV DD statement from 16K to 150K.

You can set the variable **JZOS_OUTPUT_ENCODING** under the //STDENV DD statement to specify the code page that is used to convert the raw bytes for `stdout` and `stderr`. If no code page is provided in JZOS_OUTPUT_ENCODING, the default code page in the current locale is used for `stdout` and `stderr`. You can use the variable **JZOS_ENABLE_OUTPUT_TRANSCODING** to enable or disable the code page that is specified in JZOS_OUTPUT_ENCODING. The encoding option is enabled by default. If **JZOS_ENALBE_OUTPUT_TRANSCODING** is set to false, then the code page specified in JZOS_OUTPUT_ENCODING is ignored and raw bytes are written to `stdout` and `stderr`.

Example 1

The following JCL is an example of how to use //STDENV DD statement.

```
//STDENV DD *
# This is a shell script which configures
# environment variables for the Java JVM.
# Variables must be exported to be visible to the launcher.
. /etc/profile
export JAVA_HOME=/usr/lpp/java/J7.0
export PATH=/bin:"${JAVA_HOME}"/bin
LIBPATH=/lib:/usr/lib:"${JAVA_HOME}"/bin
export LIBPATH="$LIBPATH":

# Customize your CLASSPATH here.
CLASSPATH="$CLASSPATH":myLibPath/imsudbimsxxxx.jar
for i in "${JAVA_HOME}"*.jar; do
    CLASSPATH="$CLASSPATH":"$i"
    done
# Classpath length can be up to 150K
export CLASSPATH="$CLASSPATH":

# Use this variable to specify the encoding for DD STDOUT and DD STDERR.
export JZOS_OUTPUT_ENCODING=Cp1047
# Use this variable to enable or disable the encoding specified
# in JZOS_OUTPUT_ENCODING.
# The default is true. When the variable is set to false, the encoding
# specified in JZOS_OUTPUT_ENCODING is ignored.
export JZOS_ENABLE_OUTPUT_TRANSCODING=false
...
```

Example 2

The following JCL provides an example of how to configure Java environment variables and options by using the //STDENV DD statement. You can separate the JVM configurations variables in multiple files and concatenate them in a single //STDENV DD statement. The member names here are provided as examples.

```
//JMP00001 JOB MSGLEVEL=1,MSGCLASS=E,CLASS=K,
//   LINES=999999,TIME=1440,REGION=0M,
//   MEMLIMIT=NOLIMIT
//*
//JMP00001 PROC CL1=001,CL2=000,CL3=000,
//   CL4=000,OPT=W,OVLA=0,
//   SPIE=0,TLIM=00,VALCK=0,
//   PCB=032,SOD=,STIMER=,
//   NBA=5,OBA=5,IMSID=IMS1,
//   AGN=,SSM=,PREINIT=,
//   ALTID=,PWFI=,APARM=,
//   LOCKMAX=,ENVIRON=,JVMOPMAS=,
//   PARDLI=,PRLD=,JVM=31
//REGION   EXEC PGM=DFSRRC00,
//             PARM=(JMP,&CL1&CL2&CL3&CL4,
//             &OPT&OVLA&SPIE&VALCK&TLIM&PCB,&STIMER,&SOD,&NBA,
//             &OBA,&IMSID,&AGN,&PREINIT,&ALTID,&PWFI,'&APARM',
//             &LOCKMAX,&ENVIRON,,&JVMOPMAS,&PRLD,&SSM,&PARDLI,,,
//             &JVM)
//STEPLIB  DD DSN=IMSVS.IMDO.SDFSJLIB,DISP=SHR
//         DD DSN=IMSVS.IMDO.SDFSRESL,DISP=SHR
//         DD DSN=CEE.SCEERUN,DISP=SHR
//         DD DSN=SYS1.CSSLIB,DISP=SHR
//STDENV DD DSN=hlq1.IMSCONF(IMS1ENV)
//       DD DSN=hlq2.IMSCONF(IMS1OPT)
//       DD DSN=hlq2.IMSCONF(IMS1MAIN)
//       DD DSN=hlq2.IMSCONF(IMS1DBUG)
//PRINTDD  DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//STDOUT   DD SYSOUT=*
//STDERR   DD SYSOUT=*
//*
//         PEND
//JMP00001 EXEC JMP00001
```

In the example, the *IMS1ENV* file is a shell script that configures the environment variables for the JVM. The *IMS1OPT* file specifies the IBM JVM runtime options, which are typically prefixed with -X, and Java system properties, which are prefixed with -D. The *IMS1MAIN* file supplies arguments to the Java main method.

```
# IMS1ENV sample file
. /etc/profile
export JAVA_HOME=/usr/lpp/java/J7.0
export PATH=/bin:"${JAVA_HOME}"/bin
LIBPATH=/lib:/usr/lib:"${JAVA_HOME}"/bin
export LIBPATH="$LIBPATH":
CLASSPATH="$CLASSPATH":myLibPath/imsudbimsxxxx.jar
for i in "${JAVA_HOME}"*.jar; do
   CLASSPATH="$CLASSPATH":"$i"
   done
export CLASSPATH="$CLASSPATH":
```

```
# IMS1DBUG sample file
export DEBUG=Y
```

```
# IMS1OPT sample file
export JZOS_OUTPUT_ENCODING=Cp1047
export JZOS_ENABLE_OUTPUT_TRANSCODING=false
```

```
# IMS1MAIN sample file
# Use this variable to supply arguments to the Java main method
JZOS_MAIN_ARGS="gofast"
```

MSC migration considerations

The enhancements to Multiple Systems Coupling (MSC) in IMS 15 introduce a number of migration considerations.

Migration considerations for MSC exit routines

Exit routines that use information from the MSC logical and physical blocks, such as the TM and MSC Message Routing and Control User exit routine (DFSMSCE0) and the Message Control/Error exit routine (DFSCMUX0), must be changed to either use callable services or use the FIND/SCAN function of the DFSCBTS macro to find the logical link blocks (LLBs) and the physical link control blocks (LCBs).

The exit routines can no longer use the MSCDLLB and MSCDLCB fields in the MSCD block.

Exit routines that access remote logical terminal blocks (RCNTs) must be updated to use the FIND and SCAN control block callable services to access the RCNTs. In IMS 13 and earlier, exit routines could access RCNTs by referencing the RCNTs in the SCDRCNTM field of the IMS system contents directory (SCD). In IMS 15, exit routines can no longer use the SCDRCNTM field to access RCNTs. For more information about the FIND and SCAN control block callable services, see IMS Callable Control Block Services requests (Exit Routines).

User exit routines that reference MSC control blocks must run in 31-bit mode.

User exits in the IMS nucleus that reference MSC DDM or command modules with a VCON will need to be changed. Examples include the TM and MSC Message Routing and Control User Exit routine (DFSMSCE0) and the Message Control/Error exit routine (DFSCMUX0). MSC DDM modules are removed from the nucleus and now reside in 31-bit storage. Their addresses can be accessed from pointers in other control blocks.

The IMS nucleus no longer contains any MSC modules. The MSC modules that were in the nucleus in earlier releases of IMS are now in 31-bit storage. Their 31-bit addresses are stored in the MSC blocks. As a result of this change, MSC control blocks can no longer be sequentially scanned or their addresses calculated by multiplying the block length by the link number. The new pools (MSCP and MSCL) must be scanned using the DFSCBTS macro or FIND/SCAN control block callable services.

User exit routines that reference MSC modules in the nucleus must be changed to reference MSC modules in 31-bit storage, whose addresses are now saved in the MSCD.

The LLB is the main control block for MSC logical links and the LCB is the main control blocks for MSC physical links. The pointers within the MSC blocks that are used to tie the blocks together have not changed in IMS 15.

Note: Save old user exit routines, in case you need to fall back to a previous release of IMS.

Migration considerations for dynamic definition of MSC resources

There are several considerations for migrating to IMS 15 support for the dynamic definition of MSC resources.

To migrate to using dynamic definition of MSC resources, evaluate existing transaction, LTERM, and MSNAME names for conflicts with dynamic MSC. Dynamic MSC reserves additional name prefixes, including MSNS and MSNI. If you already have existing transaction, LTERM, or MSNAMEs defined that start with the prefix MSNS or MSNI, the CREATE MSNAME command might not complete successfully. The CREATE MSNAME command defines an internal system MSNAME with the naming convention MSNI*xxxx*, where *xxxx* is the link number. If MSNI*xxxx* already exists as an LTERM, transaction, or MSNAME, the CREATE MSNAME command will fail.

The QUERY LTERM, QUERY MSLINK, QUERY MSNAME, and QUERY MSPLINK commands are changed to include L before all local headers in command output, as preconditioning to distinguish from the global output fields for the IMSRSC repository. If you have automation that looks for the headers, it might need to change to look for the new local headers that have L at the beginning.

Automation might need to be changed if it issues the following commands:

- /DISPLAY ASMT MSPLINK, QUERY MSLINK, or QUERY MSPLINK commands, because the resources are now displayed in alphabetic order instead of in system definition order.
- QUERY LTERM, QUERY MSLINK, QUERY MSNAME, or QUERY MSPLINK commands that parse the output headers, because all local headers now have an L prefix, to identify them as local values.
- QUERY MSLINK specified with SHOW(ALL), because SHOW(ALL) now displays the column for definitional attribute BACKUP.
- QUERY MSPLINK specified with SHOW(ALL), because SHOW(ALL) now displays columns for definitional attributes ASR, BACKUP, BUFSIZE, MAXSESS, and MODETBL.

IMS 14 manages link numbers differently after a cold start when logical links are deleted and re-created. Update your operating procedures to use link names instead of link numbers. The numbers for links remain the same across warm and emergency restarts, even if there are number gaps caused by deleted links. If links are created and deleted dynamically, resulting in gaps in link numbers, when an IMS system is cold started, the gaps are removed and the link numbers of the logical links that followed the gap are adjusted.

Exit routines that access remote logical terminal blocks (RCNTs) must be updated to use the FIND and SCAN control block callable services to access the RCNTs. In IMS 13 and earlier, exit routines could access RCNTs by referencing the RCNTs in the SCDRCNTM field of the IMS system contents directory (SCD). In IMS 15, exit routines can no longer use the SCDRCNTM field to access RCNTs. For more information about the FIND and SCAN control block callable services, see IMS Callable Control Block Services requests (Exit Routines).

After migration, perform the following procedure to clean up system generation definitions:

1. Remove the MSC definitions from the stage 1 system definition, which include the following items:
   - MSPLINK, MSLINK, MSNAME, and NAME macros
   - MSVID and SYSTEM=(MSVERIFY) parameters in the IMSCTRL macro
   - SYSID parameter in the APPLCTN and TRANSACT macros
2. Run system generation.

Related concepts

“Dynamic definition of MSC resources fallback considerations” on page 59
You can fall back from an IMS system that has dynamic definition enabled for MSC resources to an earlier version of IMS.

Migration considerations for IMSRSC repository support for dynamically defined MSC resources

There are several considerations for migrating to IMS 15 IMSRSC repository support for dynamically defined MSC resources.

- If you use the IMSRSC repository to store dynamically defined MSC resources, ensure that automation and operational procedures that issue commands for MSC resources use type-2 commands, which specify link names, instead of type-1 commands, which specify link numbers. For example, instead of using the **/RSTART LINK 10** command to start a link, use the `UPDATE MSLINK NAME(`*`logicallinkname`*`) START(COMM)` command. During stage-1 system generation, the IMS system assigns numbers to logical links in the order in which the links are generated. However, the numbers for links are not stored in the IMSRSC repository. If logical links are referenced by using link numbers and are automatically imported from the IMSRSC repository, the numbers of the links are likely to change at the next IMS cold start.
- If you are using channel-to-channel (CTC) links, consider removing the DD definitions for the CTC links from the IMS JCL before you import the MSC resources from the IMSRSC repository. This allows the CTC addresses that are defined to be used for the CTC links that are imported from the IMSRSC repository.
- If you use the IMSRSC repository to store dynamically defined MSC resources, the DFSCLL3x and DFSCLR0x members of the IMS.SDFSRESL data set are no longer required. Because the DFSCLC0x member might contain non-MSC resources, the DFSCLC0x might still be required. After you are satisfied with the setup of your DRD environment for MSC resources, the DRD environment is running

successfully, and your MSC resources are exported to the IMSRSC repository, you can remove the DFSCLL3x and DFSCLR0x members. For the DFSCLC0x member, update the member to remove MSC logical link path definitions. If automatic import is enabled, MSC resource definitions are imported during IMS cold start from the repository that contains the most current data. However, you can continue to use the DFSCLL3x, DFSCLR0x, and DFSCLC0x members as the source for your MSC resource definitions, instead of a repository. If you continue to use the DFSCLL3x, DFSCLR0x, and DFSCLC0x members, keep your system definition macros synchronized with the changes you make dynamically using DRD commands.

- If you migrate to using the IMSRSC repository for dynamically defined MSC resources but continue to use the DFSCLL3x, DFSCLR0x, and DFSCLC0x members of the IMS.SDFSRESL data set, keep resource definitions that are in the members synchronized with the resource definitions that are in the repository. This synchronization enables you to maintain viable DFSCLL3x, DFSCLR0x, and DFSCLC0x members if you must disable DRD and fall back to using the system generation process for MSC resources. To keep your DFSCLL3x, DFSCLR0x, and DFSCLC0x members synchronized with your online definitions, update your static macro definitions with the changes that you make dynamically using type-2 commands. When changes are made dynamically, perform a MSC system definition to add, change, or delete resources from the DFSCLL3x, DFSCLR0x, and DFSCLC0x members.
- **Recommendation:** It is recommended that you enable automatic export to the IMSRSC repository only after both of the following tasks are completed:
  - All RM systems are migrated to IMS 14 or later.
  - For IMS 14 systems, the enabling APAR for IMSRSC repository for dynamically defined MSC resources, APAR PI50129, is applied.
  - For IMS 15 systems, the enabling APAR for IMSRSC repository for dynamically defined MSC resources, APAR PI74957, is applied.

OTMA migration considerations

IMS 15 includes migration considerations for OTMA.

Migration considerations introduced in IMS 15

Network security credential propagation enhancement

If the security-data section of the OTMA message prefix contains network security credentials, the size of the OTMA message can increase by up to 504 bytes. Therefore, consider increasing the size of the SHMSG and LGMSG message queue data sets and the size of the message queue pool.

Migration considerations introduced in IMS 14

Access to the IMS APPL class for user IDs passed on the APPL= parameter of the RACROUTE ENVIRON=CREATE call

In IMS 14, the APPL= parameter is passed by IMS on the RACROUTE ENVIRON=CREATE call when an ACEE is created for an OTMA message. IMS uses the IMS ID or the value from the DFSDCxxx SAPPLID= parameter on the APPL= parameter. This means that as of IMS 14 you must ensure that these user IDs have access to the IMS APPL class if the APPL class is active.

Dynamic storage for OTMA descriptors

Before IMS 14, only a value of 255 or 510 was displayed in messages DFS2384W and DFS3678E, which are the warning and error messages that are issued for approaching or exceeding the maximum allowable number of OTMA descriptors. In IMS 14, the value that is displayed in the error messages can be 255, 510, or another value that is specified on the DDESCMAX or MDESCMAX keywords in the DFSOTMA descriptor.

XRF and Communication Controller for Linux on System z (CCL) migration considerations

IBM is withdrawing from support the Communication Controller for Linux® on System z (CCL). The announced date for withdrawal is March 31, 2016.

If your installation uses CCL for IMS XRF tracking of VTAM terminals, consider replacing XRF entirely by setting up an IMSplex with two or more IMS systems and using VTAM Generic Resources (VGR). This option requires a Parallel Sysplex environment.

Migrating to IMS 15: System

IMS considerations for migrating from IMS Version 13 or IMS 14 systems to IMS 15 systems include how the enhancements to IMS affect migration, as well as how major IMS functions such as DBRC and dynamic resource definition (DRD) are affected by migration.

These topics describe the IMS considerations for migrating to the IMS 15 systems.

CQS migration considerations

Migrate CQS and any CQS clients on the z/OS image at the same time. If doing so is not possible, CQS must be migrated before any of the CQS clients are migrated.

Any customer- or vendor-written CQS client that processes CQS return, reason, or completion codes should be evaluated to see if it should be updated for the new codes.

See “Common Queue Server coexistence considerations” on page 68 for information about CQS coexistence rules.

DBRC migration considerations

Migrating DBRC to IMS 15 includes several tasks, including upgrading the RECON data set.

These topics describe the considerations and tasks for migrating DBRC to IMS 15.

Changes to the RECON data set

Certain records in the RECON data set are new or changed from the records in IMS Version 13 and IMS 14.

Changes introduced in IMS 15

In IMS 15, the following RECON records have changed fields:

- DSPRCNRC:
  - The RCNDATA flag within the RCNFIXED field is changed to indicate the new RECON header name.
  - The RCNMVERS flag within the RCNFIXED field is changed to indicate the current minimum version number during upgrade. The version number cannot be earlier than 13.1 (X'D1').
- DSPRCR1: The RCR1LVL flag within the RCR1VERS field is changed to indicate the RECON header extension record.
- DSPLOGRC: The LOGRELVL flag within the LOGFIXED field is changed to indicate the log release level, which is 15.1 in IMS 15 for all log record types.
- DSPOLDRC: The OLDRELVL flag within the OLDDENT(*) field is changed to indicate the OLDS release level, which is 15.1 in IMS 15 for all OLDS record types.
- DSPSSRC:
  - The SSRELLVL flag within the SSFIXED field is changed to indicate the subsystem release level, which is 15.1 (X'E1') in IMS 15.
  - The SSCOEXLV flag within the SSFIXED field is changed to indicate the subsystem coexistence level, which is 15.1 (X'E1') in IMS 15.

Changes introduced in IMS 14

In IMS 14, the following RECON records have changed fields:

- DSPDBHRC: New flag DBOSAM8G within the DMBFlags field is added to indicate that a HALDB database supports 8-GB OSAM database data sets.
- DSPPTNRC: New flag PTNOSAM8G within the PTNFlags field is added to indicate that within each HALDB partition the maximum capacity of each OSAM PHDAM and PHIDAM data set is 8 GB.
- DSPRCNRC: New field RCNCATLG is used to indicate the IMS catalog if one is being used.

REPAIR.RECON migration considerations

The DBRC Command Authorization exit routine (DSPDCAX0) or RACF command authorization definitions might need to be updated to allow users to use the **REPAIR.RECON** command.

If you use security procedures to verify the authority of a user to issue DBRC commands, update the DBRC Command Authorization exit routine (DSPDCAX0) or RACF command authorization definitions to authorize the use of the **REPAIR.RECON** command. As with other DBRC commands, consider restricting access to only those users who must issue the command.

Related concepts

Security for DBRC commands and API requests (System Administration)

Upgrading the RECON data set

You are not required to change the MINVERS value to '15.1' when you migrate to IMS 15. Change this value only after you verify that you do not need to coexist with an earlier version of IMS, will not need to fall back, and when you need to use new functions that require the MINVERS value to be set to '15.1'.

Attention:

- Do not issue the IMS 15 **CHANGE.RECON UPGRADE** command to upgrade the RECON data sets until all IMS Version 13, IMS 14, and IMS 15 systems that access the RECON data sets have the correct supporting products in place and have been tested for IMS 15 support.
- Because Remote Site Recovery (RSR) is no longer supported after IMS 14, you must remove all Global Service Group (GSG) information before migrating to IMS 15. Issue the LIST.GSG command to identify any GSG and issue the DELETE.GSG command to remove it before upgrading the RECON data set.

Migration to IMS 15 from IMS Version 13 or earlier versions may be achieved by migrating to the IMS Version 13 or the IMS 14 RECON data set format first and then using IMS 15 to issue the CHANGE.RECON UPGRADE command.

To upgrade an IMS Version 13 or IMS 14 RECON data set:

1. Apply the IMS 15 coexistence Small Programming Enhancements (SPEs) to all earlier versions of IMS systems before you upgrade the RECON data set. For a list of the coexistence SPEs (APARs/PTFs) for DBRC RECON data sets, see “Overview of coexistence APARs” on page 67.

   Attention: Jobs that access the RECON data set and do not create subsystem records, such as the Database Change Accumulation utility (DFSUCUM0) and the Database Recovery Control utility (DSPURX00), are not protected from having the RECON data set upgraded while they are running on a version of IMS that does not have the appropriate migration/coexistence SPE applied. When these types of jobs access the RECON data set after the upgrade, the results might be unpredictable. Ensure that no such jobs are running when you upgrade the RECON data set.
2. Ensure that you have two active RECON data sets (COPY1 and COPY2) and a spare data set when you upgrade the RECON data sets while other jobs are accessing them.
3. Before issuing the **CHANGE.RECON UPGRADE** command against the production RECON data sets, upgrade a copy of the production RECON data sets to verify that the upgrade will complete successfully.

4. Optionally, issue the **CHANGE.RECON UPGRADE CHECKUP** command. This command checks the status of the RECON data set and records to verify whether the RECON data set is in a state that allows an upgrade. No RECON data set records are changed as a result of issuing the **CHANGE.RECON UPGRADE CHECKUP** command.
5. Issue the **CHANGE.RECON UPGRADE** command by using either the IMS 15 DBRC Recovery Control utility (DSPURX00) or the IMS 15 DBRC Command API request. This command:
   - Upgrades the RECON data set without shutting down all IMS activity.
   - Uses the DBRC I/O recovery algorithms to recover from any failures during upgrade (so you do not need to back up the RECON data set before you upgrade).

   After this command successfully completes, DBRC sets the value for MINVERS (the minimum version of IMS that can sign on to DBRC) to '13.1' if the value was less than '13.1'. You can display the MINVERS value in the output for a **LIST.RECON** command or a Query request using the DBRC API.

   Recommendation: If you use DBRC command authorization, consider setting the RECON qualifier as part of your migration process. You can set the RECON qualifier when you upgrade by adding CMDAUTH parameters to the **CHANGE.RECON UPGRADE** command, or after the RECON has been upgraded by issuing a **CHANGE.RECON CMDAUTH** command. If CMDAUTH parameters are specified on the **CHANGE.RECON UPGRADE** command, the RECON is upgraded first and then other parameters (such as CMDAUTH) are processed.

   For details about the **CHANGE.RECON UPGRADE** command, see *IMS Version 15 Commands, Volume 3: IMS Component and z/OS Commands*. For details about the Query request, see *IMS Version 15 System Programming APIs*.
6. Optionally, after the RECON data set for a system is upgraded, issue the **REPAIR.RECON DMBNUM CHECKUP** command against a copy of the production RECON data set. This command verifies that all of the data management block (DMB) numbers in the different records in the RECON data set are valid. If no problems are found, run the command once a year.

   If problems are found when you verify the validity of the DMB numbers, issue the **REPAIR.RECON DMBNUM UPDATE** command against the production RECON data set when access to the RECON data set would be minimal.

   Like the **CHANGE.RECON UPGRADE**, you can issue the **REPAIR.RECON DMBNUM** command by using either the IMS 15 DBRC Recovery Control utility (DSPURX00) or the IMS 15 DBRC Command API request.
7. When you are sure that a fallback to a previous IMS version is unnecessary and all systems that access the RECON data set are at an IMS 15 level, you can update the MINVERS value. Before you issue the **CHANGE.RECON MINVERS**('15.1') command, read “Minimum version value in the RECON data set” on page 58 to understand the ramifications involved in falling back to a previous version.

After you set the MINVERS level for an IMS system, system signon fails for earlier versions of IMS for online environments. All other jobs accessing the RECON data set fail DBRC initialization if the version of IMS used is lower than the MINVERS level.

Related concepts

“Overview of coexistence APARs” on page 67
IMS Version 13 and IMS 14 must have certain APARs installed to coexist with IMS 15.

Dynamic resource definition migration considerations

If you are migrating from IMS Version 13 or IMS 14, the process for enabling dynamic resource definition (DRD) in an IMS 15 system differs depending on whether your existing IMS system has DRD enabled. For MODBLKS resources, the process also depends on whether your resource definitions are stored in the IMSRSC repository or in the resource definition data set (RDDS).

Recommendations:

Before enabling dynamic resource definition or shared queues, evaluate any existing DFSINSX0 exit routines. The DFSINSX0 exit might need to be changed so that it checks whether LTERM creation is

allowed before it accesses the USEQDATA parameter list that is related to LTERM processing. If LTERM creation is not allowed, the USEQDATA buffer address (INSXAUSQ) is zero.

After you enable DRD, ensure that the resource definitions are no longer loaded from the IMS.MODBLKS data set and the DFSCLL3x, DFSCLR0x, and DFSCLC0x members of the IMS.SDFSRESL data set during IMS cold starts. Otherwise, if you delete runtime resources with a **DELETE** command and then perform a cold start using the IMS.MODBLKS data set and the DFSCLL3x, DFSCLR0x, and DFSCLC0x members for the resource definitions, those runtime resources will reappear after the next IMS cold start. For MODBLKS and MSC resources, you can either perform another system definition that omits all those resources, or hereafter start IMS without the IMS.MODBLKS data sets and the DFSCLL3x, DFSCLR0x, and DFSCLC0x members defined. For MODBLKS resources, you can use the resource definitions from the RDDS instead. MODBLKS resources can be stored in the IMS.MODBLKS data set, RDDS or the IMSRSC repository, while MSC resources can be stored in the DFSCLL3x, DFSCLR0x, and DFSCLC0x members or the IMSRSC repository.

If resources need to be changed during migration, perform a MODBLKS online change operation or the system generation process for MSC resources on the IMS systems that have not migrated to DRD. Then, issue **CREATE**, **UPDATE**, and **DELETE** commands as necessary on the IMS systems that have migrated to DRD.

Recommendation: When migrating to DRD, for MODBLKS resources, use the IMSRSC repository instead of an RDDS, because the repository function is the strategic direction for IMS.

Related tasks

Enabling dynamic definition for IMS resource groups (System Definition)

Migrating a non-DRD-enabled IMS system to DRD and the IMSRSC repository

To enable dynamic resource definition (DRD) with the IMSRSC repository, which is the recommended option for storing dynamically defined resources, you need to enable DRD and the Repository Server (RS) address space. For MODBLKS resources, you also need to import the resource definitions from the MODBLKS data set to the RDDS.

Recommendation: When you migrate to DRD for MODBLKS resources, use the IMSRSC repository instead of an RDDS because the repository function is the strategic direction for IMS.

To enable DRD with an IMSRSC repository:

1. Shut down IMS normally.
2. Define the following DRD parameters in the DYNAMIC_RESOURCES section of the DFSDFxxx member of the IMS.PROCLIB data set:
   - AUTOIMPORT=AUTO, which specifies that IMS automatically imports resource definitions during a cold start.

     When AUTOIMPORT=AUTO, IMS searches data sources in the following order:

     a. IMSRSC repository

     b. RDDS

     c. MODBLKS data set and the DFSCLL3x member of the IMS.SDFSRESL data set
   - During migration to IMS 15, if the IMSRSC repository is enabled and the DFSDFxxx member has the AUTOEXPORT=AUTO explicitly defined, automatic export of MODBLKS resources to the IMSRSC repository is enabled after IMS 15 is cold started. If dynamic definition of MSC resources is also enabled, MSC resources are also automatically exported to the repository after IMS 15 is cold started. Any resource definition changes (creates and updates) are automatically exported to the IMSRSC repository at the next checkpoint.

     If you do not want to automatically export MODBLKS resource definitions to the IMSRSC repository, you must remove the AUTOEXPORT= parameter in the DYNAMIC RESOURCES section of the DFSDFxxx member and either let it default to AUTO or use one of the following values:

     – AUTOEXPORT= NO for no autoexport

     – AUTOEXPORT = RDDS for autoexport to the RDDS

For MSC resources, automatic export must be enabled to store the MSC resources in the IMSRSC repository.

When you are ready to enable autoexport to the IMSRSC repository you must modify the AUTOEXPORT= parameter in the DYNAMIC RESOURCES section of the DFSDFxxx member to explicitly specify AUTOEXPORT=AUTO or AUTOEXPORT=REPO.

3. Enable DRD by specifying MODBLKS=DYN in either or both of the following locations:
   - The DFSCGxxx member of the IMS.PROCLIB data set
   - The DYNAMIC_RESOURCES section of the DFSDFxxx member of the IMS.PROCLIB data set

   To enable DRD for MSC resources, you must also specify MSCRSCS=DYN in the MSC section of the DFSDFxxx member.
4. If you are enabling DRD for MSC resources, specify MSCREPO=Y in the MSC section of the DFSDFxxx PROCLIB member to enable the IMSRSC repository for MSC resources.
5. Specify attributes of the repository in the following members of the IMS PROCLIB data set:
   - FRPCFG member
   - BPE configuration parameters member
   - CSLRIxxx member
   - DFSDFxxx member
6. Create the repository catalog pairs of data sets.
7. Create the IMSRSC repository pairs of data sets.
8. Start the Repository Server (RS) address space.
9. Define the IMSRSC repository data sets to RS, which stores information about the IMSRSC repository in the RS catalog repository data sets.
10. Optional: Start the Common Queue Server (CQS) with a resource structure.
11. Enable the IMS Resource Manager (RM) to use the IMSRSC repository dynamically.
    - If the RM address space is running, issue the **UPDATE RM** command.
    - If RM is not running, restart RM so that it connects to the RS address space.
12. Before you start IMS, specify the EXEC parameters DFSDF=*xxx* and, if MODBLKS=DYN was specified in the DFSCG*xxx* member, CSLG=*xxx*. These parameters identify which DFSDF*xxx* and DFSCG*xxx* members in the IMS.PROCLIB data set to use.
13. Cold start IMS.

    If the IMSRSC repository is empty, during cold start IMS imports the resource definitions from the IMS.MODBLKS data set and the DFSCLL3x, DFSCLR0x, and DFSCLC0x members of the IMS.SDFSRESL data set to create the runtime resource definitions. The online change process for the IMS.MODBLKS data set is now disabled.
14. After IMS is running, issue one of the following commands to export the runtime resource definitions to the IMSRSC repository:
    - For MODBLKS resources, the **EXPORT DEFN TARGET(REPO)** command
    - For all runtime resource definitions, including both MODBLKS and MSC resources, the **/CHECKPOINT** command

You can now use DRD to add (**CREATE** command), change (**UPDATE** command), or delete (**DELETE** command) the runtime resource definitions.

To ensure new and updated runtime resource definitions are recovered across an IMS cold start, issue the **EXPORT DEFN TARGET(REPO)** for MODBLKS resources or the **/CHECKPOINT** command for both MODBLKS and MSC resources to harden the definitions in the IMSRSC repository.

To ensure that deleted runtime resource definitions are not recovered across an IMS cold start, issue the **DELETE DEFN** command to delete the stored resource definitions from the IMSRSC repository.

Migrating a non-DRD-enabled IMS system to DRD and an RDDS

To enable dynamic resource definition (DRD) with an resource definition data set (RDDS), you need to enable DRD, specify and allocate the RDDS, and import the resource definitions from the MODBLKS data set to the RDDS.

Recommendation: When migrating to DRD, use the IMSRSC repository instead of an RDDS, because the repository function is the strategic direction for IMS.

If resources need to be changed during migration, perform a MODBLKS online change operation on the IMS systems that have not migrated to DRD, and issue CREATE, UPDATE, and DELETE commands as necessary on the IMS systems that have migrated to DRD.

To enable DRD with an RDDS:

1. Shut down IMS normally.
2. Define the following DRD parameters in the <DYNAMIC_RESOURCES> section of the DFSDFxxx member of the IMS.PROCLIB data set:
   - RDDSDSN=(*dsname_1*, *dsname_n*)

     These system definition data sets are for the resource definitions.
   - AUTOIMPORT=AUTO, which specifies that IMS automatically imports resource definitions. When AUTOIMPORT=AUTO, IMS checks the RDDS first. If the RDDS is empty, IMS loads the resource definitions from the IMS.MODBLKS data set. If the RDDS contains any resource definitions, IMS ignores any definitions in the IMS.MODBLKS data set.

     Note: If AUTOIMPORT=MODBLKS is specified, instead of AUTOIMPORT=AUTO, your runtime definitions are imported from the IMS.MODBLKS data set during IMS cold start. Any changes you make to your online system will not be recovered across the cold start. You can either perform another system definition that includes the changes you made online, or hereafter start IMS with AUTOIMPORT=AUTO specified in the DFSDFxxx PROCLIB member.
   - AUTOEXPORT=AUTO, which specifies that IMS automatically exports resource definitions to the RDDS data sets, the IMSRSC repository, or both, during system checkpoints.
3. Enable DRD by specifying MODBLKS=DYN in either or both of the following locations:
   - The DFSCG*xxx* member of the IMS.PROCLIB data set
   - The <DYNAMIC_RESOURCES> section of the DFSDF*xxx* member of the IMS.PROCLIB data set
4. Allocate the system RDDS data sets that are specified on the RDDSDSN= parameter in the DFSDFxxx member.
5. Specify the IMS EXEC parameters DFSDF=*xxx* and, if MODBLKS=DYN was specified in the DFSCG*xxx* member, CSLG=*xxx*. These parameters identify which DFSDF*xxx* and DFSCG*xxx* members to use in the IMS.PROCLIB data set.
6. Cold start IMS. If the RDDS data sets are empty, during cold start IMS imports the resource definitions in the IMS.MODBLKS data set to create the runtime resource definitions. The online change process for the IMS.MODBLKS data set is now disabled.
7. Start using DRD to add (**CREATE** command), change (**UPDATE** command), or delete (**DELETE** command) the runtime resource definitions.
8. At system checkpoint time, IMS automatically exports the definitions to the RDDS if any changes have been made. To export any changes immediately after they have been made, either issue a **/CHE** command, or issue an **/EXPORT** command.
9. For subsequent cold starts of this IMS, specify AUTOIMPORT=RDDS in the <DYNAMIC_RESOURCES> section of the DFSDFxxx member of the IMS.PROCLIB data set. When AUTOIMPORT=RDDS is specified, IMS automatically imports resource and descriptor definitions from the RDDS during cold start processing.

Migrating a DRD-enabled IMS system that uses an RDDS to a new release

To migrate a DRD-enabled IMS system using Resource Definition Data Sets (RDDSs) to a new release of IMS, the resource and descriptor definitions for the current IMS must be migrated to a system RDDS used by the new IMS.

There are multiple ways to migrate resource and descriptor definitions from the current system to a system RDDS used by the new IMS.

Option 1

1. Create a non-system RDDS that contains the resource and descriptor definitions from your current IMS. Use any of the following methods to create this RDDS:
   - Run the Create RDDS from the Log Records utility (DFSURCL0).
   - Run the Create RDDS from the MODBLKS utility (DFSURCM0).
   - Run the DRD IMS SYSGEN stage 1 pre-parser utility (DFSURST0).
   - Run the Copy RDDS utility (DFSURCP0).
   - Use the **EXPORT** command if the current IMS is still up.
2. Allocate empty system RDDS data sets for the new IMS.
3. Cold start the new IMS without importing any resource definitions. This can be done by cold starting IMS with empty system RDDS data sets and no MODBLKS data sets defined. Bring up the new IMS system including the Common Service Layer (CSL) address spaces (SCI, OM, and potentially RM).
4. Once the new IMS is up, use the **IMPORT** command to import the resource and descriptor definitions from the non-system RDDS created in step 1.
5. Export the resource and descriptor definitions to a system RDDS used by the new IMS using either of the following methods:
   - Issue the **EXPORT** command to export the resource and descriptor definitions to a system RDDS.
   - If AUTOEXPORT=AUTO or RDDS is specified in the DYNAMIC_RESOURCES section of the DFSDFxxx member, issue the **/CHE** command to export the resource and descriptor definitions to a system RDDS.

Option 2

1. Run the RDDS Extraction utility (DFSURDD0) to convert the stored resource and descriptor definitions in the system RDDS used by the current IMS to IMS type-2 **CREATE** commands.
2. Allocate empty system RDDS data sets for the new IMS.
3. Cold start the new IMS without importing any resource definitions. This can be done by cold starting IMS with empty system RDDS data sets and no MODBLKS data sets defined. Bring up the new IMS system including the Common Service Layer (CSL) address spaces (SCI, OM, and potentially RM).
4. Use the Batch SPOC utility (CSLUSPOC) to submit the **CREATE** commands generated in step 1.
5. Export the resource and descriptor definitions to a system RDDS used by the new IMS using either of the following methods:
   - Issue the **EXPORT** command to export the resource and descriptor definitions to a system RDDS.
   - If AUTOEXPORT=AUTO or RDDS is specified in the DYNAMIC_RESOURCES section of the DFSDFxxx member, issue the **/CHE** command to export the resource and descriptor definitions to a system RDDS.

Migrating MSC macro definitions to the IMSRSC repository

You can migrate your MSC macro definitions to the IMSRSC repository to store the definitions in a single, centralized location for all IMS systems in an IMSplex. Migrating MSC definitions to the IMSRSC repository also ensures that the definitions are saved across an IMS cold start.

To migrate MSC macro definitions to the IMSRSC repository, complete the following steps:

1. Enable automatic export and automatic import by defining both of the following parameters in the DYNAMIC_RESOURCES section of the DFSDFxxx member of the IMS.PROCLIB data set:
   - AUTOEXPORT=AUTO or AUTOEXPORT=REPO
   - AUTOIMPORT=AUTO
2. Enable dynamic resource definition for MSC resources by specifying MSCRSCS=DYN in the MSC section of the DFSDFxxx member. Also ensure that MODBLKS=DYN is specified in either or both of the following locations:
   - The DFSCGxxx member of the IMS.PROCLIB data set
   - The COMMON_SERVICE_LAYER section of the DFSDFxxx member of the IMS.PROCLIB data set
3. Enable the IMSRSC repository for MSC resources by specifying MSCREPO=Y in the MSC section of the DFSDFxxx member.
4. Specify attributes of the repository in the following members of the IMS PROCLIB data set:
   - FRPCFG member
   - BPE configuration parameters member
   - CSLRIxxx member
   - DFSDFxxx member
5. Create the repository catalog pairs of data sets.
6. Create the IMSRSC repository pairs of data sets.
7. Start the Repository Server (RS) address space.
8. Define the IMSRSC repository data sets to RS, which stores information about the IMSRSC repository in the RS catalog repository data sets.
9. If you are enabling more than one IMS Resource Manager (RM), start the Common Queue Server (CQS) with a resource structure.
10. Enable RM to use the IMSRSC repository dynamically.
    - If the RM address space is running, issue the **UPDATE RM** command.
    - If RM is not running, restart RM so that it connects to the RS address space.
11. Specify the MSC=Y execution parameter in your startup procedure to initialize the MSC function.
12. If one or more logical link paths are not defined in an MSNAME stage-1 system definition macro, specify the SYSID= parameter in the MSC section of the DFSDFxxx member to define one or more local system IDs (SYSIDs) for the IMS system.
13. If you are cold starting IMS with IMSRSC repository support for MSC resources enabled for the first time and you want MSC resources to be automatically exported to the IMSRSC repository at the cold start, ensure that the following data sets contain the current MSC resource definitions:
    - The DFSCLL3x member of the IMS.SDFSRESL data set, for both MSC physical and logical link definitions
    - The DFSCLC0x member of the IMS.SDFSRESL data set, for MSC logical link path definitions
    - The DFSCLR0x member of the IMS.SDFSRESL data set, for remote logical terminal definitions
14. Specify the EXEC parameters DFSDF=*xxx* and, if MODBLKS=DYN was specified in the DFSCG*xxx* member, CSLG=*xxx*. These parameters identify which DFSDF*xxx* and DFSCG*xxx* members in the IMS.PROCLIB data set to use.
15. Cold start IMS.

    If the IMSRSC repository does not contain MSC resources, the MSC resource definitions that were generated during the system generation process are imported into the IMS system to create the runtime resource definitions. The runtime resource definitions are then automatically exported to the IMSRSC repository at the cold start.

    If one of the following conditions are true, ensure that at least one system identifier (SYSID) is specified in the MSC section of the DFSDFxxx PROCLIB member. Otherwise, IMS cold start abends

with ABENDU0741 `MODID MS0ABEND`. At least one of the SYSIDs should be the lowest SYSID you plan to define for that IMS system.

- AUTOIMPORT=AUTO is specified in the DYNAMIC_RESOURCES section of the DFSDFxxx member with no MSC resources in the IMSRSC repository and no MSC resources are defined in stage-1 system definition macros.
- AUTOIMPORT=REPO is specified in the DYNAMIC_RESOURCES section of the DFSDFxxx member with no MSC resources in the IMSRSC repository.
- AUTOIMPORT=NO is specified in the DYNAMIC_RESOURCES section of the DFSDFxxx member.

16. Optional: Issue the QUERY command for the type of MSC resource that you exported to the IMSRSC repository with the SHOW(DEFN) keyword specified.

    The local definitions in the IMS system and the global definitions in the IMSRSC repository are displayed. All of the MSC resource attributes should be identical between IMS and the IMSRSC repository.

After you migrate MSC macro definitions to the IMSRSC repository, the MSC resource definitions that you create or update since the last automatic export are exported to the IMSRSC repository at the next IMS checkpoint. The IMS checkpoint can be initiated either by issuing the **/CHECKPOINT** command or automatically by the IMS system.

If you are using channel-to-channel (CTC) links, consider removing the DD definitions for the CTC links from the IMS JCL before you import the MSC resources from the IMSRSC repository. This allows the CTC addresses that are defined to be used for the CTC links that are imported from the IMSRSC repository.

If you use the IMSRSC repository to store dynamically defined MSC resources, the DFSCLL3x and DFSCLR0x members of the IMS.SDFSRESL data set are no longer required. Because the DFSCLC0x member might contain non-MSC resources, the DFSCLC0x might still be required. After you are satisfied with the setup of your DRD environment for MSC resources, the DRD environment is running successfully, and your MSC resources are exported to the IMSRSC repository, you can remove the DFSCLL3x and DFSCLR0x members. For the DFSCLC0x member, update the member to remove MSC logical link path definitions. If automatic import is enabled, MSC resource definitions are imported during IMS cold start from the repository that contains the most current data. However, you can continue to use the DFSCLL3x, DFSCLR0x, and DFSCLC0x members as the source for your MSC resource definitions, instead of a repository. If you continue to use the DFSCLL3x, DFSCLR0x, and DFSCLC0x members, keep your system definition macros synchronized with the changes you make dynamically using DRD commands.

If you migrate to using the IMSRSC repository for dynamically defined MSC resources but continue to use the DFSCLL3x, DFSCLR0x, and DFSCLC0x members of the IMS.SDFSRESL data set, keep resource definitions that are in the members synchronized with the resource definitions that are in the repository. This synchronization enables you to maintain viable DFSCLL3x, DFSCLR0x, and DFSCLC0x members if you must disable DRD and fall back to using the system generation process for MSC resources. To keep your DFSCLL3x, DFSCLR0x, and DFSCLC0x members synchronized with your online definitions, update your static macro definitions with the changes that you make dynamically using type-2 commands. When changes are made dynamically, perform a MSC system definition to add, change, or delete resources from the DFSCLL3x, DFSCLR0x, and DFSCLC0x members.

Related concepts

Maintaining your dynamic resource definition environment (System Definition)

Related tasks

Defining the IMSRSC repository (System Definition)

Related reference

UPDATE RM command (Commands)
/CHECKPOINT command (Commands)
QUERY LTERM command (Commands)
QUERY MSLINK command (Commands)
QUERY MSNAME command (Commands)
QUERY MSPLINK command (Commands)
DYNAMIC_RESOURCES section of the DFSDFxxx member (System Definition)

MSC section of the DFSDFxxx member (System Definition)
FRPCFG member of the IMS PROCLIB data set (System Definition)
BPE configuration parameter member of the IMS PROCLIB data set (System Definition)
CSLRIxxx member of the IMS PROCLIB data set (System Definition)

Related information

0741 (Messages and Codes)

Exit routine migration considerations

There are migration considerations for some exit routines when you migrate to IMS 15.

Service and enhancements to IMS can change or add information in the output of certain commands. Any exit routine or automation program that parses the output from these commands might need to be modified. Service changes to the output of a command are documented in ++HOLD statements that describe the changes.

Migration considerations introduced in IMS 15

IMS 15 and later systems obtain the user exit header block (UEHB) and any additional buffers that are passed to the DFSAOUE0 exit routine from 31-bit private storage.

The following user exit routines are removed from the IMS nucleus and are loaded as stand-alone load modules during IMS initialization:

- DFSCMTU0
- DFSCNTE0
- DFSCSMB0 and user-defined from TRANSACT EDIT=
- DFSCTTO0 and user-defined from TYPE EDIT= or LINEGRP EDIT=
- DFSFEBJ0
- DFSME000-DFSME127
- DFSPIXT0 and user-defined from TYPE EDIT= or LINEGRP EDIT=
- DFSSIML0

For more information about the migration considerations that are related to the removal of the preceding user exits from the IMS nucleus, see “Migration considerations for removing user exit routine specification from system definition” on page 53.

Migration considerations introduced in IMS 14

In IMS 14 you can dynamically refresh and query type-2 Automated Operator user exit routines (DFSAOE00 and other AOIE type exit routines).

To enable dynamic refresh and query support for the existing type-2 Automated Operator user exit routine (DFSAOE00), specify TYPE=AOIE,EXITS=(DFSAOE00) on the EXITDEF parameter in the USER_EXITS section of the DFSDF*xxx* member of the PROCLIB data set. No changes to the exit routine are required.

After support for dynamically refreshing and querying type-2 Automated Operator user exit routines is enabled, you can modify, add, or delete the exit routines by issuing the **REFRESH USEREXIT TYPE(AOIE)** command. You can also display information about the exit routines with the **QUERY USEREXIT TYPE(AOIE)** command.

IMS 64-bit storage manager migration considerations

In IMS 14 , the QUERY POOL command is enhanced to provide more accurate feedback for syntax checking for the TYPE and SHOW keywords.

In earlier versions of IMS, when building QUERY POOL output with completion code text, the output was built with the CCText output header right-justified instead of left-justified. In IMS 14, the CCText header is now left-justified as it is with other type-2 commands.

IMS abend formatting module (DFSAFMD0) migration considerations

Before IMS Version 11, the IMS abend formatting module DFSAFMD0 had to be installed as a z/OS exit in the IEAVADFM dump facility installation exit routine name list when you installed IMS. IMS Version 11 and all later versions dynamically install the IMS abend formatting module, which is renamed to DFSAFMX0. No user setup is required, and you no longer need to install module DFSAFMD0 on the host z/OS system.

Although module DFSAFMD0 is not required for IMS Version 11 or later, this module is still included to support users who include DFSAFMD0 in LPA directly from the IMS library.

If DFSAFMD0 is installed from a prior version of IMS, you can remove it from the host z/OS system if no IMS Version 10 or earlier code runs on the z/OS system. For instructions on uninstalling the DFSAFMD0 module, see Uninstalling the abend formatting module (DFSAFMD0) (System Administration).

IMS Connect migration considerations

Many migration considerations pertain to migrating IMS Connect from IMS Version 13 or IMS 14 to IMS 15.

Consider the following items when planning to migrate IMS Connect support to IMS 15:

- In IMS 15, the CREATE IMSCON TYPE(PORT) command (Commands) command returns a new completion code when the number of ports that are defined to IMS Connect reaches 200, the new maximum number for defined ports.
- In IMS 15, the following IMS Connect commands are enhanced to support the setting and displaying of the timeout value for idle client connections (IDLETO):
  - CREATE IMSCON TYPE(PORT) command (Commands)
  - QUERY IMSCON TYPE(CONFIG) command (Commands)
  - QUERY IMSCON TYPE(PORT) command (Commands)
  - UPDATE IMSCON TYPE(CONFIG) command (Commands)
  - UPDATE IMSCON TYPE(PORT) command (Commands)
- In IMS 15, IMS Connect requires at least 3 MB more storage than in previous releases. Adjust the IMS Connect region size accordingly.
- If both of the following situations occur, you might need to modify code that includes the HWSOMPFX macro:
  - The Network Session ID (NETSID) section or the Network User ID (NETUID) section, or both, is included in the security section of the OTMA message header.
  - Either the **DSECT=**ALL or the **DSECT=**N0 option is specified with the HWSOMPFX macro.

  The size of the NETUID and NETSID sections can vary, causing the locations of the fields that are below the security section to change. However, if the **DSECT=**ALL or the **DSECT=**N0 option is specified, a contiguous DSECT, the HWSOMPFX DSECT, is generated that does not account for sections that vary in size. Therefore, the fields in the OTMA message header that are below the security section might become inaccessible.

  For the fields of the OTMA message header that are below the security section to be accessed, you need to map the HWSOMUSR, HWSOMAPP, or HWSOMAPX DSECTS of the HWSOMPFX macro to the changed locations of the fields.

For more information about the fields of the OTMA message header, see OTMA header fields used by IMS Connect (Communications and Connections).

- In IMS 15, processing by the HWSJAVA0 user message exit routine of the user data section that is in the OTMA message header is updated. If the OTMA message header contains network security information and the HWSOMPFX macro is used, the HWSJAVA0 exit routine specifies both the **DSECT=** and the **NETSEC_OPT=**YES options for the HWSOMPFX macro. The **DSECT=** and the **NETSEC_OPT=**YES options cause the following behaviors:
  - An individual DSECT is generated for each section of the OTMA message header.
  - The HWSECDNDS DSECT, or the HWSECARDS DSECT, or both, is generated to map network security information.
  - The HWSOMPFX DSECT is not generated.
- Automated application programs that interpret the output from the **VIEWHWS** and **QUERY MEMBER** commands must be changed to take advantage of:
  - New output fields added in IMS 15
  - New output fields added in IMS 14

Migrating TMRA connections from Local Option to TCP/IP

IMS 14 is the last version to support the Local Option for connections between IMS Connect and IMS TM Resource Adapter. In IMS Version 13, Local Option is supported for 31-bit only. Migrating TMRA connections from Local Option to TCP/IP requires changes to the IMS Connect TCP/IP configuration member.

Local Option uses the z/OS Program Call function for communications between IMS Connect and IMS TM Resource Adapter that runs on WebSphere Application Server for z/OS

When you migrate from Local Option to TCP/IP connections, consider changing the following configurations:

- In the IMS Connect HWSCFGxx configuration member, change the LOCAL value that the PORT and PORTID parameters specify to a unique TCP/IP port number. Valid values for the TCP/IP port numbers are decimal numbers from 1 to 65535. For example, change from **PORT=(ID=LOCAL)** or **PORTID=(LOCAL)** to **PORT=(ID=nnnn)** or **PORTID=(nnnn)**.
- In the IMS TM Resource Adapter connection factory Custom Properties pages, complete the following actions:
  - Disable Local Option connections by clearing the **IMSConnectName** field.
  - Enable TCP/IP connections by specifying the **HostName** and **PortName** fields.

Related reference

TCPIP statement (System Definition)

Related information

Configuring IMS connection factories (TM Resource Adapter)

HWSX0916W (Messages and Codes)

IMSCTF macro removal migration considerations

In IMS 15, the IMSCTF macro is no longer supported and is ignored during system generation. If the IMSCTF macro is specified, IMS System generation stage 1 assembly will issue message G122 in an MNOTE 2, which results in a return code of 2 for the assembly.

If you specified the following parameters in the IMSCTF macro, you must specify the parameter values by using the DFSPB*xxx* member of the IMS PROCLIB data set, JCL, or the DFSIDEF0 module for IMS 15.

The CPLOG= parameter

If you specified the **CPLOG=** parameter in the IMSCTF macro, use one of the following methods to define the checkpoint log frequency for IMS 15. If you do not use one of the following methods to specify the checkpoint log frequency for IMS 15, a default value of 500,000 is used.

- Specify the **CPLOG=** parameter in the DFSPBxxx member of the IMS PROCLIB data set.
- Specify the **CPLOG=** parameter in JCL.
- Issue the **/CHANGE CPLOG** command.

The LOG= parameter

In IMS 15, the IEFRDER DD statement for the system log is included in the DBBBATCH, DLIBATCH, IMSCOBGO, and IMSPLIGO procedures. The IEFRDER2 DD statement is included as a comment. To use the IEFRDER2 DD statement, remove the asterisks (*).

The IMSMON DD statement is included as a comment in the DBC, DCC, and IMS procedures for IMS 15. To use the IMSMON DD statement, remove the asterisks (*).

The PRDR= parameter

If you specified the **PRDR=** parameter in the IMSCTF macro, use one of the following methods to specify the name for the IMSRDR procedure for IMS 15. If you do not specify a name for the IMSRDR procedure for IMS 15, IMS uses a default name of IMSRDR as the name of the IMSRDR procedure that is started by the **/START REGION** command.

- Specify the **PRDR=** parameter in the DFSPBxxx member of the IMS PROCLIB data set.
- Specify the **PRDR=** parameter in JCL.

In addition, a sample IMSRDR procedure is supplied in the ADFSPROC and SDFSPROC library data sets. If you specify the **PRDR=** parameter in the DFSPBxxx member or in JCL, the name of the sample IMSRDR procedure does not change.

The RDS= parameter

In IMS 15, use one of the following methods to specify the buffer size for the restart data set (IMS.RDS):

- Specify the **RDS=** parameter in the DFSPB*xxx* member.
- Specify the **RDS=** parameter in JCL.

In IMS 15, you do not need to specify the device type on which the IMS.RDS data set resides.

The SVCNO= parameter

If you defined a type 2 SVC number by using the **SVCNO=** parameter on the IMSCTF macro, perform the following steps to use the type 2 SVC in IMS 15.

Important: If you specify the **SVC2=** parameter in the DFSIDEF0 module, ensure that the DFSIDEF0 module resides in an APF-authorized library that is included in the IMS Control Region JOBLIB or STEPLIB concatenation, or in the z/OS LINKLIST concatenation.

1. Define a type 2 SVC number by specifying the SVC2= keyword in one of the following locations. If you do not use the SVC2= keyword to define a type 2 SVC number, IMS uses a default value of 254.

   Important: If you use the Open Database Access (ODBA) interface or the database resource adapter (DRA) and you do not want to use the default value of 254 for the type 2 SVC number, you can define the number only by using the DFSIDEF macro of the DFSIDEF0 module.

   - In the DFSPBxxx member of the IMS PROCLIB data set. The value that you specify in the DFSPBxxx member overrides the value that is specified on the DFSIDEF macro.

- In JCL. The value that you specify in JCL overrides the SVC2= keyword value that is specified in the DFSPBxxx member and the value that is specified on the DFSIDEF macro.
- On the DFSIDEF macro of the DFSIDEF0 module by specifying the following code:

  ```
  DFSIDEF TYPE=PARM,SVC2=
  ```

  The value that is specified on the DFSIDEF macro is overidden by the value that is specified in the DFSPBxxx member or in JCL.

2. If you used the SVC2= parameter on the DFSIDEF macro to define a type 2 SVC number, assemble and link the DFSIDEF0 module into IMS.SDFSRESL.
3. Run JCL to re-link the type 2 SVC routine, DFSVC200, as IGC*xxx*, where *xxx* is the type 2 SVC number. To generate sample JCL for re-linking the routine, specify TYPE=GEN,SVC2=*xxx* on the DFSIDEF macro.

   Important: If you specify TYPE=GEN on the DFSIDEF macro, you cannot use another form of the TYPE= statement on the macro.
4. Bind the type 2 SVC routine into the z/OS nucleus.

If you defined a type 4 SVC number by using the **SVCNO=** parameter on the IMSCTF macro, perform the following steps to use the type 4 SVC in IMS 15.

Important: If you specify the **SVC4=** parameter in the DFSIDEF0 module, ensure that the DFSIDEF0 module resides in an APF-authorized library that is included in the IMS Control Region JOBLIB or STEPLIB concatenation, or in the z/OS LINKLIST concatenation.

1. To define a type 4 SVC number, specify the following code on the DFSIDEF macro of the DFSIDEF0 module. If you do not use the SVC4= keyword to specify a type 4 SVC number, IMS uses a default value of 255.

   ```
   DFSIDEF TYPE=PARM,SVC4=
   ```
2. Assemble and link the DFSIDEF0 module into IMS.SDFSRESL.
3. Run JCL to re-link the type 4 SVC routine, DSP00MVS, as IGC00*yyy*, where *yyy* is the EBCDIC representation of the zoned-decimal type 4 value. You can use the sample JCL, which is generated when you specify TYPE=GEN,SVC4=*yyy* on the DFSIDEF macro, to re-link the routine.

   Important: If you specify TYPE=GEN on the DFSIDEF macro, you cannot use another form of the TYPE= statement on the macro.
4. Bind the type 4 SVC routine in an LPA or MLPA library.

IMSplex migration considerations

Migrating an IMSplex from one version of IMS to another is a complex process because many factors are involved and many different configurations are possible.

The following considerations apply when planning to migrate an IMSplex:

- Multiple Resource Managers (RMs) and Operations Managers (OMs) can run simultaneously in an IMSplex.
- Only one Structured Call Interface (SCI) can run at any given time in an IMSplex on a single logical partition (LPAR).
- All Common Queue Server (CQS) clients connected to a CQS address space must be stopped before shutting down that CQS.
- CQS clients are limited as to which version of CQS they can connect to. For more information about these rules, see “Common Queue Server coexistence considerations” on page 68.
- Install all appropriate coexistence service onto IMSplexes before attempting to migrate.
- If you are running multiple IMS systems on one logical partition (LPAR), migrate one IMS at a time.
- If you are running multiple LPARs, migrate one LPAR at a time.

- If you activate the automatic RECON loss notification and parallel RECON access functions within the same IMSplex, you must use the **CHANGE.RECON IMSPLEX** command to ensure that all DBRCs in the IMSplex are using the same IMSplex name that is specified in the RECON data set. If you use the DBRC SCI Registration exit routine (DSPSCIX0) or the IMSPLEX EXEC parameter before issuing the **CHANGE.RECON IMSPLEX** command, message DSP1136A is issued and subsequent jobs fail due to an unavailable RECON data set.
- Open Database Manager (ODBM) can only connect to the IMS systems that are of the same version as ODBM itself. In a mixed-version IMSplex, to limit ODBM connection to the IMS systems of the same version, list the eligible IMS systems as data stores in the CSLDC*xxx* member of the IMS PROCLIB data set.

Example 1: Migrating IMS systems on a single LPAR

The following IMSplex migration example assumes:

- Continuous availability is a high priority.
- All coexistence APARs have been installed.
- All IMS systems in the IMSplex are running on one LPAR (LPAR1).
- One IMS Version 13 (V13) CQS that is using a resource structure.
- One RM and one OM running on the LPAR.
- Two V13 IMS systems (named IMSA and IMSB) that are running on LPAR1 and participating in data sharing and shared queues.

To migrate the IMS systems in this example IMSplex to IMS 15 (V15):

1. Prepare the IMSA libraries and data sets for IMS 15 (for example, perform a system definition, set up JCL, and so on).
2. Stop the V13 SCI.
3. Start the V15 SCI.
4. Start the V15 OM.

   Because there is only one LPAR in this example, and one OM must be running at all times to provide OM services, the higher-level OM is started before shutting down the lower-level OM.
5. Stop the V13 OM.
6. Shut down IMSA.
7. Shut down IMSB.
8. Stop the V13 RM.
9. Stop the V13 CQS.
10. Start the V15 CQS.
11. Start the V15 RM.
12. Cold start IMSA.
13. Restart IMSB.
14. Test IMSA.
15. After IMSA (V15) has tested successfully, proceed to the next step. If IMSA does not pass this testing step, consider whether IMSA needs to fall back to IMS Version 13 and repeat this process after any problems are fixed.
16. Stop the V13 OM.
17. Take IMSB offline and migrate it to IMS 15.

Example 2: Migrating IMS systems on multiple LPARs

The operational environment for this example consists of two LPARs and a total of three IMS systems that are participating in shared queues and data sharing.

The following IMSplex migration example assumes:

- Continuous availability is a high priority.
- All coexistence APARs have been installed.
- An example IMSplex consisting of:

  LPAR1

  - One V13 CQS
  - One Common Service Layer (CSL), consisting of an OM, RM, and SCI
  - One V13 IMS system named IMSC

  LPAR2

  - One V13 CQS
  - One Common Service Layer (CSL), consisting of an OM, RM, and SCI
  - Two V13 systems (named IMSD and IMSE)

Recommendation: Migrate less complex LPARs before migrating more complex LPARs.

To migrate the IMS systems in this example IMSplex to IMS 15 (V15):

1. Migrate the subsystems on LPAR1 first by performing the following actions:
   a. Prepare the IMSC libraries and data sets for IMS 15 (for example, perform a system definition, set up JCL, and so on).
   b. Stop the V13 SCI.
   c. Start the V15 SCI.
   d. Stop the V13 OM (assuming the same OM name is used before and after the migration).
   e. Start the V15 OM.
   f. Shut down IMSC.
   g. Stop the V13 RM.
   h. Shut down the V13 CQS.
   i. Start the V15 CQS.
   j. Start the V15 RM.
   k. Coldstart IMSC.
   l. Test IMSC. If IMSC does not pass this testing step, consider whether IMSC needs to fall back to IMS Version 13 and repeat this process after any problems are fixed.
2. After validating that the migration of IMSC on LPAR1 is successful, start migrating the IMS subsystems on LPAR2 with the following steps:
   a. Prepare the IMSD libraries and data sets for IMS 15 (for example, perform a system definition, set up JCL, and so on).
   b. Stop the V13 SCI.
   c. Start the V15 SCI.
   d. Stop the V13 OM.
   e. Start the V15 OM.
   f. Shut down IMSD.
   g. Shut down IMSE.
   h. Stop the V13 RM.
   i. Stop the V13 CQS.
   j. Start the V15 CQS.
   k. Start the V15 RM.

l. Cold start IMSD.
m. Restart IMSE.
n. Test IMSD. If IMSD does not pass this testing step, consider whether IMSD needs to fall back to V13 and repeat this process after any problems are fixed.
o. After IMSD (V15) has tested successfully, proceed to the next step.
p. Stop the V13 OM.
q. Take IMSE offline and migrate it to IMS 15.

Example 3: Migrating IMS systems on multiple LPARs (with IMS Connect involved)

The operational environment for this example consists of two LPARs and a total of three IMS systems that are participating in shared queues and data sharing.

The following IMSplex migration example assumes:

- Continuous availability is a high priority.
- All coexistence APARs have been installed.
- An example IMSplex consisting of:

  LPAR1

  - One V13 CQS
  - One Common Service Layer (CSL), consisting of an OM, RM, and SCI
  - One V13 IMS system named IMSF
  - One IMS Connect that is communicating with IMSF, IMSG, and IMSH

  LPAR2

  - One V13 CQS
  - One Common Service Layer (CSL), consisting of an OM, RM, and SCI
  - Two V13 IMS systems named IMSG and IMSH

Recommendation: Migrate less complex LPARs before migrating more complex LPARs.

To migrate the IMS systems in this example IMSplex to IMS 15 (V15):

1. Migrate the subsystems on LPAR1 first by performing the following actions:
   a. Prepare the IMSF libraries and data sets for IMS 15 (for example, perform a system definition, set up JCL, and so on).
   b. Stop the V13 SCI.
   c. Start the V15 SCI.
   d. Stop the V13 OM (assuming the same OM name is used before and after the migration).
   e. Start the V15 OM.
   f. Shut down IMS Connect.
   g. Shut down IMSF.
   h. Stop the V13 RM.
   i. Shut down the V13 CQS.
   j. Start the V15 CQS.
   k. Start the V15 RM.
   l. Coldstart IMSF.
   m. Start IMS Connect. If you start IMS Connect before IMSF, IMS Connect issues a datastore unavailable message.
   n. Test IMSF. If IMSF does not pass this testing step, consider whether IMSF needs to fall back to V13 and repeat this process after any problems are fixed.

2. After validating that the migration of IMSF on LPAR1 is successful, start migrating the IMS subsystems on LPAR2 with the following steps:
    a. Prepare the IMSG libraries and data sets for IMS 15 (for example, perform a system definition, set up JCL, and so on).
    b. Stop the V13 SCI.
    c. Start the V15 SCI.
    d. Start the V15 OM.
    e. Stop the V13 OM.
    f. Shut down IMSG.
    g. Shut down IMSH.
    h. Stop the V13 RM.
    i. Stop the V13 CQS.
    j. Start the V15 CQS.
    k. Start the V15 RM.
    l. Cold start IMSG.
    m. Restart IMSH.
    n. Test IMSG. If IMSG does not pass this testing step, consider whether IMSG needs to fall back to IMS Version 13 and repeat this process after any problems are fixed.
    o. After IMSG (V15) has tested successfully, proceed to the next step.
    p. Stop the V13 OM.
    q. Take IMSH offline and migrate it to IMS 15.

IMS repository function migration considerations

There are several migration considerations related to the IMS repository enhancements.

Automatic export to the IMSRSC repository

If AUTOEXPORT=AUTO is specified in the DFSDFxxx member and IMS is enabled with the IMSRSC repository, autoexport to the IMSRSC repository is enabled at system checkpoints. To disable the autoexport to the IMSRSC repository function during migration to IMS 15, modify the DFSDFxxx member in one of the following ways:

- Remove the AUTOEXPORT= specification so that AUTOEXPORT will default to AUTO and not trigger the autoexport to the IMSRSC repository. If IMS also has system RDDS, then autoexport will be done to the RDDS.
- Modify to AUTOEXPORT=NO so that no autoexport is enabled.
- Modify to AUTOEXPORT=RDDS so that autoexport is only to the system RDDS and not the IMSRSC repository.

Remember: Autoexport to the IMSRSC repository is not enabled if AUTOEXPORT=AUTO is defaulted to. You must explicitly specify autoexport in the DFSDFxxx member.

If you have AUTOEXPORT=AUTO defined with IMSRSC repository enabled and no system RDDS defined, IMS Version 13 and earlier will disable autoexport (AUTOEXPORT=N) since no system RDDS data sets are defined. A DFS3374W message is issued to indicate that autoexport is disabled.

If you have AUTOEXPORT=AUTO explicitly specified and not defaulted to with IMSRSC repository enabled and no system RDDS defined, IMS 15 will, at the end of the next checkpoint, export the changed definitions automatically since the last export to the IMSRSC repository.

If you have AUTOEXPORT=AUTO defined with IMSRSC repository enabled and system RDDS defined, IMS Version 13 and earlier will export the changed definitions automatically to the system RDDS at the end of the next checkpoint.

If you have AUTOEXPORT=AUTO defined with IMSRSC repository defined and system RDDS defined, IMS 15 will, at the end of the next checkpoint, export the changed definitions automatically since the last export to the IMSRSC repository. IMS will also export the changed definitions automatically to the system RDDS. The automatic export to the system RDDS will occur even if the automatic export to the IMSRSC repository did not succeed.

Create RDDS from Log Records utility (DFSURCL0) migration considerations

Run the same version of the DFSURCL0 utility as the version of the IMS that produced the IMS logs being used as input.

For example, use the IMS 15 DFSURCL0 utility with IMS 15 log data sets. If you run with mixed versions, the results can be unpredictable.

IVP enhancements migration considerations

Use the IMS installation verification program (IVP) after installing a new IMS system, to verify the installation of that new system, and use it subsequently for other purposes (for example, as an educational tool). The IVP dialogs are replaced when a new release of IMS is installed.

The IVP Variable Export utility mitigates the migration of IVP variables values between releases.

Migration considerations for Fast Path DEDB area data sets (ADS) encryption

Install APAR PI83756 to enable this feature.

Migration considerations introduced in IMS 15

To migrate from non-encrypted Fast Path DEDB ADS to encrypted Fast Path DEDB ADS, perform the following steps:

1. Perform one of the following methods to create encrypted ADS:
   - Define the shadow ADS with the same attributes as the non-encrypted ADS and specify key labels with the shadow ADS. Run DEDB ALTER utility.
   - Define new ADS as SMS-managed extended format DASD and specify key labels with them. Register the new ADS to DBRC by using the following command:

     INIT.ADS DBD(*xxxxxxxx*) AREA(*yyyyyyyy*) ADSN(*AREA data set name*) UNAVAIL

     Run CREATE utility.
2. Stop the non-encrypted ADS if necessary.

To fallback from encrypted Fast Path DEDB ADS to non-encrypted ADS, create new ADS without key label and use the DEDB ALTER and DEDB Area Data Set Create utilities to copy encrypted ADS to new ones.

Migration considerations for moving logger parameters to DFSDF*xxx*

IMS 15 includes migration considerations related to the consolidation of the IMS logger parameters into the mandatory LOGGER section of the DFSDF*xxx* member of the IMS PROCLIB data set.

The IMS logger parameters that were previously specified in the DFSVSM*xx* PROCLIB member are moved to the new LOGGER section of the DFSDF*xxx* PROBLIB member. Any logger parameters that are still specified in the DFSVSM*xx* member are ignored by the IMS system and not reported in the error log.

The **ARC=** and **WADS=** parameters, which were previously specified in the DFSPB*xxx* PROCLIB member or on the EXEC parameters of the control region JCL, are also moved to the DFSDF*xxx* PROCLIB member. If you specify **ARC=** or **WADS=** in DFSPB*xxx* or in the control region JCL, the specifications are ignored by the IMS system.

Migration considerations for network security credential propagation enhancement

There are several migration considerations related to the network security credential propagation enhancement.

- If the security-data section of the OTMA message prefix contains network security credentials, the size of the OTMA message can increase by up to 504 bytes. Therefore, consider increasing the size of the SHMSG and LGMSG message queue data sets and the size of the message queue pool.
- If both of the following situations occur, you might need to modify code that includes the HWSOMPFX macro:
  - The Network Session ID (NETSID) section or the Network User ID (NETUID) section, or both, is included in the security section of the OTMA message header.
  - Either the **DSECT=**ALL or the **DSECT=**N0 option is specified with the HWSOMPFX macro.

  The size of the NETUID and NETSID sections can vary, causing the locations of the fields that are below the security section to change. However, if the **DSECT=**ALL or the **DSECT=**N0 option is specified, a contiguous DSECT, the HWSOMPFX DSECT, is generated that does not account for sections that vary in size. Therefore, the fields in the OTMA message header that are below the security section might become inaccessible.

  For the fields of the OTMA message header that are below the security section to be accessed, you need to map the HWSOMUSR, HWSOMAPP, or HWSOMAPX DSECTS of the HWSOMPFX macro to the changed locations of the fields.

  For more information about the fields of the OTMA message header, see OTMA header fields used by IMS Connect (Communications and Connections).
- In IMS 15, processing by the HWSJAVA0 user message exit routine of the user data section that is in the OTMA message header is updated. If the OTMA message header contains network security information and the HWSOMPFX macro is used, the HWSJAVA0 exit routine specifies both the **DSECT=** and the **NETSEC_OPT=**YES options for the HWSOMPFX macro. The **DSECT=** and the **NETSEC_OPT=**YES options cause the following behaviors:
  - An individual DSECT is generated for each section of the OTMA message header.
  - The HWSECDNDS DSECT, or the HWSECARDS DSECT, or both, is generated to map network security information.
  - The HWSOMPFX DSECT is not generated.

Migration considerations for removing user exit routine specification from system definition

IMS 15 includes migration considerations for removing user exit routine specification from system definition.

Migration considerations introduced in IMS 15

The following user exit routines are removed from the IMS nucleus and are loaded as stand-alone load modules during IMS initialization:

- DFSCMTU0
- DFSCNTE0
- DFSCSMB0 and user-defined from TRANSACT EDIT=
- DFSCTTO0 and user-defined from TYPE EDIT= or LINEGRP EDIT=
- DFSFEBJ0
- DFSME000-DFSME127
- DFSPIXT0 and user-defined from TYPE EDIT= or LINEGRP EDIT=

- DFSSIML0

In order for the IMS system to properly load the user exits during IMS initialization, either move the user exit routines to an authorized library in the JOBLIB, STEPLIB, or LINKLIST library concatenated in front of the IMS.SDFSRESL, or ensure that the library that is currently specified by the USERLIB= keyword of the IMSGEN macro is added to the JOBLIB, STEPLIB, or LINKLIST concatenation.

The USERLIB= parameter on the IMSGEN macro is no longer used because no user exits are linked during Sysgen. G121 MNOTE0 is issued if USERLIB= is specified.

With the removal of user exit routines from the nucleus, some user-defined options in the system definition COMM macro are no longer valid and are replaced by IMS startup keyword parameter definitions in the DFSPBxxx proclib member or in the JCL override. The following table lists the COMM keywords affected, their replacement keywords in the DFSPBxxx, and the user exit routines that are affected by this change. If the COMM macro keywords are specified, the stage 1 system generation assembly issues an MNOTE 2.

Table 9. COMM macro changes

COMM keyword	DFSPBxxx keyword	User exit	Notes
FESEXIT = (NO|YES, timeout)	FESEXIT = N|Y FESTIM = timeout	DFSFEBJ0	Front End Switch routine. G118 MNOTE 2 is issued if FESEXIT=YES is specified in the COMM macro. The FESTIM= keyword in DFSPBxxx already exists before IMS 15.
MFSEXIT=(field, segment)	MFSEXITF=field MFSEXITS=segment	DFSME000-DFSME127	MFS input message field and segment edit routines. G119 MNOTE 2 is issued if MFSEXIT is specified in the COMM macro. Field specifies the range of field edit routines (000-field). Segment specifies the range of segment edit routines (segment-127).
OPTIONS=USERMSGS	USERMSGS=N|Y	DFSCMTU0	User message table. G120 MNOTE 2 is issued if OPTIONS=USERMSGS is specified in COMM macro.
SIMEXIT=NO|YES	SIMEXIT=N|Y	DFSSIML0	Shared printer message router routine. G117 MNOTE 2 is issued if SIMEXIT=YES is specified in the COMM macro.

Important: Prior to IMS 15, these user exits were linked into the IMS nucleus, which automatically made them non-reentrant (because the nucleus is non-reentrant). They are now loaded as stand-alone modules during IMS initialization. Thus, if you use IMS 15 and you link one of these user exit routines as reentrant, you must ensure that it is not dependent on any information from a previous iteration and that it does not store into itself. To learn more, see Routine binding restrictions (Exit Routines).

If the user exit routines that are removed from the nucleus use callable services, the customer must link DFSCSI00 with each user exit.

Existing user exit routines must be examined to determine if any external references (VCONs) to the nucleus exist. Any such external references must be removed or link edit processing will fail due to unresolved external references.

The actual interfaces to the exits are not being changed. Unless the exits have VCONs to the nucleus, users don't need to update the code in the exits.

Migration considerations for sample procedures removal enhancement

IMS includes migration considerations for the SDFSPROC data set for sample procedures removal enhancement.

Migration considerations introduced in IMS 15

In IMS 14 and earlier, the **PROCLIB=** parameter of the IMSGEN macro determines whether SYSGEN generates the IMS sample procedures in the IMS.PROCLIB dataset.

In IMS 15, the **PROCLIB=** parameter of the IMSGEN macro is obsolete. Only **PROCLIB=NO** is allowed. The default value for the parameter is changed to **PROCLIB=NO**. If **PROCLIB=YES** or **PROCLIB=IMS** is specified, the IMS system generates an MNOTE return code 2 with message G918 issued.

Delete the **PROCLIB=** keyword, or change **PROCLIB=YES** or **PROCLIB=IMS** to **PROCLIB=NO** to avoid a return code of 2 during stage 1 system definition.

If sample procedures are used, copy them from IMS.SDFSPROC to IMS.PROCLIB data set. Rename the data sets if necessary to match the original data sets generated by SYSGEN.

For sample procedures that are not delivered during the SMP/E processing in the IMS SDFSPROC library, use the DFSPROCB JCL to create the sample procedures and rename the sample procedures whose names do not match what they would have been if they are generated by system definition.

For more information about using the DFSPROCB JCL to create and rename certain sample procedures, see Running the DFSPROCB job to complete sample procedures (System Definition).

In IMS 14 or earlier, most sample procedures generated by SYSGEN includes variable data that the IMS system sets based on various specifications in the stage 1 system definition macros. In IMS 15, because sample procedures are now provided as copy source during SMP processing, you can update these sample procedures so that the variable data matches what they would have been if generated by SYSGEN when it is necessary.

In IMS 14 or earlier, some sample procedures omit entire sections of the sample procedure, or have different versions of the sample procedure, depending on the type of system or other specifications in stage 1 system definition macros.

In IMS 15, the new sample procedures, in general, assume a 'standard' DB/DC system, because the actual system environment is not known. For each procedure that has conditionally-generated statements for 'non-standard' environments, the prolog in the sample procedure includes detailed instructions on how the sample procedure should be modified.

MODBLKS data sets enhancement migration considerations

In IMS 15, you can change your MODBLKS data set from a partitioned data set (PDS) to a partitioned data set extended (PDSE) to store more resources. Each PDSE member can be up to 2 G in size, whereas the size of each PDS member is limited to only 16 M.

You can use one of the following options for migrating a MODBLKS data set from a PDS to a PDSE:

- "Apply APAR PI90417 and enable MODBLKS PDSE at the same time across an IMS warm start" on page 55.
- "Apply APAR PI90417 first, and then enable the MODBLKS PDSE data sets later" on page 56.

Apply APAR PI90417 and enable MODBLKS PDSE at the same time across an IMS warm start

These steps describe how to change a MODBLKS data set from a PDS to a PDSE by applying APAR PI90417 and defining staging, inactive, and active MODBLKS PDSE data sets across an IMS warm start (or emergency restart):

1. Keep active, inactive, and staging MODBLKS PDS data sets for fallback.
2. Define a differently named staging MODBLKS data set as PDSE.
3. Define the first differently named MODBLKS data set as a PDSE.
4. Define the second differently named MODBLKS data set as a PDSE.
5. Perform a MODBLKS system definition to generate new resource definitions into the differently named staging MODBLKS PDSE.
6. Run the Online Change Copy utility (DFSUOCU0) to copy the differently named staging MODBLKS PDSE members to the first differently named MODBLKS PDSE.
7. Shut down IMS.
8. Apply APAR PI90417.
9. Change IMS procedure to specify the first differently named MODBLKS PDSE data set as the inactive MODBLKS data set.

10. Warm start IMS with the first differently named MODBLKS PDSE data set as the inactive MODBLKS data set.
11. Issue the appropriate online change command sequence to make online change to the first differently named MODBLKS PDSE data set.
12. Perform a MODBLKS system definition to generate new resource definitions into the differently named staging MODBLKS PDSE.
13. Run the Online Change Copy utility (DFSUOCU0) to copy the differently named staging MODBLKS PDSE members to second differently named MODBLKS PDSE.
14. Shut down IMS.
15. Change IMS procedure to specify the second differently named MODBLKS PDSE data set as the inactive MODBLKS data set.
16. Warm start IMS with the second differently named MODBLKS PDSE data set as the inactive MODBLKS data set.
17. Issue the appropriate online change command sequence to make online change to the second differently named MODBLKS PDSE data set.

Apply APAR PI90417 first, and then enable the MODBLKS PDSE data sets later

You can use the following procedure to apply APAR PI90417 first, and then enable the MODBLKS PDSE data sets later. In the following procedure, one extra IMS system restart is needed than if you both apply APAR PI90417 and enable the MODBLKS PDSE data sets at the same time.

1. Shut down IMS.
2. Apply APAR PI90417.
3. Warm start IMS.
4. Keep active, inactive, and staging MODBLKS PDS data sets for fallback.
5. Define differently named staging MODBLKS data set as a PDSE.
6. Define the first differently named MODBLKS data set as a PDSE.
7. Define the second differently named MODBLKS data set as a PDSE.
8. Perform a MODBLKS system definition to generate new resource definitions into the differently named staging MODBLKS PDSE.
9. Run online change copy utility to copy differently named staging MODBLKS PDSE members to the first differently named MODBLKS PDSE.
10. Shut down IMS.
11. Change IMS procedure to specify the first differently named MODBLKS PDSE data set as the inactive MODBLKS data set.
12. Warm start IMS with the first differently named MODBLKS PDSE data set as the inactive MODBLKS data set.
13. Issue the appropriate online change command sequence to make online change to the first differently named MODBLKS PDSE data set.
14. Perform a MODBLKS system definition to generate new resource definitions into the differently named staging MODBLKS PDSE.
15. Run online change copy utility to copy differently named staging MODBLKS PDSE members to the second differently named MODBLKS PDSE.
16. Shut down IMS.
17. Change IMS procedure to specify the second differently named MODBLKS PDSE data set as the inactive MODBLKS data set.
18. Warm start IMS with the second differently named MODBLKS PDSE data set as the inactive MODBLKS data set.

19. Issue the appropriate online change command sequence to make online change to the second differently named MODBLKS PDSE data set.

Related concepts

IMS system data sets for online change (System Definition)

Related reference

Online Change Copy utility (DFSUOCU0) (System Utilities)

Syntax Checker enhancements migration considerations

The Syntax Checker assists with IMS release-to-release migrations by providing the ability to convert supported IMS.PROCLIB members from one release to the other.

When you use the Syntax Checker to check parameters for earlier releases of IMS, you must verify that the correct release number is displayed.

WADS migration considerations

IMS 15 introduced new changes to the write-ahead data set (WADS).

The WADS must be defined as a VSAM linear data set with a control interval (CI) size of 4 KB (4096-bytes), secondary space allocation of 0, and with the SHAREOPTIONS(3 3) parameter. The access method services (AMS) utility IDCAMS can be used to define the data set.

If the WADS for different IMS systems on different logical partitions (LPARs) share the same data set name, you must specify SHAREOPTIONS(3 3) for the WADS, even though the physical data sets are not shared between the systems.

Recommendation: Use different data set name for the IMS 15 WADS than the name used for the WADS in current IMS version. This allows you to predefine the IMS 15 WADS before shutting down the current IMS system. Otherwise, the WADS must be deleted and redefined after the current IMS system goes down and before the system is started as an IMS 15 system.

You can use the **ZHYPERWRITE=** parameter in the LOGGER section of the DFSDF*xxx* PROCLIB member to enable or disable the use of zHyperWrite to write to the WADS.

Example

The following JCL is an example of allocating the WADS:

```
//AMS EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN DD *

DEFINE CLUSTER -
     (NAME(IMSA.WADS.VSAM) -
     VOLUME(VOL001) -
     CONTROLINTERVALSIZE(4096) -
     SHAREOPTIONS(3 3) -
     CYLINDERS (20 0) -
     LINEAR)
/*
```

Fallback considerations

Major functions of IMS are generally not compatible with earlier versions.

Consider the following guidelines when preparing your migration fallback plan. This information is a guide to fallback inhibitors, and is not comprehensive:

- If your IMS system uses ACB libraries, the ACB Maintenance utility (ACBGEN) is required.
- For each IMS that you are migrating to a pre-15 level, complete the following steps:
  1. Ensure that the status of all databases and PSBs updated by IMS 15 are correct.

2. Resolve DBRC issues. See “DBRC fallback considerations” on page 58.
3. Shut down IMS 15.
4. Install the version of IMS that you want.
5. Cold start the IMS.

- You can use the IBM IMS Queue Control Facility for z/OS (QCF) to re-queue IMS 15 messages to IMS Version 13 or IMS 14 message queues.

If you are falling back from an IMS 15 system to IMS 14 or IMS Version 13 that is not the active system in an XRF complex, you do not need cold start the system. You can shut down and warm start the system instead.

For DBRC migration and coexistence:

- If you are falling back from IMS 15 to IMS 14, ensure that the IMS 14 DBRC coexistence APAR PI62558 and PI49208 are applied.
- If you are falling back from IMS 15 to IMS Version 13, ensure that the IMS Version 13 DBRC coexistence APAR PI62555, PI27285, and PI49334 are applied.

DBRC fallback considerations

Certain steps must be taken to revert the level of DBRC from IMS 15 to IMS Version 13 or IMS 14.

Minimum version value in the RECON data set

If the MINVERS value is set to '15.1' and you need to fall back from IMS 15 to an earlier version, you must lower the MINVERS value because jobs in an earlier release cannot access the RECON data if the current MINVERS value is set to '15.1'.

To change the MINVERS value to '13.1', complete the following steps:

1. Shut down all IMS 15 subsystems.
2. Ensure that all IMS 15 subsystem records have been removed from the RECON data set. Issue a **LIST.SUBSYS** command to see the subsystem records in the RECON data set. Delete all IMS 15 subsystem records in the RECON data set using the **DELETE.SUBSYS** command.
3. If the cross-DBRC service level ID (CDSLID) is not set to 2 and any HALDB databases are defined to support 8-GB OSAM data sets, the **CHANGE.RECON MINVERS('13.1')** command will fail, and message DSP1256E will be issued. To prevent the command from failing, take one of the following actions:
   - Complete the appropriate steps to change the maximum OSAM data set size for each HALDB from 8 GB to 4 GB.
   - If the appropriate maintenance for HALDB support of 8-GB OSAM data sets has been applied to all of the IMS Version 13 resident libraries (RESLIBs) that access the RECON data set, include the CDSLID(2) parameter in the **CHANGE.RECON MINVERS('13.1')** command in the next step.
4. Reset the MINVERS value by issuing a **CHANGE.RECON MINVERS('13.1')** command using IMS 15.

To change the MINVERS value to '14.1', complete the following steps:

1. Shut down all IMS 15 subsystems.
2. Ensure that all IMS 15 subsystem records are removed from the RECON data set.
   - To view the subsystem records in the RECON data set, issue the **LIST.SUBSYS** command.
   - If IMS 15 subsystem records exist, issue the **DELETE.SUBSYS** command to delete them.
3. Issue the **CHANGE.RECON MINVERS('14.1')** command to reset the MINVERS value to fall back to IMS 14 from IMS 15.

Related tasks

Changing the maximum OSAM data set size for a HALDB from 8 GB to 4 GB (Database Administration)

Dynamic definition for MODBLKS resources fallback considerations

You can fall back from an IMS system that has dynamic definition (DRD) enabled for MODBLKS resources to an earlier version of IMS.

To fall back from an IMS 15 system that uses the IMS repository function to an IMS 14 or IMS Version 13 system that uses a resource definition data set (RDDS):

1. Ensure that you have a non-system RDDS that contains a complete set of all the resource definitions before shutting down IMS 15.
2. Cold start the IMS 14 or IMS Version 13 system and import the resource definitions from the RDDS.

To fall back from an IMS system that has DRD enabled and uses an RDDS to an IMS system that does not use DRD:

1. Ensure that the IMS.MODBLKS data set has a complete set of all the resource definitions while you have DRD enabled. This set of resource definitions includes resource definitions that were originally in the IMS.MODBLKS data set at cold start time, and the resource definitions (or removal thereof) for the resources that were added, changed, or deleted dynamically. Having this set enables you to fall back to using online change for the IMS.MODBLKS data set with all the resources that were defined either by system definition originally or dynamically.

   Optionally, you can use the Resource Definition Data Set (RDDS) Extraction utility (DFSURDD0) to extract the resource definitions to create Stage-1 macro statements from the stored resource definitions in an RDDS.
2. Shut down IMS normally.
3. Remove or change the MODBLKS keyword to enable online change for the IMS.MODBLKS data set:
   - Remove the MODBLKS keyword from the DFSCGxxx member or the DFSDFxxx member of the IMS.PROCLIB data set (or from both members).

     If both members are defined, any values specified in the DFSCGxxx member override the values specified in the DFSDFxxx member.
   - Change the value of the MODBLKS keyword from DYN to OLC in the DFSCGxxx member or in the <COMMON_SERVICE_LAYER> section of the DFSDFxxx member of the IMS.PROCLIB data set (or in both members).
4. Ensure that the IMS JCL includes the MODBLKS DD statement.
5. Cold start IMS. An IMS cold start creates runtime resource definitions from the stored resource definitions in the IMS.MODBLKS data set. The online change process for the IMS.MODBLKS data set is now enabled. Variations of the dynamic resource definition **CREATE**, **DELETE**, and **UPDATE** commands that change definitions are no longer permitted.
6. Reinstitute your in-house procedures that use the online change process for the IMS.MODBLKS data set and disable the procedures that use DRD commands.
7. Perform other pertinent tasks related to falling back to a previous version.

Dynamic definition of MSC resources fallback considerations

You can fall back from an IMS system that has dynamic definition enabled for MSC resources to an earlier version of IMS.

Complete the following procedure to fall back from an IMS system that has dynamic definition enabled for MSC resources to an IMS system that does not have dynamic definition enabled for MSC resources:

1. Keep your stage 1 system definition synchronized with dynamic definition of MSC resources.
2. Run system generation for stage 1 system definition that includes MSC resources, which are the following:

   a. MSPLINK, MSLINK, MSNAME, and NAME macros

   b. IMSCTRL macro with MSVID and SYSTEM=(MSVERIFY) parameters specified

c. APPLCTN and TRANSACT macros with the SYSID parameter specified

3. Restore old copies of MSC user exits.
4. Restore old copies of automation programs that issue QUERY LTERM, QUERY MSLINK, QUERY MSNAME, and QUERY MSPLINK commands and parse the output.
5. Remove new MSC parameters from the DFSDFxxx member of the IMS PROCLIB data set.
6. Cold start IMS at a previous IMS release level.
7. Complete other pertinent tasks related to falling back to a previous version of IMS.
8. Disable Common Service Layer (CSL) with the Structured Call Interface (SCI) and the Operations Manager (OM) if these are not needed for any other IMS function.
9. Confirm that dynamic definition is disabled for MSC resources by issuing the QUERY MEMBER TYPE(IMS) command, and ensuring that the command output does not include DYNMSC in the local attributes.

IMS catalog fallback

An IMS system in which the IMS catalog is enabled can fall back to an earlier version of IMS.

If you are falling back to a prior version of IMS in which the IMS catalog was enabled, unless the DBD and PSB instances from the prior version were purged from the IMS catalog, you do not need to change the IMS catalog.

If the DBD and PSB instances from the prior version were not purged, fallback to the IMS catalog of the prior version is achieved by making the ACB library (ACBLIB) of the prior version the active ACBLIB again. The active ACBLIB determines which DBD and PSB instances are active in the IMS catalog.

If the DBD and PSB instances from the prior version were purged from the IMS catalog, you must repopulate the IMS catalog with the DBD and PSB instances from the prior version after you make the ACBLIB from the prior version active.

After fallback is complete, you can leave the IMS 15 DBD and PSB instances in the IMS catalog or you can purge them to save storage.

The following figure shows the IMS catalog before fallback. The ACBLIB for the new version is active. The new DBDs are used in the DMB pool of the new version of IMS and the new DBD instances in the DBD record in the IMS catalog are used.

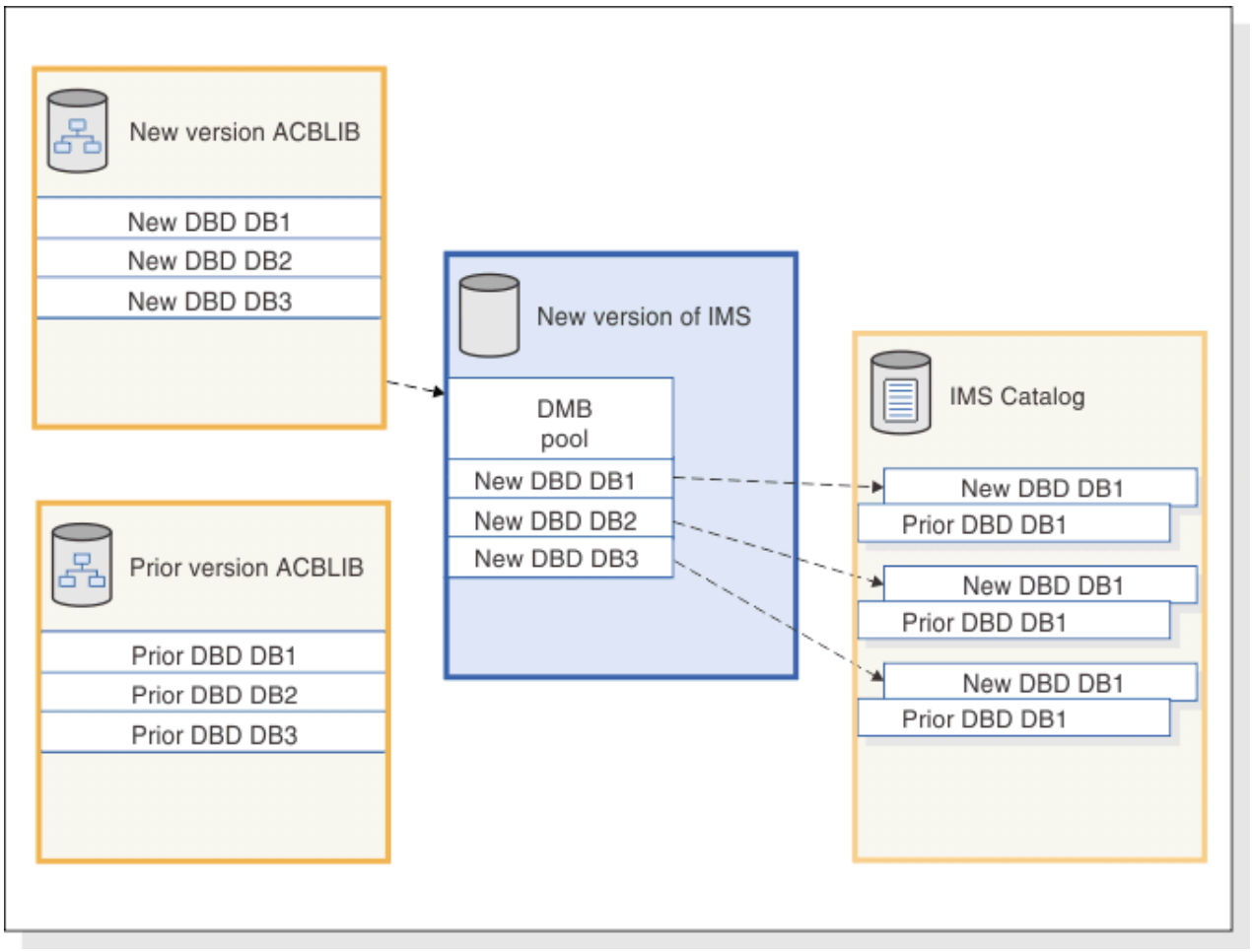


Figure 1. DBDs that IMS uses before fallback

The following figure shows the IMS catalog after fallback. The ACBLIB for the prior version is made active again. The prior version of IMS loads the prior DBDs into the DMB pool and uses the prior DBD instances in the DBD records in the IMS catalog.

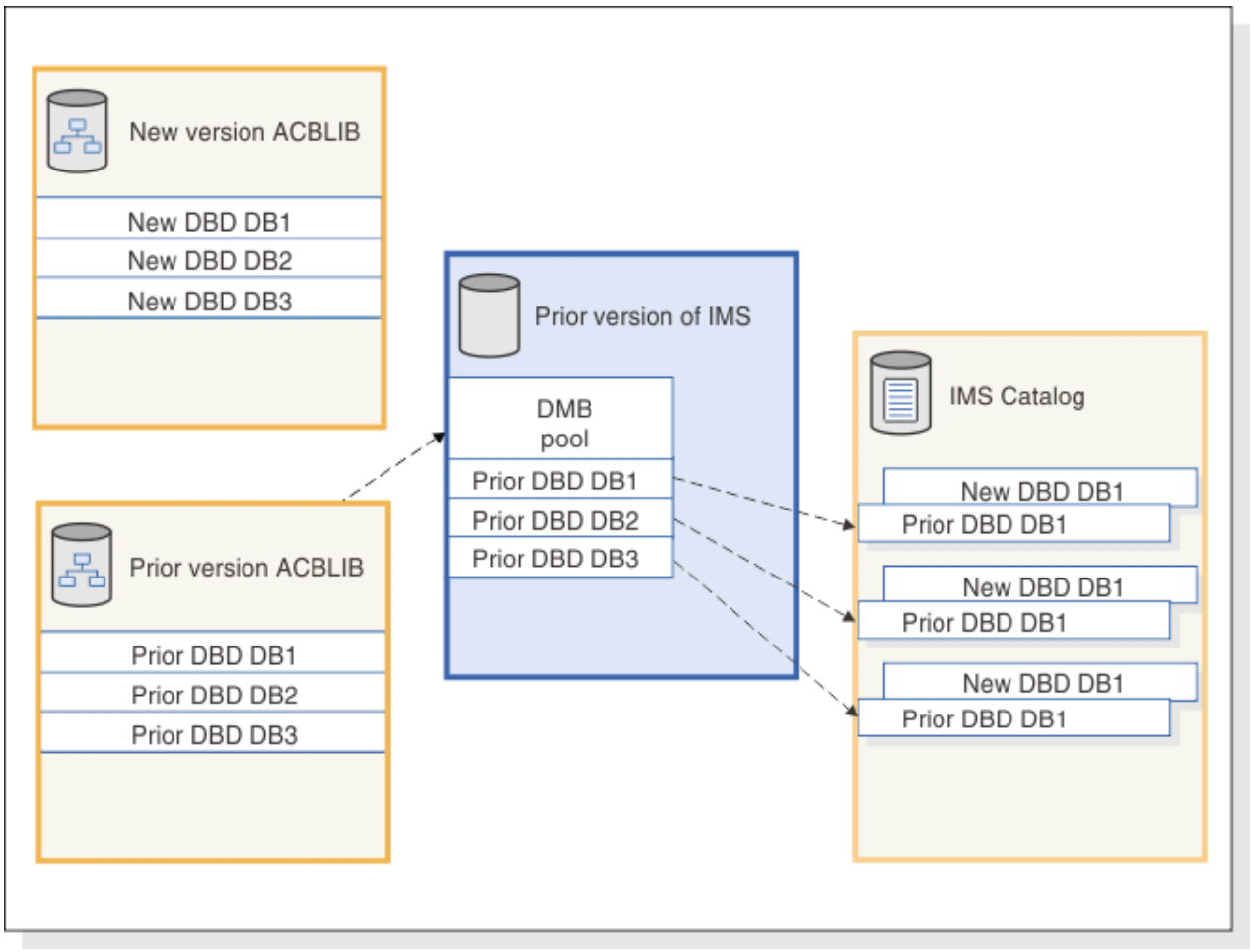


Figure 2. DBDs that IMS uses after fallback

Fallback from IMS-managed ACBs to ACBLIBs

The procedure for falling back from the IMS management of ACBs to the installation-managed ACB libraries (ACBLIBs) is different depending on whether your installation has activated any new or modified databases or program views since the IMS management of ACBs was enabled.

Falling back from IMS-managed ACBs before resource updates are activated

If your installation has not activated any new or modified databases or program views since enabling the IMS management of ACBs and your ACB, DBD, and PSB libraries are unchanged, the procedure for falling back from the IMS management of ACBs to the installation-managed ACB libraries (ACBLIBs) involves updating the DFSDFxxx member, changing various references to the IMS catalog back to references to the ACB, DBD, and PSB libraries, and restarting IMS.

The following procedure does not include steps for falling back from an IMS catalog. Disabling the IMS catalog is not required when falling back to installation-managed ACBLIBs.

The following procedure is generally applicable to both falling back within a release and falling back to a prior release of IMS.

1. In the <CATALOG> section of the DFSDFxxx PROCLIB member, specify ACBMGMT=ACBLIB.
2. If you use the IMS Catalog Definition exit routine (DFS3CDX0), modify it to indicate that the IMS management of ACBs is not enabled.
3. If necessary, update any JCL to reference the ACBLIB, DBDLIB, and PSBLIB.
4. If DBRC was configured to refer to the IMS catalog for database definitions, reconfigure DBRC to refer to the DBDLIB instead by issuing the **CHANGE.RECON** command with NOCATALG specified.

5. Restart IMS.

Before running the IMS Catalog Populate utility (DFS3PU00) again on a system that uses ACB libraries, remove the MANAGEDACBS control statement from the JCL.

If necessary, revert any tools or products that were updated to run in the IMS-managed ACBs environment so that they use the ACB, DBD, and PSB libraries again.

Falling back from IMS-managed ACBs to installation-managed ACBLIBs

If your installation has activated new or modified databases or program views after enabling the IMS management of ACBs, the procedure for falling back to installation-managed ACB libraries (ACBLIBs) includes recreating the DBD, PSB, and ACB libraries from the active resources in the IMS catalog.

The following procedure does not include steps for falling back from an IMS catalog. Disabling the IMS catalog is not required when falling back to installation-managed ACBLIBs.

The following procedure is generally applicable to both falling back within a release and falling back to a prior release of IMS.

1. Build the input statements for DBD Generation and PSB Generation utilities from the IMS catalog by using the DFS3LU00 utility.
2. Build the DBD and PSB libraries by running the DBD and PSB Generation utilities.

   If you are falling back to a prior release of IMS, be sure to use the utilities for that release of IMS.
3. Build the ACB library by providing the DBD and PSB libraries as input to the ACB Maintenance utility.

   If you are falling back to a prior release of IMS, be sure to use the utilities for that release of IMS.
4. In the <CATALOG> section of the DFSDFxxx PROCLIB member, specify ACBMGMT=ACBLIB.
5. If you use the IMS Catalog Definition exit routine (DFS3CDX0), modify it to indicate that the IMS management of ACBs is not enabled.
6. If necessary, update any JCL to reference the ACBLIB, DBDLIB, and PSBLIB.
7. If DBRC was configured to refer to the IMS catalog for database definitions, reconfigure DBRC to refer to the DBDLIB instead by issuing the **CHANGE.RECON** command with NOCATALG specified.
8. Restart the IMS system.

Remove the MANAGEDACBS control statement from the JCL for the IMS Catalog Populate utility (DFS3PU00) before running the utility again on a system that uses ACB libraries.

If necessary, revert any tools or products that were updated to run in the IMS-managed ACBs environment so that they use the ACB, DBD, and PSB libraries again.

Falling back from IMSRSC repository support for dynamically defined MSC resources

You can fall back from an IMS system that has IMSRSC repository support for dynamically defined MSC resources to an earlier version of IMS.

1. Keep your stage 1 system definition synchronized with dynamic definition of MSC resources.
2. Issue the **DELETE DEFN** command for all of the MSC resource types that have resource definitions in the IMSRSC repository for the IMS that is falling back. Issue the **DELETE DEFN** command with keywords FOR(IMSID(IMS1)) and NAME(*) for each MSC resource type.

   For example, if IMS1 is falling back, to delete all MSC resources, issue the following commands in the following order:

   ```
   DELETE DEFN TARGET(REPO) NAME(*) TYPE(TRAN)FOR(IMSID(IMS1))
   DELETE DEFN TARGET(REPO) NAME(*) TYPE(LTERM)FOR(IMSID(IMS1))
   DELETE DEFN TARGET(REPO) NAME(*) TYPE(MSNAME)FOR(IMSID(IMS1))
   DELETE DEFN TARGET(REPO) NAME(*) TYPE(MSLINK)FOR(IMSID(IMS1))
   DELETE DEFN TARGET(REPO) NAME(*) TYPE(MSPLINK)FOR(IMSID(IMS1))
   ```
3. Run system generation for stage 1 system definition that includes MSC resources, which are the following:

- MSPLINK, MSLINK, MSNAME, and NAME macros
- IMSCTRL macro with MSVID and SYSTEM=(MSVERIFY) parameters specified
- APPLCTN and TRANSACT macros with the SYSID parameter specified

4. Restore old copies of MSC user exits.
5. Restore old copies of automation programs that issue QUERY LTERM, QUERY MSLINK, QUERY MSNAME, and QUERY MSPLINK commands and parse the output.
6. Remove new MSC parameters from the DFSDFxxx member of the IMS PROCLIB data set.
7. Cold start IMS at a previous IMS release level.
8. Complete other pertinent tasks related to falling back to a previous version of IMS.
9. Confirm that dynamic definition is disabled for MSC resources by issuing the QUERY MEMBER TYPE(IMS) command, and ensuring that the command output does not include DYNMSC in the local attributes.

Falling back from MODBLKS data sets defined as PDSEs

You can fall back from an IMS system that has MODBLKS data sets defined as partitioned data sets extended (PDSEs) to an earlier version of IMS.

1. Define the staging MODBLKS data set as a partitioned data set (PDS), if the original staging MODBLKS data set that was defined as a PDS was not saved.
2. Define the first MODBLKS PDS data set, if the original first MODBLKS PDS data set was not saved.
3. Define the second MODBLKS PDS data set, if the original second MODBLKS PDS data set was not saved.
4. Perform a MODBLKS system definition to generate new resource definitions into the staging MODBLKS PDS. Ensure that the number of resources that are generated do not exceed the maximum number that is supported by MODBLKS PDS data sets.
5. Run the Online Change Copy utility (DFSUOCU0) to copy the staging MODBLKS PDS members to the first MODBLKS PDS.
6. Shut down IMS.
7. Change IMS procedure to specify the first MODBLKS PDS data set as the inactive MODBLKS data set.
8. Warm start IMS with the first MODBLKS PDS as the inactive MODBLKS data set.
9. Issue the appropriate online change command sequence to make online change to the first differently named MODBLKS PDS data set.
10. Perform a MODBLKS system definition to generate new resource definitions into staging MODBLKS PDS. Ensure that the number of resources that are generated do not exceed the maximum number that is supported by MODBLKS PDS data sets.
11. Run the Online Change Copy utility (DFSUOCU0) to copy staging MODBLKS PDS members to the second MODBLKS PDS.
12. Shut down IMS.
13. Change IMS procedure to specify the second MODBLKS PDS data set as the inactive MODBLKS data set.
14. Remove APAR PI90417.
15. Warm start IMS with the second MODBLKS PDS as the inactive MODBLKS data set.
16. Issue the appropriate online change command sequence to make online change to the second MODBLKS PDS data set.

Related concepts

IMS system data sets for online change (System Definition)

Related reference

Online Change Copy utility (DFSUOCU0) (System Utilities)

WADS fallback considerations

When you fall back from IMS 15 to a previous version of IMS, ensure that the WADS is allocated consistently with the prior version.

You must use a non-VSAM WADS data set in an IMS system of previous version.

If you defined WADS data set names for IMS 15 during migration that were different from the names used by the previous IMS version, use the previous names for fallback. The fallback process replaces the reference to the WADS data sets systematically. Otherwise, the WADS must be deleted and redefined after the IMS 15 system is shut down, and before the system is started at the previous IMS version.

At the end of fallback, cold start IMS with the **FORMAT ALL** or **FORMAT WA** keyword.

CQS automatic structure checkpoint fallback considerations

You can fall back from a common queue server (CQS) that can perform automatic structure checkpoint to an earlier version of CQS.

To fall back from an IMS 15 CQS that can perform automatic structure checkpoint to an IMS 14 or IMS Version 13 CQS, you must remove or comment out the **STRCHKPT** parameter in the CQSSLxxx member of the IMS PROCLIB data set.

Chapter 6. Coexistence with IMS 15

Restrictions and compatibility considerations apply for coexistence of IMS 15 with earlier versions of IMS.

If an IMS 15 enhancement, or any other IMS function, has no coexistence or compatibility considerations, it is not described in these topics.

Overview of coexistence APARs

IMS Version 13 and IMS 14 must have certain APARs installed to coexist with IMS 15.

The following table describes the coexistence APARs and PTFs needed for various IMS functions. For detailed information about individual APARs and PTFs, go to the IMS home page and click **Support**.

Table 10. APARs and PTFs needed for IMS 15 coexistence with IMS Version 13 and IMS 14

IMS 15 function	IMS Version 13 coexistence APAR/PTF	IMS 14 coexistence APAR/PTF	Additional information
DBRC RECON data sets	PI62555/UI44432	PI62558/UI44433	For more information, see "DBRC coexistence considerations" on page 69.
IMSRSC support for MSC	PI49334/UI32565	PI49208/UI32429	
IMS repository enhancements - Automatic export	PI27285/UI23504	No APAR needed	
OTMA TPIPE Parallelism Coexistence	PM93878/UK98632	No APAR needed	
IMS Managed ACB Coexistence	None	• PI79314/UI51473/ UI51474 • PI82331/UI51271/ UI51272	

Determining which coexistence service needs to be installed

You can identify the outstanding service that needs to be installed on your IMS Version 13 and IMS 14 systems to enable them to coexist with IMS 15 by using SMP/E and the IMS 15 FIXCAT category.

The FIXCAT category for IMS 15 is `IBM.Coexistence.IMS.V15` with the keyword `IMSV15COEX/K`.

The following is an example of the steps to determine what IMS service needs to be installed on IMS Version 13 or IMS 14 to coexist with IMS 15:

1. Download the current enhanced HOLDDATA
2. SMP/E RECEIVE the current enhanced HOLDDATA
3. Run the SMP/E REPORT MISSINGFIX command pointing to your IMS Version 13 or IMS 14 zone (for example):

```
SET BOUNDARY (GLOBAL) .
    REPORT MISSINGFIX ZONES (targetzone)
    FIXCAT(IBM.Coexistence.IMS.V15)
```

Related information

Enhanced HOLDDATA for z/OS

IBM Fix Category Values and Descriptions

General coexistence considerations

Although IMS 15 can coexist with earlier versions of IMS, general coexistence considerations apply.

IMS 15 can coexist with earlier versions, so existing applications and data can be used without change. Migration and coexistence support is provided for IMS Version 13 and IMS 14.

The following general coexistence considerations apply:

- You must build new application control blocks (ACBs) for all existing program specification blocks (PSBs) and database definitions (DBDs).
- An all-system generation and a cold start are required for online systems (DBCTL, DB/DC, DCCTL). All data sets must be formatted when IMS is initialized the first time. To ensure that the data sets are formatted, specify the FORMAT ALL keywords on the cold start command **/NRESTART CHECKPOINT 0** or **/ERESTART COLDSYS**).
- If you are installing multiple versions of IMS in the same processor, you can continue to use the prior versions of the IMS SVCs with the prior versions of IMS. However, the IMS 15 SVCs are downward compatible with IMS Version 13 and IMS 14. Only IMS 15 requires the IMS 15 SVCs. The IMS 15 SVCs routines are the same for all IMS 15 releases.
- For DB/DC and DCCTL online systems, the MFS format library is a required data set, regardless of whether MFS is used. DBCTL systems do not require an MFS format library.
- Utilities and logs

  You might need to change programs that process the log because some log records that are created by database changes have been modified. For a list of the log records that are new, deleted, or changed for IMS 15, see Chapter 9, “Log record changes in IMS 15,” on page 95.
- **Extended checkpoint restriction:** You cannot use extended checkpoint to restart applications across different releases of IMS.

Specific coexistence considerations

Functional areas of or enhancements to IMS 15 have specific coexistence considerations.

The following topics describe specific coexistence considerations for IMS 15.

Common Queue Server coexistence considerations

Restrictions limit how Common Queue Servers (CQSs) from earlier versions of IMS can coexist.

IMS 15 introduces the CQS automatic structure checkpoint function. An IMS 15 or later CQS that uses automatic structure checkpoint can coexist with IMS Version 13 and IMS 14 CQSs that are connected to the same shared queue structure. However, you can specify **STRCHKPT=** in the CQSSLxxx member of the IMS PROCLIB data set only in IMS 15 CQSs. Only IMS 15 or later CQSs can trigger automatic structure checkpoints, but all versions of CQS participate in the checkpoints.

General CQS coexistence rules

An IMS 15 CQS is downward compatible with IMS Version 13 and IMS 14. However, a CQS of an earlier IMS version is not upward compatible with a CQS of a later IMS version. The following general coexistence rules apply to CQS in IMS 15 at all IMS 15 release levels:

- An IMS Version 13 or an IMS 14 can register with an IMS 15 CQS.
- An IMS 15 cannot register with a pre-IMS 15 CQS.
- An IMS 14 cannot register with a pre-IMS 14 CQS.
- An IMS Version 13 cannot register with a pre-IMS Version 13 CQS.

- User or vendor-written CQS clients that want to register with an IMS 15 CQS must be compiled with IMS Version 13 or later CQS macros.
- User or vendor-written CQS clients that are compiled with the IMS 15 CQS macros cannot register with a pre-IMS 15 CQS.
- User or vendor-written CQS clients that are compiled with the IMS 14 CQS macros cannot register with a pre-IMS 14 CQS.
- User or vendor-written CQS clients that are compiled with the IMS Version 13 CQS macros cannot register with a pre-IMS Version 13 CQS.
- An IMS Version 13 CQS, an IMS 14 CQS, and an IMS 15 CQS can connect to the same coupling facility structure.
- Any supported version of CQS can run on the same central processing complex (CPC).

For example:

- An IMS 15 CQS supports clients that are assembled with the IMS Version 13, IMS 14, or IMS 15 CQS macros.
- A client that is assembled with the IMS 15 CQS macros can register only with an IMS 15 CQS. The IMS 15 client cannot register with an IMS Version 13 or an IMS 14 CQS. Similarly, a client that is assembled with the IMS 14 CQS macros cannot register with an IMS Version 13 CQS.

DBRC coexistence considerations

An IMS 15 Database Recovery Control (DBRC) instance can coexist with an IMS Version 13 DBRC or an IMS 14 DBRC if you install the DBRC coexistence small programming enhancements (SPEs) to the IMS Version 13 or IMS 14 systems, and upgrade your RECON data set to the IMS 15 format by issuing a **CHANGE.RECON UPGRADE** command. Additional coexistence considerations apply to other DBRC functions.

SPEs are available for IMS Version 13 and IMS 14 that enable the coexistence of the earlier version DBRC with DBRC for IMS 15. With the appropriate SPE installed, IMS 15 and earlier version DBRCs can share the upgraded RECON data set. If the RECON data set has not been upgraded to IMS 15, the SPE has no effect. After the RECON data set has been upgraded, the SPE enables DBRC to convert records to the appropriate release format, depending on whether the record is being written to or the record is being read from the RECON data set. The SPE does not, however, enable the earlier level DBRC for the new functions delivered with DBRC in IMS 15.

The following coexistence SPEs must be installed to the IMS Version 13 or IMS 14 DBRC for coexistence purposes:

- IMS Version 13: PI62555
- IMS Version 14: PI62558

Restriction: After a RECON data set is upgraded to the IMS 15 level, it is not accessible to any pre-IMS 15 system that does not have the DBRC Coexistence SPE installed.

The MINVERS level must be set to the lowest level of IMS that uses or shares the RECON data sets.

Attention: Set a region size of 0M for all pre-IMS 15 Log Archive utility (DFSUARC0) jobs when an upgraded RECON data set is used. Unpredictable results can occur for any DBRC job that reads, writes, or changes any RECON record when inadequate storage is available for the job.

DBRC application coexistence considerations

There are two versions of each DBRC API (DSPAPI) macro: Version 1.0 (delivered with IMS Version 9) and Version 2.0 (delivered with IMS Version 10 and later). DBRC applications compiled with the Version 1.0 DSPAPI macros work without modification or reassembly with Version 2.0 of the DBRC API. However, these applications cannot use any of the newer functions (such as AUTH) or newer options (such as READONLY=YES) that are supported in the Version 2.0 macros.

For IMS Version 9, the default version level of the DSPAPI macros is 1.0. For IMS Version 10 and later, the default version level of the DSPAPI macros is 2.0. If a DBRC application that was originally assembled with the version 1.0 macros is reassembled using an IMS Version 10 or later macro library, and does not specify VERSION=1.0, the application might not work as expected because of the default version change.

Recommendation: If the functionality of an IMS Version 9 DBRC application remains unchanged and is reassembled using an IMS Version 10 or later macro library, specify VERSION=1.0 on the DSPAPI macros.

The enhancements in Version 2.0 of the DBRC API are available only with IMS Version 10 and later. These enhancements can be used only by DBRC applications that are compiled with Version 2.0 or later of the DBRC API.

The output blocks for the IMS 15 DBRC API requests contain more information than the output blocks for earlier-version API requests. DBRC applications must use the latest maps to access the additional information.

In a coexistence environment, the RECON data set can be managed (read, updated, and so on) using the functions that each sharing DBRC supports. For example, a shared RECON data set could be:

- Updated by a DBRC instance using the batch DBRC commands that are processed by the Database Recovery Control (DBRC) utility (DSPURX00), and queried by using the Query requests through Version 1.0 of the DBRC API
- Updated or queried by an IMS Version 10 or later DBRC using either the batch DBRC commands or API requests through Version 2.0 of the DBRC API

IMS utilities coexistence considerations

The Batch Backout, Log Recovery, and Log Archive utilities must be run on the IMS version that created the logs. For example, an IMS 14 Batch Backout utility cannot back out logs that were created on IMS 15.

The Database Recovery and Change Accumulation utilities must be run on the IMS version that is the same as the highest level of the logs that are being used. For example, an IMS 14 Database Recover utility can use logs that were created on IMS Version 13 or IMS 14, but not on IMS 15.

DEDB Alter enhancement coexistence considerations

The DEDB Alter utility has requirements for coexistence in IMS 15.

You can run the DEDB Alter utility in a coexistence environment; however, if you are invoking the DEDB Alter utility for an IMS 15 function such as ALTERDB, the DEDB Alter utility detects the version of the IMS system and terminates if the IMS version does not support the particular change.

DRA coexistence considerations

The version of the IMS DRA modules that are used by a DRA client must be the same version as the IMS with which the DRA client is communicating. A DRA client that communicates with multiple versions of IMS must use the appropriate version of the IMS DRA modules for each version of IMS.

Recommendations:

- Concatenate the IMS.SDFSRESL library to the DRA client step library so the correct version of the DRA Startup/Router routine (DFSPRRC0) is loaded into the DRA client load library.
- Ensure that the DRA Startup Table (DFSPZPxx) points to the correct version of IMS.SDFSRESL.

Database utility coexistence considerations

Coexistence restrictions apply to the use of some database utilities.

JCL from earlier versions of IMS might need to be changed because IMS 15 DBRC uses time-stamp precision to the microsecond.

Recommendation: Use DBRC with all IMS 15 database change accumulation and database recovery jobs, especially during migration and coexistence.

Attention: Other utility programs (such as Log Merge and Log Analysis) work properly only when they process data that was created by an IMS subsystem or batch application program that is at the same version level as the utility program. Otherwise, the results are unpredictable and the output is unreliable.

Restrictions:

- IMS 15 utilities must be used whenever the input data for a DBDS contains log, image copy, or change accumulation records created by the IMS 15 system.
- Log records generated by a particular version of IMS must use that same version (or later) of the Database Recovery (DFSURDB0) and Database Change Accumulation (DFSUCUM0) utilities to process those logs. For example, the IMS 14 utilities can process either IMS Version 13 or IMS 14 log records, but cannot process IMS 15 log records.

Dynamic definition for MODBLKS resources coexistence considerations

If you use dynamic resource definition (DRD) for MODBLKS resources there are a few points to consider if different versions of IMS coexist.

When an instance of IMS 15 is using an IMSRSC repository and is coexisting with an earlier-version IMS that is using an RDDS, changes to online resources or descriptors made on the IMS 15 system are not exported to the earlier-version RDDS unless an **EXPORT DEFN TARGET(RDDS)** command is issued.

Recommendation: When changes are made to DRD runtime resources or descriptors in a multi-version IMSplex, store the definitions for those resources and descriptors in the IMSRSC repositories and RDDS as appropriate.

The Destination Creation exit routine (DFSINSX0) supports an IMSplex in which some systems are enabled for DRD and some are not. If the DFSINSX0 exit routine is set up to create runtime resource definitions (and the same exit is used across the IMSplex), the routing behavior differs, depending on whether the master is enabled for DRD or not. If the master has DRD enabled, the created definition is routed to one or all IMS systems in the IMSplex. If the master does not have DRD enabled, you cannot route the created definition to other IMS systems in the IMSplex. The local exit creates the definition for a local DRD-enabled system.

Related concepts

“IMS repository function coexistence considerations” on page 73
The IMS repository function in IMS 15 can coexist with lower-level versions of IMS.

Exit routine coexistence considerations

Exit routines that run in IMS Version 13 or IMS 14 will work without modification in IMS 15. They will not, however, be able to use the latest functions without being modified.

Exit routines that run in multiple versions of IMS must be sensitive to the version of the Standard User Exit Parm List (SXPL). The version number of the SXPL can change if fields are added to the SXPL in a release of IMS.

For example, an exit routine that runs in a mixed-version IMSplex that needs to access the SXPLASWA field in the SXPL, which was introduced in IMS Version 11, must look for SXPLVER6 or later.

SXPLVER6 is the most recent version of the SXPL.

Related concepts

“Exit routine migration considerations” on page 43
There are migration considerations for some exit routines when you migrate to IMS 15.

Fast Database Recovery (FDBR) coexistence considerations

An FDBR region must be at the same release level as the IMS system that it is tracking.

Fast Path DEDB area data sets (ADS) encryption coexistence considerations

The DEDB Alter utility has requirements for coexistence in IMS 15.

Make sure all the IMS systems that share encrypted Fast Path ADS meet the following requirements:

- All the IMS systems are IMS 15 with APAR PI83756 installed.
- All the IMS systems are using Fast Path 64-bit buffers.
- All the z/OS systems are z/OS 2.2 with OA50569 installed, or z/OS 2.3 and later.

If an encrypted Fast Path ADS is shared by an IMS system that is IMS 14or earlier versions, or IMS 15 without APAR PI83756, this IMS system will not be able to open or access the ADS. Message IEC161I with return code 122 will be displayed.

Coexistence considerations for DEDBs with more than 2048 areas

IMS 15 Fast Path DEDBs with more than 2048 areas are supported only in IMS 15.1 and later. You must install APAR PH12671 and enable the enhancement on all the IMSs that share a DEDB with more than 2048 areas. If an IMS does not have this APAR installed and attempts to open a DEDB with more than 2048 areas, opening the database will fail.

For IMS 15.1 and later, the maximum number of areas for a DEDB is 9999.

HALDB support for 8-GB OSAM data sets enhancement coexistence considerations

The HALDB support for 8-GB OSAM data sets enhancement introduces some specific considerations for coexistence with IMS 14.

This enhancement supports coexistence with IMS Version 13 systems in data sharing environments only if SPE APAR PI23918 has been applied to all the IMS Version 13 resident libraries (RESLIBS) that access the RECON data set. The maintenance enables HALDB support for 8-GB OSAM data sets for IMS Version 13. The MINVERS value in the RECON data set must be 14.1 or later with the CDSLID value set to 2.

IMS 64-bit storage manager coexistence considerations

If the QUERY POOL command is routed to an IMS 15 system and an IMS 13 or IMS 12 system at the same time, the QUERY POOL command will have mixed results.

IMS catalog coexistence considerations

If you use the IMS catalog, certain considerations apply when IMS systems of different release levels coexist.

The IMS catalog is release independent. IMS systems at different release levels can use the same IMS catalog. However, because database definitions (DBDs), program views (PSBs), and application control blocks (ACBs) are release specific, the IMS catalog must contain a complete set of release-specific metadata for each release of IMS that uses the IMS catalog.

Consequently, when IMS systems at different release levels share the IMS catalog, the amount of storage that the IMS catalog requires increases by the amount of storage that is required to store the metadata from the ACB libraries of each release that uses the IMS catalog.

You can determine the amount of additional storage that the IMS catalog requires for a new release by providing the ACB library of the new release as input to the IMS Catalog Populate utility (DFS3PU00) and running the utility in analysis mode.

The DBD and PSB metadata for a given release of IMS must be added to the IMS catalog either by DDL or by using the generation and population utilities that are provided with that release.

Earlier versions of IMS cannot process any segments or fields that are added to the IMS catalog DBD by a new release of IMS.

Coexistence between IMS 14 and IMS 15 systems using IMS managed ACBs

When migrating multiple IMS systems in a data sharing environment, it might not be possible to shut down all IMS systems at once. Consequentially, IMS 14 and IMS 15 systems must be able to support non-native directory ACBs for coexistence.

During migration, IMS 14 and IMS 15 systems use separate directory data sets. To allow IMS 14 and IMS 15 systems to support sharing the same directory data set, install the following APARs:

- APAR PI82231/UI51271 for IMS 14.
- APAR PI79314/UI51473 for IMS 15.

APAR PI79314 for IMS 15 allows an IMS 15 system to support directory ACBs generated from an IMS 14 system. APAR PI82231 for IMS 14 allows an IMS 14 system to support directory ACBs generated from an IMS 15 system.

Related concepts

Overview of coexistence APARs (Release Planning)

IMS ACB management coexistence considerations

Before you enable the IMS management of ACBs for the first time in a data sharing environment, migrate all IMS Version 13 and earlier systems in the data sharing group to the new IMS release.

After all IMS systems that share an IMS catalog are migrated to the new release, IMS systems that use DBD, PSB, and ACB libraries can coexist in the data sharing group with IMS systems that use IMS-managed ACBs. However, the ACB, DBD, and PSB libraries must be kept in sync with the IMS catalog. Changes made to databases and program views in an IMS catalog that is enabled for ACB management are not automatically propagated to IMS systems that still use ACB, DBD, and PSB libraries.

To ensure that the ACB, DBD, and PSB libraries are consistent with the resources in an IMS catalog that is enabled for IMS ACB management, use one of the following methods:

- Use the IMS Catalog Library Builder utility (DFS3LU00) to create the ACB, DBD, and PSB libraries for the IMS systems that still require them from the active databases and program views in the IMS catalog. This method establishes the IMS catalog as the definitive source of active database and program views for all IMS systems. This is the recommended method.
- Use the generation utilities to create the ACB, DBD, and PSB libraries for all IMS systems. Distribute them among the IMS systems that still require them and use them to populate the IMS catalog.

Related reference

IMS Catalog Library Builder utility (DFS3LU00) (System Utilities)

IMS repository function coexistence considerations

The IMS repository function in IMS 15 can coexist with lower-level versions of IMS.

When you specify the EXPORTNEEDED control statement on the Create RDDS from Log Records utility (DFSURCL0), it is recommended that you run the same version of the DFSURCL0 utility as the version of the IMS that produced the IMS logs being used as input. For example, use the IMS 14 DFSURCL0 utility with IMS 14 log data sets. Otherwise, the results can be unpredictable.

Automatic export to the IMSRSC repository is supported only by an IMS 14 Resource Manager (RM) or later. Any lower-level RM systems that receive a request to update the repository for an automatic export will fail. IMS Version 12 APAR PI27283 and IMS Version 13 APAR PI27285 are open for the coexistence to not support RM to handle the AUTOEXPORT parameter. It is recommended that you enable automatic export to the IMSRSC repository only after all RM systems have been migrated to IMS 14.

An IMS change list is created only if the command master IMS is IMS Version 13 or later and the RM that processes change list requests is at V13 (1.6) level or higher.

Two possible scenarios for keeping stored resource definitions synchronized across multi-version IMSplex systems are shown as follows:

Scenario 1: Making attribute changes in a mixed environment of IMS systems that use RDDS and IMSRSC repository

In this scenario:

- IMSA is running IMS Version 13, using DRD with an RDDS.
- IMSB is running IMS 14, using DRD with an RDDS.
- IMSC is running IMS 15 and using DRD with an IMSRSC repository.
- All three IMS systems are in the same IMSplex and using shared queues.

The following steps illustrate changing an attribute of a transaction and storing its resource definition for scenario 1.

1. Check for work in progress by issuing a **QRY TRAN SHOW(WORK)** command. Either wait for the work to finish or address the work in progress.
2. When the transaction is not in use, an attribute of a transaction is changed on each IMS system by issuing an **UPDATE** or **CREATE** command.
3. IMSA and IMSB store the changed resource definition into their respective RDDSs by issuing the **EXPORT DEFN TARGET(RDDS)** command. IMSC stores the changed resource definition into its IMSRSC repository by issuing the **EXPORT DEFN TARGET(REPO)** command.

   If AUTOEXPORT=AUTO is enabled, the changes are written to the system RDDS at IMSA and IMSB at the next checkpoint and to the IMSRSC repository for IMSC at the next checkpoint.
4. Work for the transaction is restarted.

Important: During migration to IMS 15, IMSRSC repository is enabled if the DFSDFxxx member has AUTOEXPORT=AUTO explicitly defined and autoexport export to the IMSRSC repository is enabled after IMS 15 is cold started. Any resource definition changes (creates and updates) will be automatically exported to the IMSRSC repository at the next checkpoint.

If you do not want to enable the autoexport to the IMSRSC repository, you must remove the AUTOEXPORT= parameter in the DYNAMIC RESOURCES section of the DFSDFxxx member and let it default to AUTO or you must modify the member to either of these values:

AUTOEXPORT= NO for no autoexport
AUTOEXPORT = RDDS for autoexport to the RDDS

To enable autoexport to the IMSRSC repository, you must modify the AUTOEXPORT= parameter in the DYNAMIC RESOURCES section of the DFSDFxxx member to specify AUTOEXPORT=AUTO or AUTOEXPORT=REPO. In Scenario 1, if IMSC has AUTOEXPORT=AUTO explicitly specified, autoexport to the IMSRSC repository is enabled. To disable autoexport, modify the DFSDFxxx member for IMSC to specify AUTOEXPORT= NO.

Scenario 2: Changing a transaction definition on one IMS and propagating the change to the other IMS systems

In this scenario:

- IMSA is running IMS Version 13, using DRD with an RDDS, and using an IMS 15 CSL.
- IMSB is running IMS 14, using DRD with an RDDS, and using an IMS 15 CSL.
- IMSC and IMSD are running IMS 15 and are using DRD with a single IMSRSC repository.
- All four IMS systems are participating in shared queues.

The following steps illustrate changing an attribute of a transaction and storing its resource definition for scenario 2.

1. Check for work in progress by issuing a **QRY TRAN SHOW(WORK)** command. Either wait for the work to finish or address the work in progress.
2. When the transaction is not in use, change an attribute of the transaction on IMSC by issuing an **UPDATE** command.

3. Store the changed transaction definition in the IMSRSC repository for IMSC and IMSD by issuing either of the following **EXPORT** command from IMSC.

```
EXPORT DEFN TARGET(REPO) SET(IMSID(IMSC,IMSD))
EXPORT DEFN TARGET(REPO) SET(IMSID(*))
```

4. Update the runtime definition of the transaction on IMSD by importing the stored resource definition from the IMSRSC repository by issuing the **IMPORT DEFN SOURCE(REPO)** command
5. Export the changed transaction definition from IMSC to a non-system RDDS by issuing the **EXPORT DEFN TARGET(RDDS)** command.
6. Update the runtime definition of the transaction on IMSA and IMSB by importing the stored resource definition from the non-system RDDS by issuing the **IMPORT DEFN SOURCE(RDDS)** command.
7. Export the changed transaction definition from IMSA and IMSB to their respective system RDDSs by issuing the **EXPORT DEFN TAEGET(RDDS)** command.
8. Work for the transaction is restarted.

Coexistence with IMS Version 13

The following IMS Version 13 APAR/PTF must be installed in an IMS Version 13 system to enable coexistence between an IMS 15 Resource Manager (RM) instance and an IMS Version 13 RM instance:

PI27285/UI23504
Prevents an IMS Version 13 RM address space from processing requests for automatic export to the IMSRSC repository from an IMS 15 system.

IMS Connect coexistence considerations

The IMS 15 IMS Connect function supports IMS 14 and IMS Version 13, although new functions might not be available when connecting with the older versions.

IMS Connect instances from IMS 14 or IMS Version 13 might also be able to connect to an IMS 15 system, but coexistence APARs might be required.

- Support for cascading global transactions from the IMS TM resource adapter to an IMS TM system on a different LPAR is supported only after both IMS Connect and the IMS control region are migrated to IMS 14.

  If IMS Connect receives a global transaction from IMS TM resource adapter when IMS Connect and IMS are not on the same LPAR and either IMS Connect, IMS, or both, are not at IMS 14, the transaction is rejected with a NAK message that includes a sense code of X'2F'.
- IMS Version 12 and IMS Version 13 instances of IMS Connect can connect to OTMA tpipes that support parallel processing of RESUME TPIPE requests after the appropriate coexistence APARs are applied. The APARs are required only for IMS Version 12 and IMS Version 13 instances of IMS Connect that connect to tpipes in which tpipe parallelism is enabled.

  Previous versions of IMS Connect require these compatibility fixes:

  – IMS Connect Version 13 APAR/PTF PM93878/UK98632
  – IMS Connect Version 12 APAR/PTF PM93880/UK98633
- IMS 15 introduces new and changed IMS type-2 commands for IMS Connect. If a type-2 command is broadcast to an IMSplex in which multiple versions of IMS Connect coexist, instances of IMS Connect from earlier versions reject commands that include keywords that they do not support and ignore commands that they do not recognize.

MSC coexistence considerations

You can connect an IMS 15 Transaction Manager subsystem to other supported versions of IMS by using Multiple Systems Coupling (MSC).

The following IMS versions can coexist with an IMS 15 system in an MSC network:

- IMS 14 (5635-A05)
- IMS Version 13 (5635-A04)

For an IMS that was generated with MSC resources to coexist with IMS 15, any MSC user exits that access MSC LLB control blocks (logical links) or MSC LCB control blocks (physical links) must be changed to access those blocks using callable services or DSCBTS services. This change is required regardless of whether dynamic MSC is enabled.

You might need to update an MSC resource definition in an IMSplex in which an IMS 15 system that uses an IMSRSC repository coexists with an IMS Version 13 or earlier IMS system. In this scenario, the MSC resource updates that are made on the IMS 15 system by using the **UPDATE** commands must be made on the IMS Version 13 or earlier IMS systems by coding stage-1 system definition macros.

If the IMSRSC repository support for dynamically defined MSC resources is enabled for IMS 15, apply the following coexistence APARs to the RM systems in the IMSplex:

- IMS 14: APAR/PTF PI49208/UI32429
- IMS Version 13: APAR/PTF PI49334/UI32565

Use one of the following methods to install the coexistence APARs that are listed in the preceding list:

- First, install IMS Version 13 APAR/PTF PI49334/UI32565, and the IMS 14 preconditioning APAR/PTF PI49208/UI32429 on all RM systems in the IMSplex. Then, install the IMS 14 preconditioning APAR/PTF PI45186.
- Install all of the following APARs on all RM systems in the IMSplex at the same time:
  - IMS Version 13 APAR/PTF PI49334/UI32565
  - IMS 14 preconditioning APAR/PTF PI49208/UI32429
  - IMS 14 preconditioning APAR/PTF PI45186

Network security credential propagation enhancement coexistence considerations

The network security credential propagation enhancement introduces some specific considerations for coexistence with IMS 15.

If network security credentials are sent from a client application of IMS TM resource adapter, the credentials can be passed to IMS and audited in IMS log records only if IMS, IMS Connect, and IMS TM resource adapter are all Version 15 or later. If network security credentials are included in messages from IMS TM resource adapter Version 15 and IMS Connect is Version 14 or earlier, the messages are sent to IMS Connect without the network security credentials, even if the IMS system is Version 15 or later. If network security credentials are sent from IMS TM resource adapter Version 15 and the IMS system is V14 or earlier system, you must modify the HWSJAVA0 user message exit to remove the network security credentials from the security-data section of the OTMA message prefix.

If network security credentials are sent from a user-written client application that uses the HWSSMPL0 or the HWSSMPL1 user message exit, the credentials can be passed to IMS and audited in IMS log records only if IMS and IMS Connect are both Version 15 or later. If network security credentials are sent from an application that uses HWSSMPL0 or the HWSSMPL1 and IMS Connect is Version 14 or earlier, the IRM extensions that contain the network security credentials are ignored, even if the IMS system is Version 15 or later. If network security credentials are sent from an application that uses HWSSMPL0 or the HWSSMPL1 and the IMS system is Version 14 or earlier, the user message exit removes the security credentials from the OTMA message prefix.

If network security credentials are included in IMS callout messages to IMS TM resource adapter Version 14 or earlier, the credentials are removed from the callout messages.

Open Database coexistence considerations

Coexistence restrictions apply to the use of Open Database.

The IMS Universal drivers that come with IMS 15 can be used by Java applications that access IMS 14 databases as long as all the IMS systems are part of a mixed-version IMSplex that includes an IMS 15 system (along with its ODBM and IMS Connect address spaces).

Open Database Manager (ODBM) can only connect to the IMS systems that are of the same version as ODBM itself. In a mixed-version IMSplex, to limit ODBM connection to the IMS systems of the same version, list the eligible IMS systems as data stores in the CSLDC*xxx* member of the IMS PROCLIB data set.

OTMA coexistence considerations

When an IMS 15 OTMA coexists with earlier versions, certain considerations apply.

IMS Version 12 and IMS Version 13 instances of IMS Connect can connect to OTMA tpipes that support parallel processing of RESUME TPIPE requests after the appropriate coexistence APARs are applied. The APARs are required only for IMS Version 12 and IMS Version 13 instances of IMS Connect that connect to tpipes in which tpipe parallelism is enabled.

For connections from IMS Version 12 and IMS Version 13 instances of IMS Connect, support for the parallel processing of RESUME TPIPE requests can be enabled only from the OTMA client descriptors.

Previous versions of IMS Connect require these compatibility fixes:

- IMS Connect Version 13 APAR/PTF PM93878/UK98632
- IMS Connect Version 12 APAR/PTF PM93880/UK98633

Shared message queue coexistence considerations

Instances of IMS Version 13, IMS 14, and IMS 15 can share an IMS message queue in an IMSplex.

Syntax Checker coexistence considerations

The IMS 15 Syntax Checker supports IMS Version 13, IMS 14, and IMS 15.

Be sure that the version shown is correct when you use the Syntax Checker to check the parameters of earlier versions.

Restrictions for IMS 15 during coexistence

There are no general restrictions for IMS 15 in a coexistence environment; however, certain restrictions apply to new functions.

The HALDB support for 8-GB OSAM data set enhancement supports coexistence with IMS Version 13 systems in data sharing environments only if SPE APAR PI23918 has been applied to all the IMS Version 13 resident libraries (RESLIBS) that access the RECON data set. The minimum version (MINVERS) in the RECON data set must be 14.1 or it must be 13.1 with the CDSLID value set to 2.

Chapter 7. Command changes in IMS 15

In IMS 15, a number of commands have been enhanced to support new functionality and some commands have been removed.

Most of the command enhancements are to type-2 commands in support of the IMS strategy of enhancing the capability of single point of control (SPOC) applications that issue type-2 commands through the Operations Manager (OM) API or the REXX SPOC API.

If a command appears in more than one of the following subsections, the command was enhanced to support multiple new or changed functions in IMS 15.

Subsections:

/DISPLAY TMEMBER command enhancements

The **/DISPLAY TMEMBER** command is enhanced with the following status terms, which can be displayed when a transaction pipe (tpipe) name is specified on the TPIPE keyword:

MCP
Indicates that in a shared-queues environment, the transaction pipe has output messages on the global queue.

The status term **SYW** was removed.

For more information, see /DISPLAY TMEMBER command (Commands).

DBRC migration and coexistence

DBRC migration and coexistence changes the default value of the MINVERS parameter to "13.1" in the following commands:

- /RMxxxxxx commands (Commands)
- CHANGE.RECON command (Commands)
- INIT.RECON command (Commands)

Function level activation control enhancement

The following commands are added for the function level activation control enhancement:

- Use the QUERY IMSFUNC command (Commands) command to see all of the IMS functions that are defined in the IMS function table.
- Use the UPDATE IMSFUNC command (Commands) command to dynamically enable or disable IMS functions that are not enabled by default.

IMPORT DEFN SOURCE(CATALOG) command enhancements

The **IMPORT DEFN SOURCE(CATALOG)** command is enhanced to support the NAME() keyword, in order to allow the user to specify one or more DBDs or PSBs or both to be imported by name, instead of importing all of the DBD and PSB ACBs from the staging directory.

The **IMPORT DEFN SOURCE(CATALOG)** command is also enhanced to add a new NOCHECK to OPTION(). The **IMPORT DEFN** command is used to import changed DBD members with no associated PSB members that are rebuilt by using the DFS3UACB utility with BLDPSB=NO or DDL ALTER. The enhanced **IMPORT DEFN** command to import database changes for BUILD DBD improves performance for a catalog directory with a large number of members.

The new function is enabled when the new OPTION(NOCHECK) is specified in the IMPORT DEFN SOURCE(CATALOG) command.

IMS Connect command enhancements

The following type-2 commands are enhanced for IMS Connect in IMS 15:

- The CREATE IMSCON TYPE(PORT) command (Commands) returns a new completion code when the number of ports that are defined to IMS Connect reaches 200, the new maximum number for defined ports.
- The QUERY IMSCON TYPE(CONFIG) command (Commands) is enhanced to add the following filters:
  - The ODBMAPPL filter to the SHOW keyword. You can use the ODBMAPPL filter to display the value that is specified on the APPL= parameter of the ODACCESS statement of the HWSCFG*xx* configuration member.
  - The RACFGENRC filter to the SHOW keyword. You can use the RACFGENRC filter to query whether the RACF generic return code is returned if RACF is used to verify sign-ons from IMS Connect clients and the user ID or password provided is invalid.
- The UPDATE IMSCON TYPE(CONFIG) command (Commands) is enhanced to add the following attributes:
  - The ODBMAPPL attribute to the SET keyword. You can use the ODBMAPPL attribute to set the application name that is used by IMS Connect on the RACROUTE REQUEST=VERIFY RACF call to verify DRDA client connections to IMS DB.
  - The RACFGENRC attribute to the SET keyword. You can use the RACFGENRC attribute to define whether the RACF generic return code is returned if RACF is used to verify sign-ons from IMS Connect clients and the user ID or password provided is invalid.

INIT OLC command enhancement

The **INIT OLC TYPE(ACBMBR)** command has new option called BLDPSBNO with APAR PH16612.

The BLDPSBNO option enables you to change DBDs that do not have structural updates.

OTMA command enhancements

The OTMA ACEE flood control enhancement introduces changes to the following commands:

- /DISPLAY OTMA command (Commands)
- /SECURE command (Commands)

The following output fields are changed in the **/DISPLAY OTMA** command:

- The **ACEEAGE** output field is changed to **ACEEAG**.
- The **TOA** output field is changed to **TA**. Its description is updated.
- The maximum displayed count value of the **TPCNT** output field is changed from 99999 to 9999999.
- The response ETs in examples are updated with the parameters **TPCNT**, **ACEEAG**, **MAXTP**, **TA**, **ACEECT**, **BETP**, and **WGF** displayed.
- Two examples are deleted.
- One example for displaying the TPIPE limits is added.

Program Creation user exit routine (PGMCREAT) enhancement

Program Creation user exit routine (PGMCREAT) enhances the following commands:

- QUERY DB command (Commands) and QUERY PGM command (Commands) commands can now display a new definition type of PGMCREAT.
- QUERY USEREXIT command (Commands) and REFRESH USEREXIT command (Commands) commands can show PGMCREAT as new Type. For example,

```
TYPE(exit_type)
PGMCREAT - Program Creation user exit
```

RSR commands removed in IMS 15

Commands, command keywords, and command output that are specific to the discontinued Remote Site Recovery function have been removed or are otherwise no longer effective.

Support for RSR keywords on commands that are not specific to RSR has been removed. Some RSR-specific keywords return a message or code indicating the RSR is no longer supported, while other keywords are ignored.

The following commands that are specific to RSR have been removed from IMS 15:

- CHANGE.PRILOG TSLDS
- CHANGE.SECLOG TSLDS
- CHANGE.SG
- DELETE.GSG
- DELETE.SG
- /DISPLAY TRACKING STATUS
- GENJCL.RECEIVE
- INIT.SG
- INIT.GSG
- LIST.GSG
- RESET.GSG
- /START ISOLOG
- /START SERVGRP
- /START XRCTRACK
- /STOP SERVGRP
- /STOP XRCTRACK

UPDATE IMS command enhancement

A new keyword, ZHYPERWRITE, has been added to the UPDATE IMS SET(LCLPARM) command. For more information, see UPDATE IMS command (Commands).

UPDATE TRAN command enhancement

The UPDATE TRAN command (Commands) is enhanced so that you can run the command with the PLCTTIME attribute specified whether or not dynamic resource definition (DRD) is enabled. Previously, if you ran the command with the PLCTTIME attribute specified and DRD was disabled, the command was not processed, and return code X'00000010' and reason code X'00004300' were returned.

DBRC managed ACB staging directory command support

You can specify two new mutually exclusive optional keywords, STAGING or ACTIVE, in the following DBRC commands to get database definition information from the staging directory or the active directory:

- CHANGE.DBDS
- CHANGE.PART
- INIT.DB
- INIT.DBDS
- INIT.PART
- NOTIFY.REORG

QUERY command enhancement

The description of the **IMSID** parameter in the following **QUERY** command are updated:

- **QUERY DB**
- **QUERY PGM**
- **QUERY RTC**
- **QUERY TRAN**
- **QUERY DBDESC**
- **QUERY PGMDESC**
- **QUERY RTCDESC**
- **QUERY TRANDESC**

The support for the IMS Fast Monitor (FASTMON) user exit is added to the **QUERY USEREXIT** command.

REFRESH command enhancement

The support for the IMS Fast Monitor (FASTMON) user exit is added to the **REFRESH USEREXIT** command.

Database and area command changes for the Restricted Update mode

The following commands were changed to enable the Restricted Update mode for databases, partitions, and Fast Path areas:

- **UPDATE DB**
- **UPDATE AREA**
- **QUERY DB**
- **QUERY AREA**

CREATE IMCON command enhancement

The IMS compliance control block support introduces the following updates:

- A new return code X'0C000014' with the reason code X’00005000’ in **CREATE IMSCON TYPE(DATASTORE)** command

- A new completion code 53 in **CREATE IMSCON TYPE(IMSPLEX)** command

IMS ALTPCB enhancement for IMS Connect

The SENDALTP keyword is introduced in the following commands:

- **CREATE OTMADESC** command
- **UPDATE OTMADESC** command
- **VIEWHWS** command
- **VIEWDS** command
- **CREATE IMSCON TYPE(DATASTORE)** command
- **UPDATE IMSCON TYPE(CONFIG)** command
- **UPDATE IMSCON TYPE(DATASTORE)** command
- **QUERY IMSCON TYPE(CONFIG)** command
- **QUERY IMSCON TYPE(DATASTORE)** command

Chapter 8. Message and code changes in IMS 15

IMS 15 includes new and changed messages and codes. Also, many messages were deleted from IMS 15.

Messages and codes that were added or changed in earlier versions of IMS are not listed.

For messages and codes that were added or changed through the service process, the APARs or PTFs contain appropriate ++HOLD cards to indicate the updates.

Recommendation: Always check the ++HOLD cards in the service stream for information about new, deleted, or changed messages and abend codes.

New messages and codes for IMS 15

IMS 15 includes new messages, as shown in the lists that follow.

New CQS messages

The following messages are new:

CQS0224E
CQS0249E

New CSL messages

The following messages are new:

CSL2202E

CSL2505W
CSL4200W
CSL4201W
CSL4202W
CSL4203W

New DFS messages

The following messages are new:

DFS7432I
DFS686I
DFS0745E
DFS3253W
DFS3458
DFS3478
DFS4401E
DFS4470E
DFS4550W
DFS4553W
DFS4555W
DFS4588E
DFS4690I
DFS4691I
DFS4692E
DFS4723A
DFS4725I

DFS4787I
DFS4852E
DFS4861W
DFS4862W
DFS4863W
DFS4864W
DFS4865E
DFS4866E
DFS4867A
DFS4878I
DFS4879I
DFS4881I
DFS4888I
DFS4896I
DFS4897I
DFS4898E
DFS4899W
DFS4892E
DFS4930I
DFS4965E
DFS4896I
DFS4897I
DFS4898E
DFS5055I
DFS5386I
DFS7411I
DFS7412I
DFS7413I
DFS7419E
DFS7420E
DFS7421E
DFS7422E
DFS7423E
DFS7424E
DFS7429E
DFS7430W
DFS7431I
DFS7433E
DFS7434W
DFS7435E
DFS7436E
DFS7438E
DFS7439E
DFS7440W
DFS7441I
DFS7442W
DFS7443E
DFS7444E
DFS7445A
DFS7447E
DFS9123E

DFS9128I

New G messages

The following messages are new:

G116
G117
G118
G119
G120
G121
G122

New FLD messages

The following messages are new:

FLD760
FLD761
FLD763
FLD764
FLD765
FLD766
FLD767
FLD768
FLD769

New HWS messages

The following messages are new:

HWSX0908W
HWSX0915W
HWSX0916W

New abend codes

The following abend codes are new:

0133
0397
0421
0423
0424
0425
0426
512
1155

New AIB return and reason codes

The following status codes are new:

0108-071D

New component codes

The following component codes are new:

Return and reason codes for IMS Connect exits
SQL -9012
SQL -9013

Changed messages and codes for IMS 15

This release includes changed DSP messages, as shown in the lists that follow.

Changed BPE messages

BPE 0042E
BPE 0045E
BPE 3400

Changed CQS messages

The following messages are changed:

CQS0035E

Changed DFS messages

The following messages are changed:

DFS0413I
DFS627W
DFS686W
DFS0730I
DFS0762I
DFS0919I
DFS982I
DFS1132I
DFS1269E
DFS1769W
DFS1796I
DFS1919I
DFS1934E
DFS2205I
DFS2342E
DFS2385E
DFS2411I
DFS2679A
DFS2854A
DFS2930I
DFS3177E
DFS3254I
DFS3303I
DFS3377
DFS3398E
DFS3435A
DFS3498W

DFS3505E
DFS3551E
DFS3613I
DFS3649A
DFS3656
DFS4198E
DFS4382W
DFS4383E
DFS4384I
DFS4385W
DFS4386I
DFS4515W
DFS4516E
DFS4517I
DFS4570E
DFS4573E
DFS4879I
DFS4881I

DFS5100E
DFS7412I
DFS7413I

DFS4427E
DFS4585W
DFS4593E
DFS4610E
DFS4615E
DFS554A
DFS3176E
DFS3438
DFS4332E
DFS3446
DFS4447E
DFS4549E
DFS4774E
DFS4775E
DFS4830I
DFS4851E
DFS4899W
DFS7443E

Changed DSP messages

The following messages are changed:

DSP0012I
DSP0141I

Changed FLD messages

The following messages are changed:

FLD602
FLD603

FLD604
FLD605

Changed HWS messages

The following messages are changed:

HWSC0010I
HWSP1503E
HWSX0909E

Changed abend codes

The following abend codes are changed:

U0021
U0070
U0071
U0073
U0078
U0109
U0166
U0113
U0711
U0718
U0757
U1002
U1060
U1143
U3303

Changed AIB return and reason codes

The following status codes are changed:

0110/0050

Changed component codes

The following component codes are changed:

BPESTART codes
OTMA C/I return codes
OTMA 001A
OTMA 0024
OTMA 0028
Return and reason codes for IMS Connect exits
IMS TM Resource Adapter return and reason codes
SQL -9000
SQL -9005
SQL -9055

Deleted messages and codes for IMS 15

The messages that are listed in the following sections were removed from IMS 15.

The following messages were deleted in this release:

DFS2211I
DFS4555W
G040
G043
G904
G042
G1205
G1212

LGEN messages deleted

The following messages were removed with the removal of support for large system definitions (LGEN).

DFS3512I
DFS3514I
DFS3516I
DFS3518I
DFS3520I
DFS3522I
DFS3524I
DFS3526I
DFS3528I
DFS3530I
DFS3532I
DFS3534I
DFS3536I
DFS3538I
DFS3540I
DFS3546I
DFS3548I
DFS3550I
DFS3552I
DFS3554I
DFS3556I
DFS3558I
DFS3559A
DFS3560I
DFS3562I
DFS3564I
DFS3566I
DFS3567I
DFS3568I
DFS3569I
DFS3570I
DFS3572I
DFS3574I
DFS3577A
DFS3593I
DFS3599I
G008
G1211

RSR messages deleted

The following messages and abends were removed with the removal of support for Remote Site Recovery (RSR). These messages include messages issued by the Transport Manager Subsystem and other RSR services, such as online forward recovery, log router, DBRC service groups.

Abends

- 360
- 361
- 362
- 363
- 364
- 365
- 378
- 379
- 380
- 381
- 388
- 3090
- 3091
- 3399

DFS messages (IMS)

- DFS170
- DFS176
- DFS2903I
- DFS2908I
- DFS2909I
- DFS2910I
- DFS2911I
- DFS2912I
- DFS2913I
- DFS2914I
- DFS2915I
- DFS2916W
- DFS2917I
- DFS2918A
- DFS2922A
- DFS2923I
- DFS2924I
- DFS2925I
- DFS2926I
- DFS2927I
- DFS2928I
- DFS2929A
- DFS2931I
- DFS2932I
- DFS2933I
- DFS2935I
- DFS2936I
- DFS2937I
- DFS2953I
- DFS2954I
- DFS2955W
- DFS2956I
- DFS2959I
- DFS2960A
- DFS2961I
- DFS2962I
- DFS2963A
- DFS2964I
- DFS2965A
- DFS2966A
- DFS2967A
- DFS2968A
- DFS2969A
- DFS2980E
- DFS2981E
- DFS2982E
- DFS2983E
- DFS2984I
- DFS2989I
- DFS4010W
- DFS4011I
- DFS4012I
- DFS4013W
- DFS4014I
- DFS4015I
- DFS4016A
- DFS4017A
- DFS4018I
- DFS4019I
- DFS4020I
- DFS4021I
- DFS4022I
- DFS4024I
- DFS4025I
- DFS4026I
- DFS4027I
- DFS4028I
- DFS4029I
- DFS4030A
- DFS4031A
- DFS4032A
- DFS4033I
- DFS4034A
- DFS4034I
- DFS4035A
- DFS4036I
- DFS4037A
- DFS4039A
- DFS4041I
- DFS4042A
- DFS4043A
- DFS4044A
- DFS4045A
- DFS4046A
- DFS4047A
- DFS4048I
- DFS4049I
- DFS4050A
- DFS4051I
- DFS4052A
- DFS4053A
- DFS4054A
- DFS4055I
- DFS4056I
- DFS4057A
- DFS4058A
- DFS4060I
- DFS4061A
- DFS4062W
- DFS4063I
- DFS4064W
- DFS4065A
- DFS4066I
- DFS4067A
- DFS4068A
- DFS4069A
- DFS4070A
- DFS4071I

DFS4072A
DFS4073A
DFS4074W
DFS4075A
DFS4076A
DFS4077I
DFS4078I
DFS4079A
DFS4085W
DFS4086W
DFS4087A
DFS4088A
DFS4089A
DFS4090A
DFS4091I
DFS4092A
DFS4094A
DFS4095A
DFS4096A
DFS4097I
DFS4098A
DFS4099A
DFS4100I
DFS4101A
DFS4102A
DFS4103I
DFS4104A
DFS4105A
DFS4106I
DFS4107A
DFS4108A
DFS4109
DFS4111I
DFS4112A
DFS4113I
DFS4114A
DFS4115I
DFS4121I
DFS4122A
DFS4123I
DFS4124I
DFS4125I
DFS4126I
DFS4127A

DSP messages (DBRC)

DFS4130I
DFS4131A
DFS4132A
DFS4133A
DFS4134I
DFS4135I
DFS4136I
DFS4150I
DFS4152A
DFS4153W
DSPM058I
DSPM059I
DSP1001I
DSP1002I
DSP1030I
DSP1004I
DSP1005I
DSP1006I
DSP1007I
DSP1009I
DSP1010I
DSP1011I
DSP1012I
DSP1013I
DSP1014I
DSP1016I
DSP1017I
DSP1021I
DSP1022I
DSP1025I
DSP1027I
DSP1028I
DSP1029I
DSP1030I
DSP1032I
DSP1035I
DSP1036I
DSP1037I
DSP1038I
DSP1042I
DSP1043I
DSP1044I

ELX messages (TMS)

- ELX0001A
- ELX0002A
- ELX0003A
- ELX0004A
- ELX0005A
- ELX0100A
- ELX0101W
- ELX0102W
- ELX0103I
- ELX0104A
- ELX0105I
- ELX0106A
- ELX0107I
- ELX0108I
- ELX0109I
- ELX0111A
- ELX0112I
- ELX0113A
- ELX0114I
- ELX0115I
- ELX0116A
- ELX0118A
- ELX0119I
- ELX0120I
- ELX0122I
- ELX0128I
- ELX0129I
- ELX0130I
- ELX0150I
- ELX0170I
- ELX0171A
- ELX0181A
- ELX0183A
- ELX0184I
- ELX0185I
- ELX0187I
- ELX0188I
- ELX0189I
- ELX0200I
- ELX0201W
- ELX0202I
- ELX0203W
- ELX0204I
- ELX0205I
- ELX0209I
- ELX0210A
- ELX0211I
- ELX0212A
- ELX0213A
- ELX600A
- ELX1001E
- ELX1002I
- ELX1003W
- ELX1004W
- ELX1005W
- ELX1010I
- ELXC106I
- ELXC109I
- ELXC112A
- ELXC160I
- ELXC161I
- ELXC162A
- ELXC181I
- ELXC315I

G messages (SYSGEN)

- G1205
- G1212

Chapter 9. Log record changes in IMS 15

The following table lists the log records that are new or changed in IMS 15.

Table 11. New or changed log records for IMS 15

Log record	Description of enhancement
X'01'	Enhanced to record distributed network security credentials if the credentials are passed to IMS in the OTMA message prefix.
X'03'	Enhanced to record distributed network security credentials if the credentials are passed to IMS in the OTMA message prefix.
X'07'	A new field DLREXTOF is added. DLREXTOF contains an offset to an extension of the call statistics section. The offset value can be used to determine whether additional information exists in the log record extension. Zero indicates no extension is added to the log record. A non-zero offset value can also be used to generate the mapping address to the new extension.
X'08'	Enhanced to indicate the use of Parallel DL/I mode (PARDLI) option(LINTPDLI) with a flag at offset X'06'.
X'22'	Enhanced to record runtime resources creation status after the PGMCREAT user exit returns to IMS: • An X'22' log record, with the map byte field set to X'20', is written when a runtime database resource is created by IMS after the PGMCREAT user exit returns to IMS and indicates that a database resource is to be created. • An X'22' log record, with the map byte field set to X'21', is written when a runtime program resource is created by IMS after the PGMCREAT user exit returns to IMS and indicates that a program resource is to be created.
X'42'	Enhanced to include the current IMS function level at offset X'104'.
X'4500'	Enhanced to include the current IMS function level at offset X'C0' plus some reserved space.
X'4050'	Added to log the following information: • The IMS functions that are enabled so that the function enablement value can be retrieved at IMS restart. • The current IMS function level.
X'4507'	The following fields are added or removed for the IMS Logger enhancements of encryption and use of Media Manager to write to WADS: • ST4507_WADSCIS (new). • ST4507_FLG2 (new). • ST4507_ENC_WADS_MTX (new) • ST4507_WADSTRACKS (removed). • ST4507_WADSBLKSTRK (removed).
X'4511'	Enhanced to include an optional section for DLI/SAS region private storage statistics. A new field, ST4511_DSOFF, is added to contain the offset to the DLI/SAS region private storage section (mapped by ST4511L DSECT). The offset is 0 if no DLI/SAS region private storage section exists.
X'451A'	New log record X'451A' added for OTMA global statistics information.

Table 11. New or changed log records for IMS 15 (continued)	
Log record	**Description of enhancement**
X'451B'	New log record X'451B' added for OTMA member statistics information.
X'45FF'	Three new feature flags are added to indicate the following status: • Enablement of Fast Path. • Use of Fast Path Shared EMHQ. • Use of Fast Path 64-bit DEDB buffers. This log record is also enhanced to include the following information for IMS functions: • At offset X'50', the current IMS function level. • At offset X'54', the offset to the IMS functions enabled bitmap from the start of the X'45FF' log record. • At offset X'30', some reserved space.
X'4E90'	A new field is added to contain the IMS installed level. The following fields are added or renamed to support the new field: • Existing fields SL90S_SIDN and SL90S_SIDS are renamed to SL90S_OSIDN and SL90S_OSIDS, respectively. • EQUate SL90S_OLEN is added to represent the pre-PH17307 size of the log record. • A new field, SL90S_INS_LVL, is added to contain the IMS installed level. • A new field, SL90S_SID_OFFSET, is added to represent the offset of the MSC section from the start of the SL90 section. • The MSC SID section is defined by fields SL90S_NSIDN and SL90S_NSIDS. Comments in the DFSLOG4E macro explain how to determine if the X’4E90’ record is the pre- or post-PH17307 format.
X'56FA'	A new field TPCEXTOF is added. TPCEXTOF contains an offset to an extension of the accounting statistics section. The offset value can be used to determine whether additional information exists in the log record extension. Zero indicates no extension is added to the log record. A non-zero offset value can also be used to generate the mapping address to the new extension.
X'5901'	Enhanced to record distributed network security credentials in the following situations: • If a Fast Path message that contains the credentials is processed by the Fast Path expedited message handler (EMH) on the local IMS system. • If a Fast Path message that contains the credentials is processed by using the EMH queue (EMHQ) in a shared-queues environment, the credentials are included in the log record in the processing, back-end IMS system.
X'5911'	Enhanced to record distributed network security credentials in a front-end IMS system if a Fast Path message that contains network security credentials is processed by using the EMH queue (EMHQ) in a shared-queues environment.

Table 11. New or changed log records for IMS 15 (continued)	
Log record	**Description of enhancement**
X '67D0'	**DFS67D0**. A new one byte field, D0CRGTYP, has been added to the subtype x'0C' log record written by DFSNDMI0 during NDM user exit interface processing to indicate the type of IMS dependent region processed. The D0CRGTYP field will contain one of the following values: • x'88' = Java Message Processing Region (JMP) • x'80' = Message Processing Region (MPP) • x'50' = Message Driven Fast Path Region (IFP) • x'40' = Message Driven Batch Message Processing Region (BMP)

In IMS Version 13 and later, certain existing statistics fields in the type X'07' and the type X'56FA' records now include I/O counts and times relating to Fast Path DEDB I/O that is issued by an IMS dependent region. Prior to IMS Version 13, Fast Path DEDB I/O statistics were not included in these fields.

Table 12. Fast Path DEDB statistics recorded in X'07' and X'56FA' log records

X'07' record field	X'56FA' record field	Description
DLRVSAMR	TPVSAMR	VSAM READ I/O count
DLRVSAMW	TPVSAMW	VSAM WRITE I/O count
DLRTOTIO	TPTOTIO	Total DLI I/O count
DLRTMEIO	TPTDBIO	Elapsed DB I/O time

Note: Only Fast Path I/O that is issued while under the dependent region is included in these statistics. Statistics about Fast Path write I/Os that are issued asynchronously by the IMS control region are not included.

For details about the DSECT names that are associated with these log records and descriptions of why the log record was issued, see the topic Log records (Diagnosis) in *IMS Diagnosis* information.

Related concepts

“Network security credential propagation enhancement” on page 145
In IMS 15, you can associate the security credentials that are entered by a user in a distributed environment with the end-to-end processing of a transaction in IMS. The distributed security credentials can even be propagated to synchronous callout requests that are initiated by the ICAL call of the IMS DL/I interface.

Part 2. IMS 15 enhancements

The enhancements to introduced in IMS 15 span the following areas of IMS: system definition, administration, troubleshooting, and reference.

The following topics provide planning information for the enhancements to IMS 15.

Chapter 10. IMS enhancement PTFs

Until a new version of IMS is released, IBM continues to enhance the most recently released version of IMS. The enhancements, which can include one or more new IMS functions or support for new technologies or products, are released as PTFs.

The following topics provide an overview of the IMS continuous delivery model and a list of the newest IMS functions.

The IMS continuous enhancement process

IMS uses a continuous delivery model to enhance the most recent in-service version of IMS. In the continuous delivery model, as soon as new IMS function or support for new technology is developed and tested, it is immediately released in a PTF.

Continuous delivery enhancements are applied only to the most recent in-service version of IMS. As soon as a new version of IMS is released, continuous delivery enhancements are applied only to the new version of IMS, and the previous version is designated as a long term support release and is no longer enhanced.

The continuous release of enhancements delivers the IMS functionality and IMS support for new technology that your business needs when your business needs it, without having to wait for a new version of IMS.

The continuous release of enhancements also delivers even higher quality code, because enhancements are delivered when they are ready, without the pressure to match the development and test schedule of a particular enhancement to the schedule of a major release that was set before development on the enhancement even began.

Enhancements that are delivered in function-level releases do not require you to reinstall IMS to adopt new functions or enable new support. Most new functionality or support for new technology that would require you to reinstall IMS or that would be particularly disruptive to your IMS installation is held for delivery on a release boundary.

Some new IMS functions affect IMS Tools. To keep your IMS Tools working as expected, you must apply the APARs/PTFs specified in the 'IMS Tools' column. For a list of functions delivered as part of the continuous delivery process for the IMS Tools family of products, see IMS Tools: New Functions Available via Continuous Delivery.

Some new functionality remains disabled by default after you install the PTF, so that you can enable it when you're ready. You can dynamically enable some of the disabled enhancements by using the **UPDATE IMSFUNC** command. Or, you can enable the function statically at IMS cold start by defining the parameter for the function in the applicable member of the IMS PROCLIB data set. Other new functionality, due to either technical or strategic requirements or because it has no impact until you choose to use it, is enabled by default after you install the PTF.

IMS 15 Database Manager continuous delivery functions

IMS 15 Database Manager functions are delivered using PTFs as part of the IMS continuous delivery enhancement process and allow you to use new enhancements faster and more frequently.

Table 13. IMS Database Manager continuous delivery enhancements

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"IMS Catalog Maintenance utility (DFS3CM00) enhancement" on page 121 The IMS Catalog Maintenance utility (DFS3CM00) fixes incorrect entities in the catalog such as header timestamps and PARTYPE values. It can be run in either a DL/I region or a BMP region.	PH47533/UI91647 May 2023	15.1 and later	Yes	Not impacted
"Bypass extent check for DEDB data sets" on page 121 This enhancement is added to the available Fast Path options. When enabled, it specifies that normal extent checking may be suspended while data is being written.	PH26898/UI91084 March 2023	15.1 and later	No	Not impacted
"IMS catalog API enhancement" on page 122 The GET functions of the IMS catalog API are enhanced so that you do not need to return the extended attribute table in a DBD. This parameter is valid only for the **FORMAT=DBDLIB** parameter.	PH39492/UI80985 June 2022	15.1 and later	Yes	Not impacted
"IMS Catalog Library Builder utility (DFS3LU00) enhancement" on page 123 The IMS Catalog Library Builder utility (DFS3LU00) is enhanced to build GSAM resources.	PH30248/UI79185 February 2022	15.1 and later	Yes	Not impacted
"IMS restricted updates" on page 123 This enhancement ensures that the consistency of data is maintained between active and standby sites in an IMS replication environment by allowing only the replication program, database utilities, and authorized users to make updates to the databases at the standby site.	PH26604/UI79023 January 2022	15.1 and later	No	Not impacted
"Increased number of areas for Fast Path DEDBs" on page 126 This enhancement allows up to 9999 areas per database.	PH12671/UI78774, UI78775 January 2022	15.1 and later	Yes	IMS Fast Path Solution Pack: PH35790/UI78785 IMS Recovery Solution Pack: PH43903/UI79415 IMS Tools Base: PH37927/UI77431, PH36800/UI75486 Others: Not impacted

Table 13. IMS Database Manager continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"IMS catalog API enhancement" on page 122 The IMS catalog API can support up to 36 concurrent FUNCTION=OPEN requests. Up to 36 OPEN requests can be active at one time if the system-generated DDname is available and there are no environment limits.	PH25400/UI71469 September 2020	15.1 and later	Yes	Not impacted
"Catalog Populate utility batch logging enhancement for GSAM resources" on page 126 The IMS Catalog Populate utility (DFS3PU00) is enhanced with a new parameter **GSAMPCB** to indicate GSAM resources in MANAGEDACBS= STAGE or UPDATE mode running in DLI using PSB DFSCP001.	PH10634/UI69598 May 2020	15.1 and later	Yes	Not impacted
"DBRC managed ACB staging directory command support" on page 127 If the IMS management of ACBs is enabled, you now can get database definition information from the staging directory or the active directory.	PH17441/UI69829 June 2020	15.1 and later	No	Not impacted
"GSAM DBD enhancement" on page 127 To eliminate the need for an ACBGEN of a PSB that references a GSAM DBD, you can now use a new GSAM parameter, **gsamdbd**, with the STAGE and UPDATE parameters when you use the IMS Catalog Populate utility.	PI96542/UI67109 December 2019	15.1 and later	No	Not impacted
"IMPORT DEFN SOURCE(CATALOG) command enhancements" on page 127 Use the **IMPORT DEFN SOURCE(CATALOG)** command to activate application and database resource definitions (PSBs and DBDs) in an online IMS system by importing them from the staging data set of the IMS catalog.	PI83433/UI65332 September 2019	15.1 and later	No	Not impacted
"IMPORT DEFN SOURCE(CATALOG) command enhancements" on page 127(NOCHECK option) If **OPTION(NOCHECK)** is specified, the **IMPORT DEFN** command imports database changes that are created without their associated PSBs that are included in the staging directory by using the DFS3UACB utility with **BLDPSB=NO** parameter or DDL ALTER.	PH09142/UI64750 August 2019	15.1 and later	No	Not impacted

Table 13. IMS Database Manager continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"GSAM processing data set pre-allocation for the IMS Catalog Populate (DFS3PU00) utility" on page 128 Use the IMSDG001 DD statement to define an empty work data set to be temporarily used as an IMS.ACBLIB data set for the IMS Catalog Populate utility (DFS3PU00) when the IMS management of ACBs is enabled. Use this DD statement to define a work data set manually instead of the DFS3PU00 utility dynamically creating and deleting a work data set.	PI96063/UI55336 April 2018	15.1 and later	No	Not impacted
"Fast Path DEDB area data sets (ADS) encryption" on page 128 You can encrypt Fast Path DEDB area data sets (ADS) by specifying a key label with it.	PI83756/UI53418 April 2018	15.1 and later	No	IMS Fast Path Solution Pack: IMS Tools and data set encryption support Others: Not impacted
"IMS catalog API enhancement" on page 122(CATALOG API ENHANCEMENTS TO OPEN, LIST, GET AND CLOSE FOR BOTH) Allows both the staging and the directory data sets of the IMS catalog to be accessed by using a single OPEN, GET, and LIST request.	PI84981/ UI53467PI84986/ UI54029 February 2018	15.1 and later	Yes	Not impacted
"IMS catalog API enhancement" on page 122 (CATALOG API DFS3CATQ - AUTO DETECT OF THE BSDS HLQ) The HLQ request allows the boot strap data set (BSDS) name to be discovered automatically for the IMS catalog API OPEN request.	PI90082/UI55179 April 2018	15.1 and later	Yes	Not impacted
"ODBM Security Options Enhancement" on page 129 Use the **ODBMSECURE** parameter to specify whether IMS performs security checking on a PSB resource for an ODBM thread at the time of the allocate PSB (APSB) request.	PI94682/UI56399 June 2018	15.1 and later	No	Not impacted
"Preallocation of ADS for DEDB created by DDL with SDEP defined" on page 129 Use the **PREALLOC=** parameter in the DFSDFxxx member to preallocate area data sets (ADS) for data entry database (DEDB) with segment dependent (SDEP) segments defined.	PI79109/UI53032 January 2018	15.1 and later	No	Not impacted

Table 13. IMS Database Manager continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"Fast Path secondary index database maintenance enhancement" on page 130 You can use the **FPSISETI=** parameter to allow or prevent Fast Path secondary index database maintenance.	PI96872/UI57675 August 2018	15.1 and later	No	Not impacted
"DFS982I message text enhancement" on page 130 The batch and online message DFS982I is enhanced to include the log block sequence and log return code for I/O error reading backout queue in the message text.	PI95617/UI56768 June 2018	15.1 and later	Yes	Not impacted
"DFS1769W error code enhancement" on page 131 This enhancment adds error code 06 to the message text, which indicates that a **/DBD** or **/DBR** command is in progress against the IMS catalog database.	PH02205/UI58583 September 2018	15.1 and later	Yes	Not impacted
"Data capture suppression enhancement" on page 131 The enhancement allows you to prevent the Data Capture exit routine from being called for updates from a CCTL or ODBM address space.	PH00728/UI59377, UI59378 November 2018	15.1 and later	No	Not impacted
"DCCTL enhancement to support IMS management of ACBs" on page 132 IMS management of ACBs was not supported in a DCCTL environment. This enhancement adds support for IMS management of ACBs in a DCCTL environment.	PI89178/UI59937 November 2018	15.1 and later	No	Not impacted

IMS 15 system continuous delivery functions

IMS 15 system functions are delivered using PTFs as part of the IMS continuous delivery enhancement process and allow you to use new enhancements faster and more frequently.

Table 14. IMS system continuous delivery enhancements

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"RACF PassTicket support for commands from IMS Connect to IMS OM" on page 158 This enhanced support enables IMS Connect users to authenticate user IDs for IMS Connect connections to IMS Operations Manager by using RACF PassTickets. The IMS Connect API (ICON API) for Java is also enhanced to accommodate this enhancement.	PH51844/UI92221 July 2023	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	• IMS Administration Foundation (IMS Tools Base 1.7: PH55878/UI93094) • Others: Not impacted
"INQY ENVIRON2 enhancement" on page 160 The new INQY call ENVIRON2 subfunction returns more information about an IMS execution environment than the ENVIRON subfunction. ENVIRON2 returns fields such as primary and active JVM addressing modes, Managed ACB activation, IMS installed version, and IMS function level.	PH45098/UI90543 February 2023	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	• IMS Batch Terminal Simulator 4.1: PH57710/UI94994 • Others: Not impacted
"Non-stop PSB after an application abends in a non-message-driven BMP region" on page 161 With this enhancement, you can program the Non-Discardable Messages exit (DFSNDMX0) to control programs after an application abends in a non-message-driven BMP region. To do so, this enhancement provides new keywords that you can use with the optional **NDMX_CALLED_FOR()** parameter.	PH41104/UI90217 January 2023	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: Yes	IMS Extended Terminal Option Support 3.2: PH49840/UI82787 Others: Not impacted
"IMS JDBC Map Case enhancement" on page 161 If you use a SQL SELECT * statement and a WHERE clause with the IMS Universal JDBC driver to retrieve map case fields from a segment, the returned results include all fields by default. You can simplify your results by using the **removeInvalidCaseFields** property to remove case fields from the result set that do not satisfy the DEPENDINGON field condition in the WHERE clause.	PH48054/UI82397 September 2022	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: Yes	Not impacted
"IMS Connect send-only with error protocol enhancement" on page 162 IMS Connect clients can use the new send-only with error protocol to send transactions and receive errors that occur in IMS Connect. By using the send-only with error protocol, clients could receive responses for errors that occur in IMS Connect while maintaining the high throughput of the send only protocol.	PH41890/UI81659 July 2022	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: Not applicable	Not impacted

Table 14. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"IMS compliance control blocks support" on page 162 Operation Manager and IMS address spaces copy and consolidate internal compliance audit settings into new compliance data control blocks that are source-shipped. These address spaces then provide the address of the control blocks by using a z/OS® name and token pair with the name BPECOMPLIANCEDAT.	PH42600/UI80770 May 2022	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Not applicable	• IBM Security zSecure Suite 2.5.0: OA63173/ UJ08291 • IBM Z® Security and Compliance Center (IBM zSCC)
"IMS Fast Monitor (FASTMON) user exit enhancement" on page 163 The IMS Fast Monitor user exit (FASTMON) provides a programming interface to capture the same data that is available to the IMS Monitor. The IMS Fast Monitor (FASTMON) user exit, like the IMS Monitor (IMSMON) user exit, provides access to the IMS Monitor data without the need to modify IMS code.	PH24963/UI76510 July 2021	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Not applicable	Not impacted
"ACEE creation and management enhancement for ESAF Db2 interface" on page 164 The **ESAF_SIGNON_ACEE=YES | NO** option is added to the DFSJVMEV member of the IMS PROCLIB data set. You can use this parameter to enable the IMS system to create and manage the ACEE in a persistent JVM dependent region for ESAF threads.	PH33024/UI76067 June 2021	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	Not impacted
"HEX and binary literal support in JDBC SQL queries" on page 165 IMS Universal JDBC Drivers support the usage of HEX and binary literals in SQL syntax. The supported SQL statements for literals include SELECT, INSERT, UPDATE, DELETE, and fields in the WHERE clause.	PH 25586/UI71410 September 2020	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: Yes	Not impacted
"IMS support for IBM z/OS Workload Interaction Correlator" on page 165 IBM z/OS Workload Interaction Correlator gathers statistical data from participating applications, and generates synchronized, standardized, summarized data across z/OS and middleware stack.	PH15062/UI70312 July 2020	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	Not impacted

Table 14. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"IMS installed level enhancement in the IMS Monitor log record" on page 158 The IMS installed level is added to the IMS Monitor's start record, the X'4E90' record.	PH17307/UI68217 March 2020	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	IMS Performance Analyzer 4.4: PH22481/UI68673 IMS Problem Investigator 2.4: PH23704/UI69102 IMS Problem Investigator 2.5: PH23716/UI69234
"INIT OLC TYPE(ACBMBR) command enhancement" on page 166 The INIT OLC TYPE(ACBMBR) command has a new option called **BLDPSBNO**. The BLDPSBNO option enables you to change DBDs that do not have structural updates.	PH16612/UI67189, UI67190 December 2019	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: No	Not impacted
"REXXIMS MAPDEF packed decimal function enhancement" on page 166 The IMS adapter REXXIMS is enhanced to increase the max MAPDEF length value to 16 bytes for packed (P) and 32 bytes for zoned (Z) data types.	PH16409/UI66831 December 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	Not impacted
"Data privacy for diagnostics support for IMS 64-bit storage" on page 167 To protect sensitive diagnostic data that is sent to IBM or other third-party vendors, you can use a sample job that runs against an IMS dump to redact 64-bit storage objects that have been tagged as sensitive by IMS. Requests for certain 64-bit storage objects in IMS are made by specifying the **IARV64 SENSITIVE=** parameter to tag the storage as possibly containing or not containing customer-sensitive data.	PH14059/UI65556 September 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	Not impacted
"Password phrase enhancement for IMS Connect" on page 153 IMS Connect is enhanced to support password phrases with 9 - 100 characters for IMS database clients using Open Database function and for IMS transaction manager user-provided clients using HWSSMPL0, HWSSMPL1, or equivalent user-defined exit routines.	PH14651/UI65540 September 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted

Table 14. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"IMS installed level API (DFSGVRM) enhancement" on page 158 Use the DFSGVRM API to get the version, release, and modification level of an IMS system.	PH14457/UI65422, UI65423, UI65424, UI65425, UI65426 September 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	IMS Recovery Expert: PH19397/UI66692 IMS Cloning Tool 1.2: PH18926/UI66638 Others: Not impacted
"ByteBuffers in the IMS Universal JDBC and DL/I Interfaces" on page 167 All users of IMS Universal Driver running IMS 15 or later can use byte buffers as an I/O area to INSERT, SELECT, and UPDATE full segment areas from an SQL query. A new interface for issuing ICAL and enhanced support for Dynamic Arrays and ArrayResultSets have also been added.	PH14157/UI64958 August 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"ODBM RAS U210 prevention enhancement" on page 153 IMS Connect has been enhanced to prevent U210 abend in IMS when UDB applications terminate with work in progress.	PH07679/UI62878 July 2019	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: No	Not impacted
"Dynamic enablement of zHyperWrite enhancement" on page 149 Dynamic enablement of zHyperWrite enhancement provides a new parameter, **ZHYPERWRITE**, to the **UPDATE IMS SET(LCLPARM)** command to allow you to dynamically enable or disable IBM zHyperWrite for the online log data sets (OLDS) and write-ahead log data set (WADS).	PH02149/UI61325 February 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"Database segment mapping enhancement" on page 167 The database segment mapping enhancement allows application developers to access an IMS database segment whose schema is determined by the key feedback data from a parent segment without knowledge of the database schema.	PH05433/UI61285 February 2019 APAR PH03426 for IMS Universal Drivers October 2018 PI97302/ UI59327 October 2018	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: No	Not impacted

Table 14. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"STOP REGION command enhancement" on page 168 The **/STOP REGION** command has a new **ABDUMP FORCE** keyword to terminate regions with a TERM PENDING or WAIT-INIT-INPROG status when a CREATE THREAD is not performed on IMS.	PH05432/UI60488 January 2019	15.1 and later	• DBCTL: Not applicable • DCCTL: Yes • Batch: Not applicable	Not impacted
"Starting Common Service Layer components enhancement " on page 169 This enhancement enables IMS to automatically start in an Resource Manager environment, the Operations Manager, Structured Call Interface (SCI), and RM address spaces of the CSL.	PH04044/UI60475 January 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"IMS restart message enhancement" on page 169 Message DFS5055I is added to enable you to determine whether an IMS restart is in progress, completed, or hung.	PH01551/UI59302 27 October 2018	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"Open Database Manager (ODBM) and JDBC driver support for INIT STATUS Group call" on page 170 ODBM allows an INIT STATUS GROUPx call from an application by using IMS Universal Drivers (UDB). Issuing the INIT STATUS GROUPA call avoids ABEND U3303 and issuing the INIT STATUS GROUPB call avoids ABEND U0777.	PH02698/ UI58748PH00366/ UI58745 October 2018	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"RACF PassTicket support for DRDA clients enhancement" on page 154 RACF® PassTickets is used to authenticate users who access an IMS database from IMS Connect clients that use the Distributed Relational Database Architecture™ (DRDA) protocol.	PI99040/UI58288 PH02135/UI58345 September 2018	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: Yes	IMS Connect Extensions 3.1: PH16143/UI65791 Others: Not impacted
"UPDATE TRAN command enhancement " on page 170 You can run the **UPDATE TRAN** command with the **PLCTTIME** attribute to specify whether or not dynamic resource definition (DRD) is enabled.	PH00581/UI58235 September 2018	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	Not impacted
"Log record PARDLI flag enhancement" on page 170 The X'08' log record has been enhanced to include a flag that indicates the use of the parallel DL/I mode (PARDLI) of the IMS application region that an application has been scheduled into.	PI99293/UI58053 28 August 2018	15.1 and later	• DBCTL: No • DCCTL: No • Batch: No	Not impacted

Table 14. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"Displaying RACF sign-on messages" on page 159 You can configure IMS to pass RACF sign-on messages to the Greeting Message exit routine (DFSGMSG0) when sign-on is successful. You can code the DFSGMSG0 user exit routine to display or process the RACF messages to improve security and password management.	PI85328/UI57462, UI57463 July 2018	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	IMS Extended Terminal Option Support 3.2: PH04092/UI60354 Others: Not impacted
"IMS Universal Database resource adapter connectivity enhancement for WebSphere Application Server Liberty" on page 171 The IMS Universal Database resource adapter is enhanced to provide type-2 and type-4 connectivity support for WebSphere Application Server Liberty.	PI95663/UI57273 July 2018	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"IVP support for 8-character TSO/E user IDs on z/OS 2.3" on page 171 The IVP supports the use of 8-character TSO/E user IDs. This requires that IMS run on z/OS® 2.3 or later.	PI94550/UI56602 June 2018	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	Not impacted
"IMS Connect message HWSC0010I enhancement" on page 157 IMS Connect message HWSC0010I is enhanced to be issued after IMS Connect initialization is complete. With this enhancement, system administrators can start automated operations after message HWSC0010I is issued to ensure that their automated operations and requests are processed by IMS Connect.	PI91859/UI55921 May 2018	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	Not impacted
"Generic return code enhancement for RACF verifications" on page 160(IMS CONNECT - RACFGENRC OPTION) The **RACFGENRC=** parameter is added to the HWS statement of the HWSCFGxx member of the IMS PROCLIB data set to allow you to specify whether a generic return code or message is returned by IMS Connect. The generic return code or message is issued if RACF is used to verify sign-ons from IMS Connect clients and the user ID or password provided is invalid.	PI94909/UI55527 April 2018	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	Not impacted

Table 14. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"Generic return code enhancement for RACF verifications" on page 160 (IMS - SGNGENRC OPTION) The **SGNGENRC=** parameter for procedures is added to allow you to specify whether a generic return code is issued by IMS if RACF is used to verify sign-ons to IMS and the user ID or password provided is invalid.	PI95173/UI55198, UI55199 April 2018	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	Not impacted
"Data set support for zHyperWrite" on page 149 Specify whether to use zHyperWrite for writing data to the write-ahead log data sets (WADS) and online log data sets (OLDS). The command output of **/DISPLAY OLDS** shows whether zHyperWrite is used when data is written to the OLDS or WADS.	PI75575/UI54239 March 2018 PI82325/UI54815 April 2018	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"Function level activation control enhancement" on page 171 Dynamically enable or disable new IMS functions that are delivered as PTFs under the IMS continuous delivery model without causing an IMS system outage. After you install a new IMS function, you control when to enable and disable the function by using the **UPDATE IMSFUNC** command.	PI83839/UI52153 December 2017	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	Not impacted

IMS 15 Transaction Manager continuous delivery functions

IMS 15 Transaction Manager functions are delivered using PTFs as part of the IMS continuous delivery enhancement process and allow you to use new enhancements faster and more frequently.

Table 15. IMS Transaction Manager continuous delivery enhancements

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"OTMA checkpoint statistics enhancement" on page 137 Two new x'45' statistic record subtypes are added, one for Global OTMA information (x'451A') and one for OTMA Member information (x'451B'). This provides an easier way to track OTMA statistics to aid in fine-tuning the system.	PH45589/UI93202 October 2023	15.1 and later	No	• IMS Problem Investigator with APAR PH55496/PTF UI92916 • IMS Performance Analyzer
"IMS ALTPCB enhancement for IMS Connect" on page 137 IMS introduces a new function, SENDALTP, for IMS Connect customers to obtain an ALTPCB output without issuing Resume TPIPE calls. When IMS receives a commit-then-send send-receive call from IMS Connect, an ALTPCB output triggered by the input transaction can be sent back to the initiating IMS Connect client by using the input TPIPE name.	PH39434/UI83360, PH39438/UI83364 November 2022	15.1 and later	No	Not impacted
31-bit COBOL and 64-bit Java interoperability (Application Programming) You can enable interoperability between 31-bit COBOL code and 64-bit Java™ code by adding value JVM=3164 to an IMS dependent region's parameter list, installing required software, and configuring the dependent region. Supported dependent region types include MPR, BMP, IFP, JBP, and JMP.	PH37140/UI78199 November 2021	15.1 and later	No	Not impacted
"Static VTAM transaction output security enhancement" on page 139 Static VTAM® terminals are enhanced with the ability to apply transaction output security checks to prevent unauthorized accesses from different users to transaction outputs. With this enhancement, you can enable output security for static VTAM terminals by specifying an optional parameter **STATICOUTSEC** in the DFSDCxxx member of the IMS PROCLIB data set.	PH24997/UI70314, UI70315 July 2020	15.1 and later	No	Not impacted

Table 15. IMS Transaction Manager continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"OTMA lightweight transaction pipe enhancement" on page 140 The OTMA lightweight transaction pipe enhancement improves the flood control of OTMA transaction pipes (tpipes). By using the OTMA lightweight tpipe function, IMS reduces the storage for each tpipe by dynamically allocating the associated ITASKs and other tpipe related storage only when they are needed.	PH17832/UI68699, UI68700 April 2020	15.1 and later	No	Not impacted
"Enhancement for the processing of OTMA commit-then-send messages in shared-queues environments" on page 141 A new OTMA ITASK DFSYDAD0 is created through OID TCB to separately process OTMA commit-then-send back-end messages in a shared queues environment. As a result, the main OTMA ITASK DFSYMOM0 can focus on other important jobs.	PH02371/UI65336 September 2019	15.1 and later	No	Not impacted
"MFS sign-on format support for RACF password phrases" on page 141 You can use MFS for RACF password phrases that are up to 100 characters long and that are submitted from 3270 and SLU 2 devices through DFS3649A or DFS3656A.	PH09313/UI64359, UI64360 July 2019	15.1 and later	No	IMS Extended Terminal Option Support 3.2: PH14600/UI64580 Others: Not impacted
"OTMA ACEE flood control enhancement" on page 143 With this enhancement, you can enable OTMA ACEE flood control in the DFSOTMA descriptor of the DFSYDTx member of the IMS PROCLIB data set. When enabled, you limit the number of RACF user IDs, which in turn limits the number of ACEEs that are cached by OTMA and prevents virtual storage in the IMS control region from running out.	PI81171/UI62316, UI62317 April 2019	15.1 and later	No	Not impacted
"Reduce LUMP storage for OTMA commit-then-send messages enhancement" on page 143 OTMA is enhanced to reduce the amount of storage that is allocated in LU 6.2 device manager private buffer pools and OTMA for commit-then-send (CM0) I/O PCB output messages.	PH00002/UI62030 March 2019	15.1 and later	No	Not impacted

Table 15. IMS Transaction Manager continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"OTMA conversational transaction timeout enhancement" on page 144 You can configure IMS Open Transaction Manager Access (OTMA) to end conversational transactions and remove from storage the control blocks associated with those transactions if the transaction is inactive for a specified period of time.	PI94954/UI61211 February 2019	15.1 and later	No	Not impacted
Tpipe processing You can split OTMA client's ACK/NAK messages to a new IMS ITASK to avoid delay for tpipe processing.	PI96089/UI57596 August 2018	15.1 and later	No	Not impacted
"OTMA transaction pipe cleanup enhancement" on page 144 An OTMA tpipe is deleted after it has been idle across three consecutive system checkpoints, even if other tpipes associated with the same tmember are being used. Consequently, idle OTMA tpipes are made available more quickly to process subsequent transactions on the IMS message queue, and IMS storage space is less likely to become flooded.	PI88409/UI54735, UI54736 April 2018	15.1 and later	No	Not impacted
IMS ICAL processing IMS ICAL processing for synchronous program switch needs to support the DFSMSCE0 exit for workload router processing.	PI82826/UI52624 January 2018	15.1 and later	No	Not impacted

IMS 15 base-level enhancements

The enhancements that are included in the initial *base-level* release of IMS 15 affect all areas of the product: IMS Database Manager, IMS Transaction Manager, and IMS system.

IMS Database Manager enhancements overview

IMS 15 Database Manager includes the following enhancements:

- "DBRC migration and coexistence" on page 134
- "DEDB Alter utility enhancements" on page 132

IMS Transaction Manager enhancements overview

The IMS 15 Transaction Manager includes the following enhancements:

- "Program Creation user exit routine (PGMCREAT) enhancement" on page 177

IMS system enhancements overview

IMS 15 includes enhancements to the overall IMS system, including both the IMS Database Manager and the IMS Transaction Manager.

- "Consolidation of IMS logger parameters in the DFSDFxxx PROCLIB member" on page 173
- "CQS automatic structure checkpoint" on page 145
- "CQS return code enhancements for z/OS Logger write errors" on page 174
- "Network security credential propagation enhancement" on page 145
- "Reduce need for IMS system definition enhancements" on page 178
- "WADS support for zHyperWrite" on page 150

Chapter 11. IMS Database Manager enhancements

The IMS 15 enhancements to IMS Database Manager (IMS DB) include enhancements that enable dynamic database definition, enhancements to the Open Database Manager (ODBM), and other enhancements that improve usability and performance for users of IMS DB.

The Chapter 13, “IMS system enhancements,” on page 149 in IMS 15 might also impact IMS DB.

IMS Catalog Maintenance utility (DFS3CM00) enhancement

The IMS Catalog Maintenance utility (DFS3CM00) is added to fix incorrect entities in the catalog such as header timestamps and PARTYPE values.

The DFS3CM00 utility can be run in either a DL/I region or a BMP region.

This enhancement is delivered with APAR PH47533/PTF UI91647 and enabled by IMS 15.1.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Bypass extent check for DEDB data sets

In IMS 15, a bypass extent check enhancement for DEDB data sets is added to the available Fast Path options. When enabled, this enhancement specifies that normal extent checking may be suspended while data is being written.

Enabling this option could result in improved performance in certain cases when multiple applications are simultaneously reading or writing the same disk extent ranges. For example, users of HSSP or HSRE with a Metro Mirror configuration may benefit from use of this feature.

Normally, when your program writes on DASD, the DASD subsystem performs extent serialization that prevents all access to that extent from all other programs on all systems while data is being written. This prevents other programs from reading and writing within the extent and from seeing certain types of incomplete updates. But if bypass extent check is enabled by coding BYPASS_EXTENT=Y in the FASTPATH section of the DFSDFxxx member, the DASD subsystem will serialize access to only one track at a time, not to the whole extent.

If you know that other programs might be reading the data set at the same time that your program is writing and that a mechanism exists within those other programs to avoid or tolerate potentially incomplete updates within an extent, then enabling bypass extent check could provide improved performance due to normal extent serialization being suspended.

This enhancement is delivered with APAR PH26898 (PTF UI91084).

Restrictions

When enabled, bypass extent check will function for all supported DEDB CI sizes except for:

- **3380 DASD:** 12 KB, 16 KB, 24 KB, and 28 KB
- **3390 DASD:** 20 KB and 28 KB

Coexistence considerations

It is acceptable to have bypass extent check enabled on one IMS and disabled on the other(s), but the bypass extent check option will not become active until it is enabled on all systems.

Log records

The following log records have been changed by this enhancement in IMS 15:

- **Checkpoint record 4080:** CHKRBEC flag is added to the CHKRSTF byte to indicate bypass extent check mode.

Changes to installing and defining IMS

After applying PTF UI91084 for APAR PH26898, you can enable the bypass extent check option by specifying BYPASS_EXTENT=Y in the FASTPATH section in the DFSDFxxx member. (The default is BYPASS_EXTENT=N).

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the IMS messages and codes row in the table in "Documentation changes" on page 122.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, "Message and code changes in IMS 15," on page 85.

Documentation changes

The following table lists the publications that contain new or changed topics for the bypass extent check enhancement for DEDB data sets. Publications that are not impacted by this enhancement are not included in the table.

Table 16. Links to topics that have new or changed content for this enhancement

Publication	Links to topics	
Release planning	• General planning information for IMS 15 – "Changed messages and codes for IMS 15" on page 88 – – • IMS Version 15 enhancements – "IMS 15 Database Manager continuous delivery functions" on page 101 – "Bypass extent check for DEDB data sets" on page 121 (new) (this topic)	
System definition	• FASTPATH section of the DFSDFxxx member (System Definition)	
IMS messages and codes	**DFS messages**	DFS1919I

IMS catalog API enhancement

In IMS 15, the IMS catalog API function enhancements allow both the staging and the directory data sets of the IMS catalog to be accessed using a single OPEN, GET, and LIST requests. The HLQ request allows the boot strap data set (BSDS) name to be discovered automatically for the IMS catalog API OPEN request. The IMS catalog API can support up to 36 concurrent FUNCTION=OPEN requests. These enhancements can be used by IMS vendor-supplied tools.

The IMS catalog API function enhancement to OPEN, GET, and LIST requests is delivered by APARs/PTFs PI84981/UI53467 and PI84986/UI54029. The IMS catalog API HLQ function is delivered by APARs/PTFs PI90082/UI55179.

The OPEN function enhancement allows you to allocate and open the staging and the directory data sets of the IMS catalog by providing the new keyword BOTH for the DEFINITION parameter of the OPEN request. Previously, each OPEN request could allocate and open only either the staging data set or the directory data set, but could not open both.

The HLQ function enhancement allows IMS vendor-provided tools to acquire the high-level qualifier of the boot strap data set (BSDS) during an OPEN request without manually specifying the BSDS name in the request JCL.

The LIST and GET functions of the IMS catalog API are also enhanced, allowing you to define whether the functions retrieve information from the staging or the directory data set.

With APAR/PTF PH39492/UI80985, the GET functions of the IMS catalog API are enhanced so that you do not need to return the extended attribute table in a DBD. This parameter is valid only for the **FORMAT=DBDLIB** parameter.

The CLOSE function has also been updated to close both the staging and the directory data sets of the IMS catalog if they are both open.

Changes to programming for IMS

IMS Catalog Library Builder utility (DFS3LU00) enhancement

In IMS 15, the IMS Catalog Library Builder utility (DFS3LU00) is enhanced to build GSAM resources.

Previously, you could not build GSAM resources with the IMS Catalog Library Builder utility (DFS3LU00). This restriction is removed.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

IMS restricted updates

Install PH26604 to ensure that the consistency of data is maintained between active and standby sites in an IMS replication environment by allowing only the replication program, database utilities, and authorized users to make updates to the databases at the standby site.

Prerequisites

You must have the following prerequisites to enable the restricted update feature:

- IMS 15.1 or IMS 15.2 with PH26604
- z/OS 2.4
- RREPL parameter in the database section of the DFSDFxxx member must be set to ABEND, STATUS, or NONE
- Facility class DFS.DB.RREPL.* defined with update access permit for selective users

Setting Restricted Update mode by using type-2 commands

You can use a new attribute RREPL (Read-or-Replication only) for the database to determine whether a user can make updates. You can use the type-2 commands **UPDATE DB** and **UPDATE AREA** with the

RREPL parameter to enable or disable the Restricted Update mode on full-function databases, including partitions, and Fast Path areas:

```
UPDATE DB NAME(DB List) SET(RREPL(ABEND | STATUS | NONE))
UPDATE AREA NAME(Area List) SET(RREPL(ABEND | STATUS | NONE))
```

RREPL
Specifies whether the database (or area) is in Read-or-Replication-only mode where reads are allowed for any program, but updates are allowed only for replication programs and authorized users, and the action to take when this mode is enabled.

STATUS
If an update is attempted by a nonreplication and unauthorized program, the status code RR is returned on any DL/I call that would have resulted in an update.

ABEND
If an update is attempted by a nonreplication and unauthorized program, the program is terminated with the user abend U3303.

NONE
The database (or area) is not in a Read-or-Replication-only mode.

The following guidelines and restrictions apply to the RREPL parameter:

- The RREPL parameter cannot be combined with any other **UPDATE DB** or **UPDATE AREA** command options.
- The RREPL parameter cannot be set on a catalog database. The command will fail and indicate that it is an IMS defined resource and the action cannot be completed. RC=0 is issued when the **UPDATE DB** command is used with wildcard (*), but the catalog is not impacted.
- The RREPL parameter cannot be set on an MSDB. The command will fail and indicate that the RREPL parameter is not valid for an MSDB.
- GSAM databases are not supported. If the **UPDATE DB** command is used to enable Restricted Update mode on a GSAM database, RC=0 is issued, and no action will be taken.
- If the RREPL parameter set on a Fast Path or HALDB database, its value is propagated to Fast Path areas or to HALDB partitions.
- The RREPL parameter that is specified on a database is retained across WARM, ERE, and ERE COLDCOMM restarts.
- During COLD, ERE COLDBASE, and ERE COLDSYS restarts, the RREPL parameter will be set on all databases, areas, and partitions based on the value that is specified in the database section of the DFSDFxxx member.
- Updates are allowed from Fast Path utilities (Create, Compare, Scan, Delete, and Reorg) and full-function utilities (OLR and OIC) regardless of the RREPL value on the database.

Setting the default Restricted Update mode by using the DFSDFxxx member

A default RREPL value for all the databases and areas can be set by using the RREPL keyword in the database section of the DFSDFxxx member during a cold restart:

```
RREPL = ABEND | STATUS | NONE | NA
```

RREPL =

Specifies whether to enable the Restricted Update mode on all the databases where reads are allowed for any program, but updates are allowed only for replication programs and authorized users.

Note that the **CREATE DB** command does not set the RREPL value for the new database. You must use the **UPDATE DB** command to set it.

ABEND
Restricted Update mode is enabled, and a U3303 abend occurs when unauthorized users try to make updates.

STATUS
Restricted Update mode is enabled, and an RR status code occurs when unauthorized users try to make updates.

NONE
Restricted Update mode is not enabled, and any user can make updates. However, you can use the **UPDATE DB** and **UPDATE AREA** commands to enable the RREPL mode.

NA
This is the default value and means that Restricted Update mode is disabled. You cannot use the **UPDATE DB** and **UPDATE AREA** commands to enable the RREPL mode. If you use the **UPDATE DB** and **UPDATE AREA** commands to enable the RREPL mode, those commands will fail with reason code 2074 and the error text "RREPL is not active".

During cold restarts, the RREPL value in the database section of the DFSDFxxx member is used to set the RREPL value on all databases, partitions, and areas.

During warm, ERE, and ERE Coldcomm restarts, the RREPL value in the FSDFxxx member is used to enable or disable the Restricted Update mode. The RREPL value that is set to any value other than NA enables the Restricted Update mode. Note that the RREPL value in the DFSDFxxx member does not impact the RREPL setting on any database, partition, or area unless the value is set to NA.

Checking the Restricted Update mode by using type-2 commands

You can find the RREPL value associated with a database or area by using the type-2 QUERY DB and QUERY AREA commands, for example:

```
QUERY DB NAME(DB List) STATUS(RREPL)
QUERY DB NAME(DB List) SHOW(STATUS)

QUERY AREA NAME(Area List) STATUS(RREPL)
QUERY AREA NAME(Area List) SHOW(STATUS)
```

RREPL
Sets the STATUS() filter to return information about databases that have the Restricted Update RREPL value set to ABEND or STATUS.

Security for restricted database updates

You can restrict specific users to make DLET, ISRT, and REPL calls to databases that have Restricted Update mode enabled by setting the RREPL parameter to ABEND or STATUS.

Also, you must define the facility class DFS.DB.RREPL.*, and users must be authorized with UPDATE authority.

If an unauthorized user makes an update call to a database that uses Restricted Update mode, it will result in the 3303 abend or the RR status code depending on the RREPL parameter value.

Note that the RREPL value at the area and partition level will take precedence over the value on the database level. Also, updates are allowed from Fast Path utilities (Create, Compare, Scan, Delete, and Reorg) and full-function utilities (OLR and OIC) regardless of the RREPL value that is set on the database.

The following sample RACF command defines the facility class and grants USRT002 and USRT005 permission to update the database:

```
RDEF FACILITY DFS.DB.RREPL.* UACC(NONE)
PERMIT DFS.DB.RREPL.* CLASS(FACILITY) ID(USRT002, USRT005) ACCESS(UPDATE)
```

Log record changes

The following log record changes were made for this feature:

- Log record 22: The RREPLAF byte is added to indicate Restricted Update mode on an area.

- Checkpoint record 4006: RREPL flags are added to the CHKDDFG2 byte to indicate Restricted Update mode on an area.
- Checkpoint record 4084: The area level RREPL flag byte DMACRRAF is stored in 4084.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in IBM Docs.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Increased number of areas for Fast Path DEDBs

Before this enhancement, Fast Path Data Entry Databases (DEDBs) allowed up to 2048 areas per database. However, you can have up to 9999 areas if you apply APAR PH12671 on IMS 15.1.

The maximum size of a DEDB area is 4 GB. The maximum number of areas per database is increased from 2048 to 9999, making the maximum size of a DEDB database 39996 GB (40 TB).

You can manage larger workloads by creating DEDBs that are 5 times larger than in previous versions of IMS.

After you apply PTFs UI78774 and UI78775 for APAR PH12671 on IMS 15.1, you can enable this enhancement by using either of the following methods:

- Specify DEDBGT2K=Y in the FASTPATH section in the DFSDFxxx member. (The default is DEDBGT2K=N.)
- Issue the following **UPDATE IMSFUNC** type-2 command:

```
UPDATE IMSFUNC NAME(DEDBGT2K) SET(ENABLED(Y))
```

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Catalog Populate utility batch logging enhancement for GSAM resources

In IMS 15, the IMS Catalog Populate utility (DFS3PU00) is enhanced with a new parameter GSAMPCB to indicate GSAM resources in MANAGEDACBS= STAGE or UPDATE mode running in DLI using PSB DFSCP001.

The GSAMPCB parameter indicates that the IEFRDER batch log data set is used by the catalog update task for catalog database changes and not shared with other tasks in the utility.

The function is enabled when new GSAMPCB parameter is specified on MANAGEDACBS=(STAGE|UPDATE,LATEST|UNCOND,GSAMPCB)= control statement in Catalog Populate utility using PSB DFSCP001 in DLI mode.

Changes to utilities

A new parameter GSAMPCB is added to the IMS Catalog Populate utility (DFS3PU00).

DBRC managed ACB staging directory command support

If the IMS management of ACBs is enabled, you now can get database definition information from the staging directory or the active directory.

You can specify two new mutually exclusive optional keywords, STAGING or ACTIVE, in the following DBRC commands:

- CHANGE.DBDS
- CHANGE.PART
- INIT.DB
- INIT.DBDS
- INIT.PART
- NOTIFY.REORG

If neither keyword is specified, the active directory is read by default.

These optional keywords are not allowed if DBDLIB is being used.

GSAM DBD enhancement

To eliminate the need for an ACBGEN of a PSB that references a GSAM DBD, you can now use a new GSAM parameter, *gsamdbd*, with the STAGE and UPDATE parameters when you use the IMS Catalog Populate utility.

For example, you can specify:

- MANAGEDACBS=(STAGE,GSAM=*gsamdbd*)
- MANAGEDACBS=(UPDATE,GSAM=*gsamdbd*)

gsamdbd is the name of changed GSAM database. This database's record will be inserted into the IMS catalog, and the application control block will be written to the staging or active directory based on the MANAGEDACBS control statement parameters that you specify.

IMPORT DEFN SOURCE(CATALOG) command enhancements

The IMPORT DEFN SOURCE(CATALOG) command has new options: NAME and NOCHECK.

NAME option

The **IMPORT DEFN SOURCE(CATALOG)** command is enhanced to support the NAME() keyword to allow you to specify one or more DBDs or PSBs or both to be imported by name instead of importing all of the DBD and PSB ACBs from the staging directory.

The function is enabled when the new OPTION(NAME) is specified in the **IMPORT DEFN SOURCE(CATALOG)** command.

All the resources associated with the database DBD or program PSB resources (or both) that are specified on the NAME() keyword are also imported, except for GSAM. For GSAM DBDs and PSBs, only the named GSAM DBDs and PSBs are imported.

NOCHECK option

The **IMPORT DEFN** command can be used to import changed DBD members with no associated PSB members that are rebuilt by using the DFS3UACB utility with BLDPSB=NO or by using DDL ALTER. The **IMPORT DEFN** command with the NOCHECK option improves performance to import database changes for the BUILD DBD especially for a catalog directory with large number of members.

The function is enabled when the new OPTION(NOCHECK) is specified in the **IMPORT DEFN SOURCE(CATALOG)** command.

GSAM processing data set pre-allocation for the IMS Catalog Populate (DFS3PU00) utility

In IMS 15, you can use the IMSDG001 DD statement to define an empty work data set to be temporarily used as an IMS.ACBLIB data set for the IMS Catalog Populate utility (DFS3PU00) when the IMS management of ACBs is enabled. Use this DD statement to define a work data set manually instead of the DFS3PU00 utility dynamically creating and deleting a work data set.

IMSDG001 is an optional control statement. The empty work data set that you define by using this statement temporarily holds the IMS.ACBLIB data set members that reference a generalized sequential access method (GSAM) database. The DFS3PU00 utility then moves the ACBLIB members into the IMS directory data set after it copies the ACB library members from the libraries that are specified on the IMSACBnn DD statement.

Changes to utilities

A new control statement, IMSDG001, is added to the IMS Catalog Populate utility (DFS3PU00).

Fast Path DEDB area data sets (ADS) encryption

In IMS 15, you can encrypt Fast Path DEDB AREA data sets (ADS) by specifying a key label with it. Install APAR PI83756 to enable this feature. Fast Path DEDB area data sets (ADS) uses z/OS data set encryption, which is available in z/OS 2.2 with APAR OA50569 and dependent APARs installed, or in z/OS 2.3 or later.

Restriction

DEDB ADS encryption requires Fast Path 64-bit buffers. This is specified by FPBP64=Y in the FASTPATH section of the DFSDFxxx member in the IMS PROCLIB data set. DEDB ADS encryption is not supported when you are using 31-bit Fast Path buffers.

You must define all data sets that are encrypted by using z/OS data set encryption, including Fast Path DEDB ADS, as SMS-managed extended format data sets. Do not define Fast Path DEDB ADS with the extended addressability attribute. Ensure that the DATACLAS parameter that you use to allocate your ADS does not include the extended addressability attribute.

Migration considerations

To migrate from non-encrypted Fast Path DEDB ADS to encrypted Fast Path DEDB ADS, perform the following steps:

1. Perform one of the following methods to create encrypted ADS:
   - Define the shadow ADS with the same attributes as the non-encrypted ADS and specify key labels with the shadow ADS. Run DEDB ALTER utility.
   - Define new ADS as SMS-managed extended format DASD and specify key labels with them. Register the new ADS to DBRC by using the following command:

     INIT.ADS DBD(*xxxxxxxx*) AREA(*yyyyyyyy*) ADSN(*AREA data set name*) UNAVAIL

     Run CREATE utility.
2. Stop the non-encrypted ADS if necessary.

To fallback from encrypted Fast Path DEDB ADS to non-encrypted ADS, create new ADS without key label and use the DEDB ALTER and DEDB Area Data Set Create utilities to copy encrypted ADS to new ones.

Remember: If you use non-IMS tools or products to process the Fast Path ADS, confirm with the tool or product provider that the tool or product supports encrypted DEDBs before enabling encryption.

Coexistence considerations

Make sure all the IMS systems that share encrypted Fast Path ADS meet the following requirements:

- All the IMS systems are IMS 15 with APAR PI83756 installed.
- All the IMS systems are using Fast Path 64-bit buffers.
- All the z/OS systems are z/OS 2.2 with OA50569 installed, or z/OS 2.3 and later.

If an encrypted Fast Path ADS is shared by an IMS system that is IMS 14or earlier versions, or IMS 15 without APAR PI83756, this IMS system will not be able to open or access the ADS. Message IEC161I with return code 122 will be displayed.

Performance considerations

Additional Fast Path buffers are used when writing to an encrypted area data set. A temporary buffer is obtained at write I/O time to encrypt the data to be written. This buffer is released after the data has been written to the ADS. Each Fast Path buffer includes the buffer itself (64-bit storage) and a 31-bit ECSA control block called a DMHR, which is used to track the buffer. Therefore, encrypting ADS may increase Fast Path 64-bit buffer and ECSA usage. Use the **FPBP64M=** parameter in the FASTPATH section of the DFSDFxxx member to increase the limit for the amount of 64-bit Fast Path buffers to avoid buffer shortages if necessary. Monitor the 64-bit buffer usage statistics in the IMS 4516 statistics log records when migrating to encrypted ADS.

ODBM Security Options Enhancement

In IMS 15, the ODBM security options enhancement added a parameter, **ODBMSECURE**, to the IMS control region.

You can use the **ODBMSECURE** parameter to specify whether IMS performs security checking on a PSB resource for an ODBM thread at the time of the allocate PSB (APSB) request.

The **ODBMSECURE** parameter can be specified in either the DFSCGxxx member, or the DFSDFxxx member section <SECTION=COMMON_SERVICE_LAYER>. If you specify ODBMSECURE in both the DFSCGxxx member and the CSL section of the DFSDFxxx member, the values specified in the DFSCGxxx member override the values specified in the DFSDFxxx member.

This enhancement is delivered by APARs/PTFs PI94682/UI56399. To enable the ODBMSECURE option, both the IMS subsystem and ODBM must have PI94682 applied.

Preallocation of ADS for DEDB created by DDL with SDEP defined

In IMS 15, use the **PREALLOC=** parameter in the DFSDFxxx member to preallocate area data sets (ADS) for data entry database (DEDB) with segment dependent (SDEP) segments defined.

If a DEDB does not have an SDEP, IMS calculates the space of an ADS cluster by using the **UOW**, **ROOT**, and **SIZE** parameters in an AREA statement.

For DEDB that has SDEP segments defined, the **PREALLOC=** parameter is added to the DDL section of the DFSDFxxx member so that you can choose one of the following ways to define area data sets:

- If **PREALLOC=YES** is defined, pre-allocated area data sets are used.
- If **PREALLOC=NO** is defined, parameters such as **CYLINDERS**, **TRACKS**, and **VOLUME** are used to allocate area data sets.

PREALLOC=NO is the default.

Changes to installing and defining IMS

The **PREALLOC=** parameter is added to the DDL section of the DFSDFxxx member of the IMSPROCLIB data set.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Fast Path secondary index database maintenance enhancement

In IMS 15, install APAR/PTF PI96872/UI57675 so that you can use the **FPSISETI=** parameter to allow or prevent Fast Path secondary index database maintenance.

The Set Index Maintenance Off (SETI) statement suppresses index maintenance for any data entry database (DEDB). If a process that updates DEDB records does not access the DEDB through the secondary index database, updating the DEDB records simultaneously with the secondary index database is less efficient. It is more efficient to disable the secondary index maintenance, update the DEDB records separately, and then update the secondary index database. In this case, you might prefer using SETI statements to suppress index maintenance and later using vendor product tools or in-house applications to resynchronize the DEDB with its index database. If the SETI statement is used but you do not use resynchronizing tools, secondary index databases might become out of sync with its primary DEDB databases. With this enhancement, you can use **FPSISETI=N** in the Fast Path section of the DFSDFxxx member to disable the SETI control statement and to ensure that primary DEDB databases and its secondary indexes are synchronized.

Changes to installing and defining IMS

The new parameter, **FPSISETI=**, is added to FASTPATH section of the DFSDFxxx member.

Changes to troubleshooting for IMS

A new message DFS4723A is created to inform users of **FPSISETI=N**. Abend code 1060 is changed to be related to DFS4723A.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

DFS982I message text enhancement

In IMS 15, the batch and online message DFS982I is enhanced to include the log block sequence and log return code for I/O error reading backout queue in the message text. Install APAR/PTF PI95617/UI56768 to enable this enhancement.

The addition of log information to the message text facilitates the diagnosis of database backout problems.

Changes to troubleshooting for IMS

The message text of DFS982I is enhanced to include the log block sequence and log return code for I/O error reading backout queue.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

DFS1769W error code enhancement

In IMS 15, the DFS1769W error code enhancement adds error code 06 to the message text. Install APAR/PTF PH02205/UI58583 to enable this enhancement.

When a **/DBD** or **/DBR** command is in progress for the IMS catalog database, IMS cannot dynamically attach the catalog PSB DFSCP000 because the IMS catalog database is not available. Previously, IMS issues message DFS1796W with the error code 03. This error code is misleading because it indicates a PSB or PSBW pool space shortage. This enhancement adds error code 06 to message DFS1796W, which indicates that a **/DBD** or **/DBR** command is in progress against the IMS catalog database.

Changes to troubleshooting for IMS

New error code is added to message DFS1796W.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Data capture suppression enhancement

In IMS 15, you can use the Data capture suppression enhancement to prevent the Data Capture exit routine from being called unnecessarily. This enhancement allows you to prevent the Data Capture exit routine from being called for updates from a CCTL or ODBM address space.

Previously, the Data Capture exit routine was always called for application program activity on an IMS database if the exit routine was specified in the database definition (DBD). The exit routine would be called regardless of which program specification block (PSB) was active. Therefore, Data Capture exit routines were global and might have had a performance impact across the entire database system.

With this enhancement, the **SUPPDCAPNAME=** parameter is introduced to the DFSDF*xxx* member of the IMS PROCLIB data set. If you specify the job name of a CCTL or ODBM address space on the **SUPPDCAPNAME=** parameter, database updates invoked by the job are not captured by the Data Capture exit routine, even if the exit routine is specified on the **EXIT=** parameter of the DBD. Database or database segment updates that are invoked by jobs other than the one that is specified on the **SUPPDCAPNAME=** parameter continue to be captured by the Data Capture exit routine.

By using this enhancement to suppress database or database segment updates when those updates are made from a CCTL or ODBM address space, you can reduce CPU usage and improve the efficiency with which data is processed in your IMS environment.

This enhancement is delivered with APAR PH00728 (PTFs UI59377 and UI59378).

Do not enable this support in a replication environment if the updates made by the replication are replicated, also known as cascaded, to another system.

Log records

No log record changes were made for this enhancement, and products that use X'99' log data do not need to change if this enhancement is enabled.

Changes to defining IMS

The **SUPPDCAPNAME=** parameter is introduced to the DATABASE section of the DFSDF*xxx* member of the IMS PROCLIB data set.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

DCCTL enhancement to support IMS management of ACBs

In IMS 15, the DCCTL environment supports IMS management of ACBs. Install APAR PI89178 to enable this enhancement.

IMS management of ACBs was not supported in a DCCTL environment. This enhancement adds support for IMS management of ACBs in a DCCTL environment. Since a DCCTL does not own any database nor service DL/I database calls, the IMS directory that it uses must be maintained by another IMS that supports the TM/DB environment. When the IMS Catalog and directory data set has been created by that other IMS, the DCCTL system can be configured to use the directory data set. The DCCTL system cannot create or maintain any IMS directory data set or the IMS catalog.

Changes to installing and defining IMS

A DCCTL system can participate in a sysplex environment where one ore more IMS have enabled IMS management of ACBs and use the directory data sets that are created and maintained by the non-DCCTL IMS systems. The DCCTL system itself cannot create or maintain any IMS Catalog or directory data set. If ACBMGMT=CATALOG is specified in the DFSDF*xxx* member of the DCCTL system, the system will enable IMS management of ACBs.

For a DCCTL system, CATALOG=NO must be specified in the CATALOG and CATALOG*xxx* section of the DFSDF*xxx* member because a DCCTL system cannot create or maintain the IMS catalog.

Changes to troubleshooting for IMS

The following messages are either changed, created, or deleted so that if CATALOG=Y is specified for a DCCTL system or such a system tries to access the IMS Catalog, relevant error messages or abend code will occur:

- DFS3505E (changed)
- DFS3551E (changed)
- DFS4427E (changed)
- DFS4892E (new)
- 1002 (changed)

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

DEDB Alter utility enhancements

In IMS 15, the DEDB Alter utility is enhanced to enable you to add a new field to existing free space in a segment while the DEDB area remains online.

This enhancement increases the availability of your DEDB database. Previously, a DEDB database had to be taken offline to add a new field to a segment.

Requirements:

- A two-stage randomizer must be used, which enables areas to be processed individually.
- All IMS data sharing systems must be at IMS 15 or later.
- The DEDB databases must be registered to DBRC.
- If you are using the DEDB Alter utility to add a Segment Edit/Compression exit routine, the Segment Edit/Compression exit routine must be able to handle mixed compressed and non-compressed data in

a DEDB database. If data is non-compressed, on read access, it does not expand the non-compressed data, and on write access, it compresses the data and writes out as compressed data. If data is compressed, on read access, it expands the compressed data, and on write access, it compresses the data and writes out as compressed data.

- if you expand just the SDEP portion of an area by increasing the shadow's data set size, you will still need to do an ACBGEN.

Restrictions:

- You can alter only one area in a DEDB database at a time with the DEDB Alter utility. You can have multiple instances of the DEDB Alter utility running concurrently, but each instance must be running against a different DEDB database.
- The DEDB Alter function does not support DEDB databases that are in Virtual Storage Option (VSO) or Shared Virtual Storage Option (SVSO) mode. DEDB databases with the VSO or SVSO option must first be unloaded with the **/VUNLOAD** command before running the DEDB Alter utility.
- Because the IMS management of ACBs does not support XRF environments, the DEDB Alter utility does not support XRF when IMS manages ACBs.

Migration considerations

If you are invoking the DEDB Alter utility for an IMS 15 function, such as ALTERDB, the DEDB Alter utility detects the version of the IMS system and terminates if the IMS version does not support the particular change.

Coexistence considerations

You can run the DEDB Alter utility in a coexistence environment; however, if you are invoking the DEDB Alter utility for an IMS 15 function such as ALTERDB, the DEDB Alter utility detects the version of the IMS system and terminates if the IMS version does not support the particular change.

Changes to administering IMS

For a list of topics for administering IMS that are changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, "Message and code changes in IMS 15," on page 85.

Changes to utilities

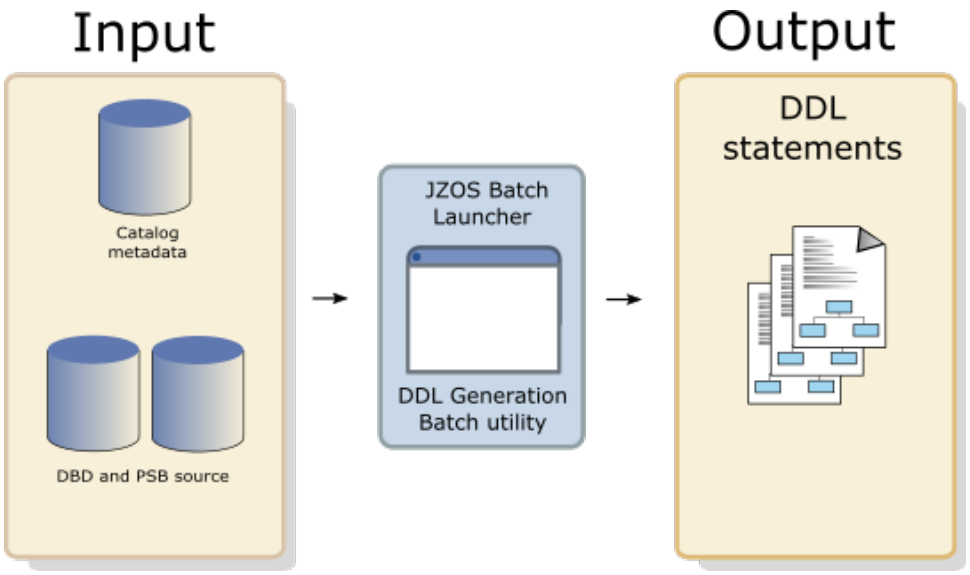
For a list of the utilities that are changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

DDL Generation Batch utility enhancement

In IMS 15, the DDL Generation Batch utility enhancement allows users to generate CREATE DDL statements from existing IMS catalog metadata, or database definition (DBD) and program specification (PSB) source.

The DDL Generation Batch utility is used to generate CREATE DDL statements, which can then be used to define databases and program views within IMS, as well as provide programmable and automated solutions for IMS. The DDL generation batch utility also goes by the shorter name of zDDL batch utility.

The DDL Generation Batch utility is included with the IMS Universal JDBC driver and uses type-4 connections. The IBM® Java™ for z/OS® (JZOS) Batch Launcher must be used to run the DDL Generation Batch utility.



Requirements

Ensure you have met the following requirement before using the DDL Generation Batch utility:

Resources that you intend to use with the DDL generation batch utility must be specified to IMS. If you do not specify all resources properly, IMS will generate many OLDs of logs for each execution of the DLL generation batch utility.

Restrictions

The following restriction must be considered while using the DDL Generation Batch utility:

If you use a wildcard for the DBDSRC or PSBSRC input statement, the corresponding DBDSRC DD or PSBSRC DD statements can only contain a single data set.

Changes to troubleshooting for IMS

Errors may be returned by the JZOS Batch launcher or by the DDL Generation Batch utility during operation of the utility. These errors are explained in detail within DDL Generation Batch utility.

DBRC migration and coexistence

DBRC enhancements include changes to the RECON data set format for IMS 15 and support that allows IMS Version 13 and IMS 14 systems to coexist until all of the systems are upgraded to IMS 15.

The changes to the RECON data set changes for IMS 15 include:

- The header version indicator is V15R1.
- The default value for MINVERS is set to "13.1" (X'D1').
- The RECON level is set to "15.1" (X'E1').
- The log release level in the PRILOG, SECLOG, PRISLD, SECSLD, PRIOLD, and SECOLD (and interim) records is set to X'3C', but is listed as "15.1".
- The version and coexistence level in the subsystem record is set to "15.1" (X'E1').

Because Remote Site Recovery (RSR) is no longer supported after IMS 14, you must remove all Global Service Group (GSG) information before migrating to IMS 15. Issue the LIST.GSG command to identify any GSG and issue the DELETE.GSG command to remove it before upgrading the RECON data set.

Certain DBRC API requests are enhanced to show the new information that is in the RECON data sets.

The output block version number of the DBRC API is as follows:

- 7.0 for the IMS 15 API.
- 6.0 for the IMS 14 API.
- 5.0 for the IMS Version 13 API.

Coexistence considerations

The INIT.GSG command is not supported in IMS 15. If you try to use this command for IMS 15, the DSP1035I message is issued.

You can use 8GB OSAM HALDB without OLR Support for IMS 15 by configuring the following settings. This support was introduced in IMS 14. With this support, you can define an HALDB database to use up to eight gigabytes of data in its OSAM PHDAM or PHIDAM OSAM data sets.

- Set the MINVERS value to 14.1.
- Set the MINVERS value to 13.1 if the cross DBRC service level ID (CDSLID) value is set to 2. The CDSLID set to 2 indicates that the IMS Version 13 8GB OSAM Support for HALDBS without OLR SPE has been applied to all IMS Version 13 resident libraries (RESLIBS) accessing the RECON data set.

Performance considerations

Before you upgrade a RECON with parallel access active, close the RECON data sets and perform a check for retained locks. The upgrade fails if retain locks exist. The RECON data sets are reopened in LSR mode when parallel access is active. This improves performance by eliminating the need for locking.

Excessive CA/CI splits might delay RECON upgrade.

While the RECON is being upgraded, other jobs wait, which impacts the performance of any DBRC requests.

Before you issue the **CHANGE.RECON UPGRADE CHECKUP** command against the production RECON data set, issue the command against a copy of the production RECON data set to understand any possible performance issues.

Log record changes

The following log records are new or changed by this enhancement in IMS 15:

- DSPRCNRC
- DSPRCR1
- DSPLOGRC
- DSPOLDRC
- DSPSSRC

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to commands

The CHANGE.RECON UPGRADE command is changed to upgrade an IMS Version 13 or IMS 14 RECON data set.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Changes to utilities

Batch Backout, Log Recovery and Log Archive utilities can only run on the release which created the log(s). That is, an IMS Version 13 or an IMS 14 Batch Backout utility cannot be used to back out an IMS 15 log.

The Database Recovery utility and the Change Accumulation utility must be run with highest level of logs being used. For example, the IMS 14 utilities may use IMS 14 logs but not IMS 15 logs.

IMS Database Manager enhancements

The IMS 15 enhancements to IMS Database Manager (IMS DB) include enhancements that enable dynamic database definition, enhancements to the Open Database Manager (ODBM), and other enhancements that improve usability and performance for users of IMS DB.

The Chapter 13, “IMS system enhancements,” on page 149 in IMS 15 might also impact IMS DB.

Chapter 12. IMS Transaction Manager enhancements

The enhancements to IMS Transaction Manager (IMS TM) in IMS 15 include enhancements to Multiple Systems Coupling (MSC), Open Transaction Manager Access (OTMA), IMS Connect, synchronous callout, and more.

The Chapter 13, “IMS system enhancements,” on page 149 in IMS 15 might also impact IMS TM.

OTMA checkpoint statistics enhancement

In IMS 15, OTMA statistics will be collected during checkpoint.

With this enhancement, two new x'45' statistic record subtypes are added, one for Global OTMA information (x'451A') and one for OTMA Member information (x'451B’). A single x'451A' record is created for the Global information and a single x'451B' record is created for each Member. These are written with the already-existing x'45' records during checkpoint.

This enhancement provides more diagnostic information and an easier way to track OTMA statistics (such as the number of TPIPEs) to aid in fine-tuning the system (such as flood control limits).

This enhancement is added to IMS 15 by APAR PH45589.

Log record changes

The following log records are new or changed by this enhancement in IMS 15:

- X'451A'
- X'451B'

IMS ALTPCB enhancement for IMS Connect

In IMS 15, with APAR PH39434 and PH39438, an IMS ALTPCB output triggered by an IMS Connect commit-then-send send-receive call can be sent back to the initiating IMS Connect client.

By default, when IMS Connect is identified as the destination of an IMS ALTPCB output message, IMS queues the output to a TPIPE hold queue. An IMS Connect client is able to retrieve this ALTPCB output with a Resume TPIPE call. However, it might be difficult for an IMS Connect client application to know whether IMS would generate an I/O PCB output or an ALTPCB output. In addition, an ALTPCB output message generated by an IMS shared-queues back-end system has an affinity of the back-end system.

This message affinity prevents the Resume TPIPE call that is sent to the front-end system from retrieving the IMS ALTPCB output message unless IMS Connect activates the super member function. This default behavior of handling the IMS ALTPCB output for IMS Connect complicates the TCP/IP application development for getting an ALTPCB output message.

With APAR PH39434 and PH39438, IMS introduces a new function, SENDALTP, for IMS Connect customers to obtain an ALTPCB output without issuing Resume TPIPE calls. When the SENDALTP function is activated, if IMS receives a commit-then-send send-receive call from IMS Connect, an ALTPCB output triggered by the input transaction can be sent back to the initiating IMS Connect client by using the input TPIPE name.

The supported ALTPCB output message flow is: TCP/IP APP → IMS CONNECT X → IMS → IMS CONNECT X → TCP/IP APP. This SENDALTP function won't work if the ALTPCB output is routed to a different IMS Connect client or to a non-IMS Connect destination using OTMA destination descriptor or OTMA DFSYDRU0 user exit.

You can activate the SENDALTP function with two methods: data store level activation and message level activation.

With data store level activation, the SENDALTP function can be activated for all the commit-then-send send-receive calls from this IMS Connect data store. You can enable the data store level activation with the following methods:

- Using the CREATE IMSCON command or the UPDATE IMSCON command
- Specifying SENDALTP in IMS Connect HWSCFGxx member
- Specifying SENDALTP parameter in OTMA client descriptor in DFSYDTx PROCLIB member

The message level activation can be set for a specific IMS Connect commit-then-send send-receive request through a user-written IMS Connect client, IMS OTMA destination descriptor, or IMS DFSYDRU0 exit.

Changes to defining IMS

The following descriptors are enhanced with the **SENDALTP=** keyword:

- The OTMA client descriptor in the DFSYDTx member of the IMS PROCLIB data set
- The OTMA destination descriptor in the DFSYDTx member of the IMS PROCLIB data set
- The DATASTORE statement in the HWSCFGxx member of the IMS PROCLIB data set
- The HWS statement in the HWSCFGxx member of the IMS PROCLIB data set

The **TPIPE=**, **SMEM=** and **EXIT=** keywords in the OTMA destination descriptor in the DFSYDTx member of the IMS PROCLIB data set are enhanced with descriptions for the **SENDALTP=** keyword.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to commands

The following commands are enhanced to have the **SENDALTP** keyword and its description added:

- **CREATE OTMADESC** command
- **UPDATE OTMADESC** command
- **VIEWHWS** command
- **VIEWDS** command
- **CREATE IMSCON TYPE(DATASTORE)** command
- **UPDATE IMSCON TYPE(CONFIG)** command
- **UPDATE IMSCON TYPE(DATASTORE)** command
- **QUERY IMSCON TYPE(CONFIG)** command
- **QUERY IMSCON TYPE(DATASTORE)** command

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Language Environment enhancement for 31-bit COBOL and 64-bit Java interoperability

In IMS 15, you can enable interoperability between 31-bit COBOL code and 64-bit Java code by adding value **JVM=3164** to an IMS dependent region's parameter list, installing required software, and

configuring the dependent region. Supported dependent region types include MPR, BMP, IFP, JBP, and JMP.

Previously, valid values for the JVM= parameter were 31 and 64. This enhancement adds new valid parameter value **JVM=3164**. Applying parameter JVM=3164 indicates to an IMS dependent region that separate Language Environment instances are to be established for each addressing mode: a primary 31-bit Language Environment, and a secondary 64-bit Language Environment that hosts the Java virtual machine (JVM). When JVM=3164, IMS uses new module DFSJVM36.

This enhancement is delivered with APAR PH37140.

Requirements

Enabling interoperability provided by this enhancement requires proper dependent region setup and specific functions from the COBOL compiler, the Language Environment, and the 64-bit IBM Java Software Development Kit (SDK). To learn more about requirements and important considerations regarding Java, COBOL (including Object-Oriented COBOL), and IMS, see 31-bit COBOL and 64-bit Java interoperability (Application Programming).

Static VTAM transaction output security enhancement

In IMS 15, static VTAM terminals are enhanced with the ability to apply transaction output security checks to prevent unauthorized accesses from different users to transaction outputs.

Previously, there was no output security for static VTAM terminals. Any user with a valid authorized access to a terminal could access queued outputs in that terminal, even if the user didn't initiate the output transaction. The typical solution was to create a user exit, which was difficult to configure.

Instead of using a new user exit, with this enhancement, you can enable output security for static VTAM terminals by specifying an optional parameter **STATICOUTSEC** in the DFSDC*xxx* member of the IMS PROCLIB data set. When you specify the **STATICOUTSEC** parameter, you decide whether IMS compares the current user with the user who initiated the transaction, if the current user is not the user who initiated the transaction, IMS discards the transaction output. This prevents other users from accessing the transaction that were not initiated by them.

This enhancement is delivered with APAR/PTFs PH24997/UI70315/UI70314.

Changes to defining IMS

The DFSDCxxx member of the IMS PROCLIB data set is enhanced with the following parameters:

STATICOUTSEC=ALL | NO | SREQ
: Specifies whether IMS discards transaction reply messages for static terminals when the current user does not match the user associated with the output message. In addition, this parameter tells IMS whether to exit any active or held conversations when a user signs off from the static terminal.

RCVYCONV=
: If **STATICOUTSEC=**ALL or **STATICOUTSEC=**SREQ is specified, **RCVYCONV=**NO will be forced for those static terminals affected by the **STATICOUTSEC** keyword.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

OTMA lightweight transaction pipe enhancement

In IMS 15, the OTMA lightweight transaction pipe enhancement improves the flood control of OTMA transaction pipes (tpipes).

This enhancement is added to IMS 15 by APAR PH17832 (PTFs UI68699 and UI68700).

Previously, when a back-end IMS system processed OTMA input transactions from front-end IMS systems in a shared queues environment, each transaction might trigger the creation of a new tpipe. However, if a tpipe is built for input messages, the output ITASK for the tpipe is not used. If a tpipe is built for output processing, the input ITASK is not needed. Such insufficient use of resources associated with a tpipe makes the back-end IMS system easily reach the limit of tpipe flood.

By using the OTMA lightweight tpipe function, IMS reduces the storage for each tpipe by dynamically allocating the associated ITASKs and other tpipe related storage only when they are needed. By doing so, the back-end IMS system in a shared queues environment can support more tpipes and avoid reaching the tpipe flood limit quickly.

Changes to system definition for IMS

A new parameter **LITETP=** is added to the DFSOTMA descriptor in the DFSYDTx member of the IMS.PROCLIB data set to specify whether the OTMA lightweight tpipe function is enabled. You can enable the OTMA lightweight tpipe function by specifying **LITETP=**YES. The default is N0, which is also the default for an IMS cold start.

Specifying **LITETP=**YES enables IMS to support more tpipe because a lightweight tpipe requires less storage than a regular tpipe. A weighting factor is used on lightweight tpipes when calculating the tpipe count for tpipe flood control. The weighting factor is the percentage of the lightweight tpipe storage size relative to the regular tpipe storage size, which is usually 28%.

The adjusted tpipe count is calculated as follows:

A: the number of front-end tpipes (total tpipes - back-end tpipes)
B: the number of back-end tpipes
W: the weighting factor
adjusted tpipe count=A+(B*W)

When the DFSOTMA **MAXTP=** parameter is specified, if the **LITETP=** parameter is enabled, IMS monitors if the number of tpipes reaches the maximum allowable number by using the adjusted tpipe count instead of the total tpipe count. If the **LITETP=** parameter is disabled, IMS keeps using the total tpipe count for flood control.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to commands

The **/DISPLAY** command is enhanced to display two new output fields **BETP** (back-end tpipe) and **WGF** (weighting factor).

BETP
If **LITETP=**YES is specified in the DFSOTMA descriptor, this field shows the number of back-end tpipes for the OTMA member. Otherwise, it is zero.

WGF
The tpipe weighting factor for calculating the adjusted total tpipe count for detecting flood condition. A value of 0 indicates that the OTMA lightweight tpipe function is disabled.

The **TOACEE** output field is changed to **TOA**.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Enhancement for the processing of OTMA commit-then-send messages in shared-queues environments

In IMS 15, the processing of OTMA commit-then-send (CM0) messages that are sent by a back-end IMS system in shared-queues environments is enhanced to be handled by a new ITASK .

This enhancement is added to IMS 15 by APAR PH02371.

Previously, when a back-end IMS system sent commit-then-send shared queues messages to a front-end IMS system, it first sent notification messages to the front-end IMS system to notify the presence of the outputs. The OTMA ITASK DFSYMOM0 in the front-end IMS system is used to manage these notification messages. However, when the ITASK was busy with processing shared queues notification messages from a back-end system, other jobs that are processed by the ITASK, such as the creation of transaction pipes (tpipes), could be delayed. This impacted the performance of IMS.

With this enhancement, a new OTMA ITASK DFSYDAD0 is created through OID TCB to separately process OTMA commit-then-send back-end messages in a shared queues environment. As a result, the main OTMA ITASK DFSYMOM0 can focus on other important jobs. This enhancement reduces delays and improves performance.

This enhancement also enhances tpipe flood control. The valid value of the **MAXTPRL** parameter in OTMA client descriptors and DFSOTMA client descriptors that defines the relief level of the **MAXTP** value was enhanced to 50 - 95, instead of 50 - 70. A new parameter **MAXTPWN** is added to OTMA client descriptors and DFSOTMA client descriptors. You can use the **MAXTPWN** parameter to define a warning threshold as a percentage of the **MAXTP** value. Before the **MAXTP** threshold is reached, a warning message DFS4515W is issued. You can specify a value in the range 50 - 95 for the **MAXTPWN** parameter. That is, the message DFS4515W can be issued before 50% - 95% of the **MAXTP** value is reached. After you see the warning message DFS4515W, you can remove idle tpipes to prevent tpipes from overflowing so that the IMS system can continue creating new tpipes. If the **MAXTPWN** value is not specified, the default tpipe flood warning level is 80% of the **MAXTP** threshold value.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to commands

The **/DISPLAY TMEMBER** command is enhanced to have **SYW** status and its description removed.

MFS sign-on format support for RACF password phrases

In IMS 15, default Message Format Service (MFS) formats can be generated that support RACF password phrases entered from 3270 and SLU 2 devices through message DFS3649A or DFS3656A.

This enhancement is delivered ins IMS 15.1 with APAR PH09313 (PTFs UI64360/UI64359).

Previously, the default MFS formats (DFSIGNP, DFSIGNPB, DFSVERO) that were generated for sign-on from 3270 and SLU2 devices supported only passwords that were 8-characters or less. With this enhancement, you can use MFS for RACF password phrases that are up to 100 characters long and that are submitted from 3270 and SLU 2 devices through DFS3649A or DFS3656A.

The following default MFS formats can be generated with this enhancement to support password phrases:

DFSIGNPC
DFS3649A for dynamic terminals

DFSIGNPD
DFS3649A for static terminals

DFSVEROA
DFS3646A

The formats result in the **/SIGN PASSPHRASE** command to be submitted to the IMS system as input. Also, the formats support both passwords that are 8-characters or less and RACF password phrases that are up to 100 characters long. Therefore, you do not need to switch between MFS formats to support both passwords and RACF password phrases entered from 3270 and SLU 2 devices through message DFS3649A or DFS3656A.

You might need to modify the default DFSIGNPC, DFSIGNPD, and DFSVEROA MFS formats to enable them to support password phrases up to 100 characters long. Due to screen size limitations, the default formats limit the length of PASSWORD and NEW PASSWORD fields so that they fit on a single line. These limits are:

- Maximum 50 characters for screen sizes greater than 66 columns (which include 3270 model 2)
- Maximum 24 characters for screen sizes fewer than 66 columns (which include 3270 model 1)

The length limitations for the PASSWORD and NEW PASSWORD fields apply only with the default formats that are delivered with this enhancement. RACF password phrases that are up to 100 characters long are supported for customer-modified formats.

You can enable the MFS formats that support password phrases to be generated by using one of the following options:

- Code the Greetings Message (DFSGMSG0) user exit to override the default MOD name that is specified by IMS.
- Specify **MFSPPDEF=Y** in the DFSDC*xxx* member of the IMS PROCLIB data set. The **MFSPPDEF** parameter is added with this enhancement.

Changes to defining IMS

The **MFSPPDEF=** parameter is added to the DFSDC*xxx* member of the IMS PROCLIB data set with this enhancement. You can use this parameter to specify whether the default IMS sign-on formats that support password phrases up to 100 characters are used.

If the Greeting Messages exit routine (DFSGMSG0) is coded to change the MFS Message Output Description (MOD) name for messages that are issued during the signon process, the MOD name that is specified in the exit routine is used regardless of the value that is specified for the **MFSPPDEF=** parameter.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to exit routines

The following changes are made with this enhancement to the sample Signon exit routine (DFSSGNX0):

- The DFSIGNPC, DFSIGNPD, and DFSVEROA MFS formats result in the **/SIGN PASSPHRASE** command to be submitted to IMS as input and include the **GROUP** and **NEWPW** keywords of the command. When no data is entered for the **GROUP** or **NEWPW** keyword, the updated sample DFSSGNX0 exit routine deletes the **GROUP** and **NEWPW** keywords and their values.
- The updated sample DFSSGNX0 exit routine uses the new MFSPVAR DSECT to determine the position of the GROUP and NEWPW keywords. The MFSPVAR DSECT assumes a password length of 100.

If you use a customized DFSSGNX0 exit routine, update your customized exit routine to delete empty **GROUP** and **NEWPW** keywords and their parameters from the **/SIGN PASSPHRASE** command string.

OTMA ACEE flood control enhancement

In IMS 15, OTMA is enhanced with the accessor environment element (ACEE) flood control function to prevent an excessive number of RACF ACEEs from being stored in cache.

Previously, the number of ACEEs that were stored in cache could not be limited. An unlimited number of ACEEs stored in cache by OTMA and a high aging value for the ACEEs caused virtual storage in the IMS control region to run out.

This enhancement is delivered with APAR/PTFs PI81171/UI62316/UI62317.

With this enhancement, you can enable OTMA ACEE flood control in the DFSOTMA descriptor of the DFSYDTx member of the IMS PROCLIB data set. When you enable OTMA ACEE flood control, you limit the number of RACF user IDs, which in turn limits the number of ACEEs that are cached by OTMA. This in turn prevents virtual storage in the IMS control region from running out.

With OTMA ACEE flood control enabled, OTMA checks the expiration values of the least recently used ACEEs first to speed up the ACEE cleanup process.

With this enhancement, you can also specify the **ACEEAGE** parameter on the **/SECURE OTMA** command to define an OTMA ACEE aging value that overrides the aging value passed by OTMA clients. You can use the **ACEEAGE** parameter to define an aging value that is lower than the value passed by OTMA clients, thereby expediting the cleanup of OTMA ACEEs that are stored in cache.

Changes defining IMS

The DFSOTMA descriptor of the DFSYDTx member is enhanced with the following parameters:

TOACEE=NO|YES
Enables or disables the OTMA ACEE flood control function.

ACEEUSR=
When OTMA ACEE flood control is enabled, allows you to define the number of RACF user profiles that are stored in ACEEs.

Changes to commands

The following commands are enhanced:

- The **/DISPLAY OTMA** command is enhanced with the following output fields:

  ACEECT
  Displays the total number of cached OTMA ACEEs for the OTMA server.

  TOACEE
  Displays whether OTMA ACEE flood control is enabled.

- The **/SECURE OTMA** command is enhanced with the **ACEEAGE** parameter to allow you to define an ACEE aging value for OTMA clients.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Reduce LUMP storage for OTMA commit-then-send messages enhancement

In IMS 15, OTMA is enhanced to reduce the amount of storage that is allocated in LU 6.2 device manager private buffer pools and OTMA for commit-then-send (CM0) I/O PCB output messages.

The storage in LU 6.2 device manager private buffer pools and OTMA is also called LUMP storage.

Previously, 38 KB of LUMP storage was allocated for every CM0 I/O PCB output message, even if the actual size of the message was much smaller. As a result, the amount of LUMP storage that was allocated for the messages was often greater than the amount of storage that was required. With this enhancement, the amount of LUMP storage that is allocated for each output message varies depending on the actual size of the message. Therefore, the amount of unused LUMP storage that is allocated for CM0 I/O PCB output messages is reduced, and more LUMP storage is available for other processes.

This enhancement is delivered with APAR/PTF PH00002/UI62030.

OTMA conversational transaction timeout enhancement

In IMS 15, you can configure IMS Open Transaction Manager Access (OTMA) to end conversational transactions and remove from storage the control blocks associated with those transactions if the transaction is inactive for a specified period of time.

This enhancement is delivered with APAR PI94954 (PTF UI61211).

You specify the time period on the **ENDCONV=** parameter of the DFSOTMA descriptor, which is in the DFSYDT*x* member of the IMS PROCLIB data set. If the conversational transaction is idle for the specified period after the prior iteration of the conversational transaction completes, OTMA ends the transaction.

With this enhancement, you have greater control in preventing IMS storage space from becoming flooded with process management resources, such as transaction instance blocks (TIBs), for transactional conversations that are no longer needed, and in ensuring that your business transactions can continue to be processed by IMS.

Changes to installing and defining IMS

The DFSOTMA descriptor in the DFSYDT*x* member of the IMS PROCLIB data set is enhanced with the **ENDCONV=** parameter. When a conversational transaction has been inactive for the amount of time that you specify, the idle transaction is ended and the resources, such as the TIB, associated with the transaction is removed from IMS storage.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

OTMA transaction pipe cleanup enhancement

In IMS 15, the OTMA transaction pipe (tpipe) cleanup enhancement improves the ability of an IMS system to delete idle OTMA tpipes.

This enhancement is added to IMS 15 by APAR PI88409 (PTFs UI54736 and UI54735).

In previous releases, an OTMA tpipe was deleted after it had been idle across three consecutive system checkpoints only if all other tpipes associated with the same OTMA target member (tmember) were idle. Therefore, IMS storage space was being used unnecessarily for OTMA tpipes that had been idle for a long time, leading to storage exhaustion. Also, the OTMA tpipes that had already been idle for three consecutive system checkpoints could not be reused for subsequent transaction requests.

With the OTMA tpipe cleanup enhancement, an OTMA tpipe is deleted after it has been idle across three consecutive system checkpoints, even if other tpipes associated with the same tmember are being used. Consequently, idle OTMA tpipes are made available more quickly to process subsequent transactions on the IMS message queue, and IMS storage space is less likely to become flooded.

Changes to administering IMS

IMS automated operator interface (AOI) exits can use message DFS5386I, which is new with this enhancement, to identify whether an OTMA tmember has disconnected from OTMA.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to commands

The **/DISPLAY TMEMBER** command is enhanced to add the following status terms. One of the status terms can be displayed if the TPIPE keyword is specified on the command:

MCP
In a shared-queues environment, the tpipe has output messages on the global queue.

SYW
The tpipe is being scanned by IMS.

If a tpipe is in either of the preceding states, the tpipe cannot be deleted.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

CQS automatic structure checkpoint

In IMS 15, you can configure IMS to take checkpoints of a common queue server (CQS) structure automatically after a user-specified number of log records have been written by a CQS.

Coexistence considerations

An IMS 15 CQS that performs automatic structure checkpoints can coexist with IMS Version 13 and IMS 14 CQSs that are connected to the same shared queue structure. However, you can use the **STRCHKPT=** parameter in the CQSSLxxx member of the IMS PROCLIB data set to trigger the automatic structure checkpoint only for IMS 15 CQSs. Only the IMS 15 CQSs can become the master CQS that performs automatic structure checkpoints.

Fallback considerations

Before reverting an IMS 15 CQS that performs automatic structure checkpoint to a CQS of an earlier version of IMS, remove or comment out the **STRCHKPT=** parameter in the CQSSLxxx member of the IMS PROCLIB data set.

Network security credential propagation enhancement

In IMS 15, you can associate the security credentials that are entered by a user in a distributed environment with the end-to-end processing of a transaction in IMS. The distributed security credentials can even be propagated to synchronous callout requests that are initiated by the ICAL call of the IMS DL/I interface.

With the network security credential propagation enhancement, when network security credentials are entered by a user in a distributed environment and are passed to IMS, the security credentials are audited in IMS log records. Previously, when a user initiated an IMS transaction in a distributed environment and entered security credentials, the credentials were not propagated to IMS and were therefore excluded from IMS log records.

The distributed network security credentials can include a network user ID and a network session ID.

Network user ID
The distributed identity of the user. The maximum length of a network user ID is 246 bytes. For users of the IMS TM Resource Adapter, the network user ID is a Distinguish Name (DN) in the X.500 series of standards.

Network session ID
The session identity of the distributed user. The maximum length of a network session ID is 254 bytes. For users of the IMS TM Resource Adapter, the network session ID is a domain name, realm, or registry name.

Network security credentials can be propagated from user-written IMS Connect client applications that use the HWSSMPL0 or the HWSSMPL1 user message exit routines. Two new IRM extension specifications are added with this enhancement to enable applications that use the HWSSMPL0 or the HWSSMPL1 user message exit routines to pass network security credentials to IMS. An IRM extension with an ID of *NETUID* can be used to pass a network user ID to IMS and an IRM extension with an ID of *NETSID* can be used to pass a network session ID to IMS. If network security credentials are included in an IMS callout request, the RESUME TPIPE call of the IMS Connect client application can be defined to support the credentials.

IMS TM resource adapter client applications that use the HWSJAVA0 user message exit routine can also propagate network security credentials to IMS. An extendable Java Authentication and Authorization Service (JAAS) login module is provided with IMS TM resource adapter to enable network security credentials to be passed from a Java EE application that uses the HWSJAVA0 user message exit routine to IMS. The activation specification is enhanced with the `resumeTpipeNsc` property to enable IMS TM resource adapter to support network security credentials in IMS synchronous callout messages. To enable IMS TM resource adapter to support network security credentials in asynchronous callout messages, the IMS interaction specification is enhanced with the `setResumeTpipeNSC` property.

Migration considerations

- If the security-data section of the OTMA message prefix contains network security credentials, the size of the OTMA message can increase by up to 504 bytes. Therefore, consider increasing the size of the SHMSG and LGMSG message queue data sets and the size of the message queue pool.
- If both of the following situations occur, you might need to modify code that includes the HWSOMPFX macro:
  - The Network Session ID (NETSID) section or the Network User ID (NETUID) section, or both, is included in the security section of the OTMA message header.
  - Either the **DSECT=**ALL or the **DSECT=**N0 option is specified with the HWSOMPFX macro.

  The size of the NETUID and NETSID sections can vary, causing the locations of the fields that are below the security section to change. However, if the **DSECT=**ALL or the **DSECT=**N0 option is specified, a contiguous DSECT, the HWSOMPFX DSECT, is generated that does not account for sections that vary in size. Therefore, the fields in the OTMA message header that are below the security section might become inaccessible.

  For the fields of the OTMA message header that are below the security section to be accessed, you need to map the HWSOMUSR, HWSOMAPP, or HWSOMAPX DSECTS of the HWSOMPFX macro to the changed locations of the fields.

  For more information about the fields of the OTMA message header, see OTMA header fields used by IMS Connect (Communications and Connections).
- In IMS 15, processing by the HWSJAVA0 user message exit routine of the user data section that is in the OTMA message header is updated. If the OTMA message header contains network security information and the HWSOMPFX macro is used, the HWSJAVA0 exit routine specifies both the **DSECT=** and the **NETSEC_OPT=**YES options for the HWSOMPFX macro. The **DSECT=** and the **NETSEC_OPT=**YES options cause the following behaviors:
  - An individual DSECT is generated for each section of the OTMA message header.

- The HWSECDNDS DSECT, or the HWSECARDS DSECT, or both, is generated to map network security information.
- The HWSOMPFX DSECT is not generated.

Coexistence considerations

Network security credentials can be passed to IMS and audited in IMS log records only if both IMS Connect and IMS are Version 15 or later. If network security credentials are passed between IMS and client applications of IMS TM resource adapter in inbound and outbound, or callout, messages, IMS TM resource adapter must also be V15 or later.

Log record changes

Because distributed network security credentials are passed to IMS in the security-data section of the OTMA message prefix, all IMS log records that contain information about the message prefix, such as log records X'01' and X'03', include the distributed security credentials.

If a Fast Path message contains network security credentials and is processed by the Fast Path expedited message handler (EMH) on the local IMS system, the credentials are logged in the X'5901' log record.

If a Fast Path message that contains network security credentials is processed by using the EMH queue (EMHQ) in a shared-queues environment, in the front-end IMS system, the credentials are included in the X'5911' log record. In the back-end IMS system, which is the processing IMS system, the credentials are included in the X'5901' log record.

Requirements

The following prerequisites must be enabled for IMS TM resource adapter client applications, except for the client applications that use the IMS service provider in IBM® z/OS® Connect Enterprise Edition (z/OS Connect EE), to support network security credentials:

- One of the following application servers:
  - WebSphere Application Server Version 8.0 or later
  - WebSphere Liberty Version 8.5.5.9 or later
- Container-managed security.
- An external user account registry, such as an LDAP server, that contains authorized users.

Restrictions

Distributed network security credentials from DataPower, IMS Connect API, and SOAP Gateway clients are not supported by IMS Connect and therefore are not audited in IMS log records.

When the IMS Connect Recorder Trace facility is active, IMS Connect takes a snapshot of the first 670 bytes of messages at key points during IMS Connect processing. Because messages that contain network security credentials might be larger than 670 bytes, the information for the network user ID and the network session ID might not be included in an IMS Connect Recorder trace record.

Changes to installing and defining IMS

The LOGSTR= parameter is added to the OTMA client descriptor in the DFSYDTx member of the IMS™ PROCLIB data set. You can use the LOGSTR= parameter to specify whether the first 255 bytes of network security credentials, which includes a network user ID or network session ID, or both, is included in the RACF SMF process records.

Changes to programming for IMS

The IMS OTMA Callable Interface (OTMA C/I) is enhanced with the `otma_send_receivey` and `otma_send_asyncx` APIs. You can use these APIs to pass the network user ID and the network session

ID to IMS. For each API, up to 100 bytes for the network user ID and up to 100 bytes for the network session ID can be passed to IMS.

The INQY call with the MSGINFO subfunction is enhanced to return the network user ID and the network session ID that are submitted to IMS. IMS application programs can use the INQY MSGINFO call to identify the distributed user who initiated a transaction.

Changes to troubleshooting for IMS

Recommendation: If network security credentials are included in IMS Connect client input messages, enable the BPE External Trace facility for the IMS Connect Recorder Trace facility. If network security credentials are passed to IMS Connect, the size of both input and output messages to and from IMS Connect might be larger than 670 bytes and the BPE External Trace facility would be required to capture the data of the entire message.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to exit routines

The following IMS Connect user message exit routines are enhanced to propagate network security credentials between IMS and applications in a distributed environment:

- HWSSMPL0
- HWSSMPL1
- HWSJAVA0

The following transaction manager exit routines are enhanced to include the address of the security-data section of the OTMA message prefix. Because the OTMA security-data section can include a network user ID and a network session ID, you can use the following exit routines to access the network security credentials if the credentials are passed to IMS.

- DFSYIOE0
- DFSYPRX0
- DFSYDRU0

The DFSCTRN0 exit routine is enhanced to add two OTMA fields, which include the addresses of the network user ID and the network session ID, in the storage area that is mapped the CTRNPARM DSECT.

Chapter 13. IMS system enhancements

The enhancements to the IMS 15 system are not specific to either the IMS Database Manager or the IMS Transaction Manager and might impact both.

Data set support for zHyperWrite

In IMS 15, you can specify whether to use zHyperWrite for writing data to the write-ahead log data sets (WADS) and online log data sets (OLDS). The command output of **/DISPLAY OLDS** shows whether zHyperWrite is used when data is written to the OLDS or WADS.

Dynamic enablement of zHyperWrite enhancement

In IMS 15, dynamic enablement of zHyperWrite enhancement provides a new parameter, **ZHYPERWRITE**, to the **UPDATE IMS SET(LCLPARM)** command to allow users to dynamically enable or disable IBM zHyperWrite for the online log data sets (OLDS) and write-ahead log data set (WADS). Install APAR PH02149 (PTF UI61325) to enable this enhancement.

Previously, you could only use the **ZHYPERWRITE** parameter in the LOGGER section of the DFSDFxxx member to enable or disable the use of zHyperWrite. Furthermore, you had to restart IMS for the **ZHYPERWRITE** parameter to take effect. This enhancement provides a new optional keyword, **ZHYPERWRITE**, in the **UPDATE IMS SET(LCLPARM)** command. You can use the **ZHYPERWRITE** keyword of the **UPDATE IMS SET(LCLPARM)** command to dynamically enable or disable zHyperWrite for OLDS or WADS without restarting the IMS system.

Unlike using **ZHYPERWRITE** in the LOGGER section of the DFSDFxxx member, any change specified by using the ZHYPERWRITE parameter in the **UPDATE IMS SET(LCLPARM)** command is not saved if you restart IMS.

If you want the zHyperWrite changes to persist across a restart, update the **ZHYPERWRITE** parameter in the LOGGER section of DFSDFxxx and then issue the **UPDATE IMS SET(LCLPARM(ZHYPERWRITE())** command. In this way, if IMS is restarted, the updated zHyperWrite value is saved and effective.

Coexistence considerations

If the **UPDATE IMS SET(LCLPARM(ZHYPERWRITE))** command is routed to an IMS that does not support the command, the ZHYPERWRITE parameter is ignored.

Changes to commands

A new keyword, ZHYPERWRITE, is added to the **UPDATE IMS SET(LCLPARM)** command.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Requirements

The primary and secondary data set volumes must be in a Metro Mirror relationship managed by HyperSwap®. To enable zHyperWrite for the OLDS, DFSMS APAR OA51385 must be installed and the OLDS must be defined as extended format data sets.

The UPDATE IMS command requires the Common Service Layer (CSL) with the Structured Call Interface (SCI) and the Operations Manager (OM) available. This command must be issued through the OM API because it is a type-2 command. The command response is returned through the OM API and is embedded in XML tags. You can issue this command in the following environments:

- DB/DC
- DBCTL

- DCCTL

Restrictions

If you issue the UPDATE IMS SET(LCLPARM(ZHYPERWRITE())) command to enable or disable zHyperWrite for the OLDS, zHyperWrite is enabled or disabled for subsequent OLDS that IMS opens, but not for the OLDS that are currently open. To start or stop using zHyperWrite immediately, issue the /SWITCH OLDS command twice.

If you issue the UPDATE IMS SET(LCLPARM(ZHYPERWRITE())) command to enable or disable zHyperWrite for the WADS, zHyperWrite is enabled or disabled the next time IMS writes to the current WADS.

WADS support for zHyperWrite

In IMS 15, the IMS Logger uses the DFSMS Media Manager to write data to the write-ahead log data set (WADS). As a result, the WADS must be defined as a VSAM linear data set.

The DFSMS Media Manager enables the usage of the hardware features like High Performance FICON® for z Systems™ (zHPF), which increases I/O throughput, and zHyperWrite, which reduces latency time for synchronous replication products. For reading from the WADS, regular VSAM is used.

To enable or disable zHyperWrite for the WADS, you have the following options:

- Use the WADS= keyword in the **ZHYPERWRITE=** parameter in the LOGGER section of the DFSDFxxx PROCLIB member. For more information, see LOGGER section of the DFSDFxxx member (System Definition).
- With APAR PH02149 (PTF UI61325) installed, you can use the **WADS(Y)** parameter in the **UPDATE IMS SET(LCLPARM(ZHYPERWRITE())** command to dynamically enable zHyperWrite without a restart. For more information, see UPDATE IMS command (Commands).

Migration considerations

The WADS must be defined as a VSAM linear data set with a control interval (CI) size of 4 KB (4096-bytes), secondary space allocation of 0, and with the SHAREOPTIONS(3 3) parameter. The access method services (AMS) utility IDCAMS can be used to define the data set.

Recommendation: Use different data set name for the IMS 15 WADS than the name used for the WADS in current IMS version. This allows you to predefine the IMS 15 WADS before shutting down the current IMS system. Otherwise, the WADS must be deleted and redefined after the current IMS system goes down and before the system is started as an IMS 15 system.

Coexistence considerations

For XRF systems, both of the coexisting systems must be of the same IMS version.

Fallback

When you fall back from IMS 15 system to a previous version of IMS, ensure that you use a non-VSAM data set for WADS.

If you defined WADS data set names for IMS 15 during migration that were different from the names used by the previous IMS version, use the previous names for fallback. The fallback process replaces the reference to the WADS data sets systematically. Otherwise, the WADS must be deleted and redefined after the IMS 15 system is shut down, and before the system is started at the previous IMS version.

At the end of fallback, cold start IMS with the **FORMAT ALL** or **FORMAT WA** keyword.

Log record changes

The following log records are new or changed by this enhancement in IMS 15:

- X'4507' - The following fields are added:
  - ST4507_WADSCIS, which specifies the number of control intervals in the WADS.
  - ST4507_FLG2 (X'40': ST4507_F2_ZHYPWADS)
- X'4507' - The following fields are removed:
  - ST4507_WADSTRACKS, which specifies the number of physical tracks in the WADS data set.
  - ST4507_WADSBLKSTRK, which specifies the number of physical blocks per track in the WADS data set.

Trace record changes

The following trace subcodes are added to the IMS logger's trace. They are defined in the ILOG macro.

Table 17. New trace subcodes introduced to the IMS Logger's trace

Trace subcode	Description
x'31'	Completed a CONNECT request.
x'32'	Completed a DISCONNECT request.
x'33'	Completed a format request.
x'34'	Completed writing instance ID request.
x'38'	The Media Manager termination exit was driven.
x'39'	The Media Manager error exit was driven.

Requirements

The support of zHyperWrite requires that both the primary and secondary data set volumes be in a Metro Mirror relationship managed by HyperSwap.

Changes to installing and defining IMS

You must define the WADS as a VSAM linear data set with a control interval (CI) size of 4 KB (4096-bytes), secondary space allocation of 0, and the SHAREOPITON (3 3) parameter.

The following JCL example demonstrates how to define the WADS:

```
//AMS EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN DD *

DEFINE CLUSTER -
     (NAME(IMSA.WADS.VSAM) -
     VOLUME(VOL001) -
     CONTROLINTERVALSIZE(4096) -
     SHAREOPTIONS(3 3) -
     CYLINDERS (20 0) -
     LINEAR)
/*
```

The installation verification program (IVP) is changed to define the WADS as linear VSAM data sets.

Changes to administering IMS

The IMS System Administrator defines all WADS to be used as VSAM linear data sets before starting the IMS 15 system for the first time.

Changes to troubleshooting for IMS

This enhancement introduces new and changed IMS messages related to Logger Media Manager.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to utilities

When IMS reads the write-ahead data sets (WADS), the Log Recovery utility might issue the DFS3253W warning message to explain the MVS messages that VSAM issues in the job log.

Changes to commands

The command output of /DISPLAY OLDS shows whether zHyperWrite is used when data is written to the WADS. If zHyperWrite is enabled, WADS=YES is displayed. If zHyperWrite is not enabled, WADS=NO is displayed.

A new keyword, ZHYPERWRITE, is added to the **UPDATE IMS SET(LCLPARM)** command.

OLDS support for zHyperWrite

In IMS 15, users can choose whether or not the IMS Logger uses zHyperWrite to write data to the online log data sets (OLDS).

Using zHyperWrite for the OLDS decreases replication latency and makes writes to the OLDS complete quicker in a synchronous replication environment.

Note: This optional enhancement requires that DFSMS APAR OA51385 be applied to your environment and the OLDS be defined as extended format data sets.

Log record changes

No changes to log records. However, as part of the IMS 15 base, the value of the OLDS sub-parameter of the **ZHYPERWRITE** parameter is included in the x’4507’ record as flag ST4507_F2_ZHYPOLDS.

Changes to installing and defining IMS

zHyperWrite can be used for writing to the OLDS to decrease replication latency. To enable or disable zHyperWrite for the OLDS, you have the following options:

- Use the OLDS= keyword in the **ZHYPERWRITE=** parameter in the LOGGER section of the DFSDFxxx PROCLIB member. For more information, see LOGGER section of the DFSDFxxx member (System Definition).
- With APAR PH02149 (PTF UI61325) installed, you can use the **OLDS(Y)** parameter in the **UPDATE IMS SET(LCLPARM(ZHYPERWRITE())** command to dynamically enable zHyperWrite without restarting the IMS system. For more information, see UPDATE IMS command (Commands).

You must ensure that all the OLDS that will be used by the IMS system are defined as extended format data sets.

To disable this enhancement, remove the **OLDS=YES** parameter or change it to **OLDS=NO**.

Changes to commands

The command output of /DISPLAY OLDS shows whether zHyperWrite is used when data is written to the OLDS. If zHyperWrite is enabled, OLDS=YES is displayed. If zHyperWrite is not enabled, OLDS=NO is displayed.

IMS Connect enhancements

In IMS 15, IMS Connect is enhanced in multiple ways to improve reliability, availability, serviceability, and security.

In addition to the enhancements, IMS Connect support for SSL and local option connections is removed.

Password phrase enhancement for IMS Connect

In IMS 15, IMS Connect is enhanced to support password phrases with 9 - 100 characters for IMS database clients using Open Database function and for IMS transaction manager user-provided clients using HWSSMPL0, HWSSMPL1, or equivalent user-defined exit routines.

This enhancement is delivered with APAR PH14651 (PTF UI65540).

Previously, IMS Connect rejected any passwords with a length greater than 8 characters for IMS database clients using Open Database function and for IMS transaction manager user-provided clients using HWSSMPL0, HWSSMPL1, or equivalent user-defined exit routines. With this enhancement, password phrases with lengths that are greater than 8 characters and up to 100 characters are supported by IMS Connect. This enhancement enables you to create stronger passwords with higher complexity and security.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to exit routines

The following changes are made with this enhancement to the **HWSAUTH0** user exit routine parameter list:

- In the field **AUTPM_PVER**, new version numbers 65 and 66 are added.
- In the field **AUTPM_Flag1**, a new flag byte X'20' is added.
- The **AUTPM_APssword** field is used as the address of passwords or password phrases.
- A new field **AUTPM_APsswordL** is added to represent the address of a fullword that contains the length (1 - 100) of the password or the password phrase.

ODBM RAS U210 prevention enhancement

In IMS 15, ICON has been enhanced to prevent a U210 abend in IMS when UDB applications terminate with work in progress.

This enhancement is added to IMS 15 by APAR PH07679/UI62878.

When UDB applications terminate and close their socket connections with work in progress due to ICON timeouts, ODBM Timeouts, or a connection error, IMS issues a U210 abend. With this enhancement, ICON issues an internal DPSB call that rolls back uncommitted work and prevents the U210 abend.

To support this enhancement, new CSL4200W, CSL4201W, CSL4202W, and CSL4203W messages are added for the ODBM address space to return information about the internal DPSB request.

Important:

This enhancement must be applied to all IMS, ODBM, and IMS Connect address spaces to ensure that U210 abends in IMS for an internal DPSB requests from IMS Connect are prevented.

If the ODBM CSLDCxxx member is being shared among all ODBM address spaces and you would like to override the DIAGDPSBMSG= parm in this member, then the value must be set after the enhancement

changes are applied to all ODBM address spaces. If the CSLDCxxx member is modified before the APAR is applied then the ODBM initialization will fail in error parsing the parameter.

Any SLIP Traps for msgid=DFS554A monitoring for abendU0210 must be modified to SLIP on CSL4202W or CSL4203W messages. Additionally, if DIAGDPSBMSG=NONE is specified in the CSLDCxxx member, then it must be modified to SHORT or LONG or left unspecified so that it defaults to SHORT.

Changes to installing and defining IMS

With this enhancement, new parameter `DIAGDPSBMSG=SHORT | LONG | NONE` is added to the CSLDCxxx member of the IMS PROCLIB data set.

Changes to troubleshooting for IMS

New CSL4200W, CSL4201W, CSL4202W, and CSL4203W messages are added for the ODBM address space to return information about the internal DPSB request. Also, IMS Connect Recorder trace and the BPE RCTR trace in IMS Connect is modified to trace the IMS Connect Socket logon token.

Log record changes

The DFSLOG07 macro of the X'07' log record now indicates whether changes in IMS have been rolled back to prevent a u210 abend.

The DFSLOG07 macro is enhanced to include a new X'08' flag bit (DLRIRLBK) in DLRFLAG4 at offset X'15E'. The DLRIRLBK flag bit operates as an indicator to state whether IMS changes were rolled back before the DPSB request from ODBM was processed to prevent a U210 abend. This DPSB from ODBM is due to the internal DPSB request from IMS Connect. Refer to the CSL4200W and CSL4201W and additional CSL4202W or CSL4203W messages in ODBM for more details.

Changes to troubleshooting for IMS

Trace records are written to the BPE Error trace table in the ODBM address space.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see IMS 15 Message and code changes.

Changes to commands

The QUERY ODBM command is updated to return the DIAGDPSBMSG value.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

RACF PassTicket support for DRDA clients enhancement

In IMS 15 with APAR PI99040 (PTF UI58288), you can use RACF PassTickets to authenticate users who access IMS DB from IMS Connect clients that use the Distributed Relational Database Architecture (DRDA) protocol.

RACF PassTickets are one-time-only passwords and are an alternative to RACF passwords and password phrases. RACF PassTickets are also more secure than RACF passwords and password phrases because PassTickets remove the need to send passwords and password phrases across the network in clear text. Because this enhancement adds support for PassTickets for IMS Connect clients that connect to IMS DB by using DRDA, you can use this enhancement to improve the security of the DRDA client connections. Previously, when IMS Connect was configured to call RACF, access from IMS Connect clients to IMS DB could be authenticated by using only RACF passwords or password phrases.

With APAR PH02135 (PTF UI58345), the SQL Batch utility of the IMS Universal Java Database Connectivity (JDBC) driver is also enhanced to enable the utility to generate PassTickets for IMS DB access authentication. If you use another DRDA client instead of the SQL Batch utility to access IMS DB, ensure that a service that uses the RACF PassTicket generator algorithm is used to generate the PassTicket.

The following procedure is a high-level description of the end-to-end process, introduced with this enhancement, by which a RACF PassTicket is used to authenticate a user who accesses IMS DB from a DRDA client:

1. When the client connection is first established, the RACF PassTicket that is used to authenticate the connection to IMS DB is generated either by the SQL Batch utility or, for other DRDA clients, by a service that uses the RACF PassTicket generator algorithm.
2. The client application sends to IMS Connect the generated PassTicket and the ID of the user requiring access in the **SECCHK** command (X'106E'). The PassTicket is specified in the code point, X'11A1', for the **PASSWORD** parameter of the **SECCHK** command. The user ID is specified in the code point, X'11A0', for the **USRID** parameter of the **SECCHK** command.
3. IMS Connect issues the `RACROUTE REQUEST=VERIFY` call to RACF to authenticate the client connection. On the RACF `RACROUTE REQUEST=VERIFY` call, IMS Connect includes the following information:
   - The RACF PassTicket and the user ID sent from the client application in the **SECCHK** command (X'106E').
   - The application name as specified on the **APPL=** parameter of the ODACCESS statement, which is in the HWSCFG*xx* member of the IMS PROCLIB data set. If an application name is not specified on the **APPL=** parameter of the ODACCESS statement, IMS Connect uses instead the value that is specified on the **ID=** parameter of the HWS statement, which is also in the HWSCFG*xx* member.

Changes to installing and defining IMS

The **APPL=** parameter is added to the ODACCESS statement in the HWSCFG*xx* member of the IMS PROCLIB data set. To authenticate DRDA client connections to IMS DB by using PassTickets, you must specify on the **APPL=** parameter the application name that is defined to RACF in the PTKTDATA class. The value that is specified on this parameter is used, in addition to the user ID and the RACF PassTicket, by IMS Connect in the RACF call `RACROUTE REQUEST=VERIFY` to authenticate the IMS Connect client to IMS DB.

If a RACF PassTicket is passed from a DRDA client to IMS Connect but this parameter is not specified, the HWS ID from the **ID=** parameter of the HWS statement is used instead by IMS Connect in the RACF call `RACROUTE REQUEST=VERIFY`.

The **APPL=** parameter is used only if **RACF=Y** is specified in the HWS statement of the HWSCFG*xx* member.

Changes to programming for IMS

To enable you to use the SQL Batch utility to generate RACF PassTickets to authenticate user access to IMS DB from a JDBC application, the **applName** URL property is added to the `DriverManager.getConnection` method of the IMS Universal JDBC driver. On the **applName** parameter, you can specify the 1- to 8-character application name that is defined to RACF in the PTKTDATA class for DRDA clients that access IMS DB. The value that is specified on this parameter is used by the SQL Batch utility to generate the RACF PassTicket.

When a JDBC application connects to IMS DB by using the JDBC `DriverManager` interface, the connection can be authenticated by a PassTicket only when the SQL Batch utility is run.

If you do not use the SQL Batch utility to generate PassTickets, see Generating and evaluating a PassTicket for information on other methods that you can use to enable your DRDA client to generate and evaluate PassTickets.

The **SECCHK** command (X'106E') is also enhanced to allow the PassTicket to be passed to IMS Connect, regardless of whether the PassTicket is generated by the SQL Batch utility or by another service. To pass the generated PassTicket to IMS Connect to authenticate a user to access IMS DB from a DRDA client, include the PassTicket in the code point, X'11A1', for the **PASSWORD** parameter of the command. The user ID must also be specified in the code point, X'11A0', for the **USRID** parameter of the command. IMS Connect uses, in addition to value of the **APPL=** parameter of the ODACCESS statement, the user ID and the PassTicket that are received on the **SECCHK** command to call RACF for user authentication.

Changes to commands

The following commands are enhanced:

QUERY IMSCON TYPE(CONFIG)
The **ODBMAPPL** filter is added to this command to display the value that is specified on the **APPL=** parameter of the ODACCESS statement:

```
QUERY IMSCON TYPE(CONFIG) SHOW(ODBMAPPL)
```

UPDATE IMSCON TYPE(CONFIG)
The **ODBMAPPL** keyword option is added to this command. You can use this keyword option to set the application name that is used by IMS Connect on the RACROUTE REQUEST=VERIFY RACF call to verify DRDA client connections to IMS DB:

```
UPDATE IMSCON TYPE(CONFIG) SET(ODBMAPPL(applname))
```

Changes to exit routines

The IMS Connect DB security user exit routine (HWSAUTH0) is enhanced with the **AUTPM_AAppl** field in the HWSAUTPM parameter list. This field includes the application name that is specified on the **APPL=** parameter of the ODACCESS statement.

Changes to utilities

The SQL Batch utility is enhanced to generate RACF PassTickets to authenticate users of JDBC applications to access IMS DB. To enable the utility to generate RACF PassTickets, you must specify the name of the application that the user requires access to on the **applName** URL property of the `DriverManager.getConnection` method.

To use the SQL Batch utility to generate RACF PassTickets, in addition to specifying the application name in the **applName** property of the `DriverManager.getConnection` method, you must also ensure that the following conditions are met:

- Both the `IRRRacf.jar` and `ibmjzos.jar` files are in the job's class path.
- The following values are the same as each other:
  - The value of the **applName** URL property of the `DriverManager.getConnection` method.
  - The value of the **APPL=** parameter of the ODACCESS statement, which is in the HWSCFG*xx* member of the IMS PROCLIB data set.
- On the JOB statement of the JCL for the SQL Batch utility, the z/OS user ID that is associated with the job is specified.

Coexistence considerations

To use the updates to the **QUERY IMSCON TYPE(CONFIG)** and **UPDATE IMSCON TYPE(CONFIG)** commands that are delivered with this enhancement in a mixed-version IMSplex that includes both IMS 14 and IMS 15, apply the IMS 15 APAR/PTF for this enhancement before you apply the IMS 14 APAR/PTF. That is, apply IMS 15 APAR PI99040 (PTF UI58288) on IMS 15 systems before you apply IMS 14 APAR PI99038 (PTF UI58287) on IMS 14 systems.

IMS Connect message HWSC0010I enhancement

In IMS 15, IMS Connect message HWSC0010I is enhanced to be issued after IMS Connect initialization is complete. With this enhancement, system administrators can start automated operations after message HWSC0010I is issued to ensure that their automated operations and requests are processed by IMS Connect.

This enhancement is delivered by APAR PI91859 (PTF UI55921).

Previously, message HWSC0010I was issued after IMS Connect started, but IMS Connect might not have completed initialization. Consequently, requests that were sent to IMS Connect after message HWSC0010I was issued might not have been processed and might have failed.

With this enhancement, message HWSC0010I is issued after all the internal components of IMS Connect are initialized.

Restriction: If Open Database Manager (ODBM) is started and **RRS=Y** is specified, but z/OS Resource Recovery Services (RRS) is not started, IMS Connect does not issue message HWSC0010I. Instead, ODBM issues message CSL4001A. In this situation, message HWSC0010I is issued only after the system operator submits RETRY, CONTINUE, or CANCEL in response to message CSL4001A.

Changes to administering IMS

Message HWSC0010I is changed to be issued after instead of before IMS Connect is initialized. System administrators can change automated operations to start after message HWSC0010I is issued to ensure that the operations are processed by IMS Connect. If message HWSC0010I is already being used to start automated operations, you do not need to change your automation.

Changes to troubleshooting for IMS

Message HWSC0010I is changed to be issued after instead of before IMS Connect is initialized. Message HWSC0010I is also enhanced to specify the ID of the IMS Connect instance. The IMS Connect ID that is specified in message HWSC0010I is defined in the **ID=** parameter of the HWS statement in the HWSCFG*xx* member of the IMS PROCLIB data set.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Maximum number of IMS Connect ports enhancement

In IMS 15, the maximum total number of ports that you can define is increased to 200.

The previous maximum number was 50.

All ports that are defined to an IMS Connect instance count toward the maximum, including CICS and DRDA ports.

Changes to installing and defining IMS

When you are configuring IMS Connect ports, the maximum number of ports that you can specify is now 200. This is a new maximum for the sum total of all defined ports, including CICS and DRDA ports.

Changes to troubleshooting for IMS

At IMS Connect startup, if more than 200 ports are defined in the IMS Connect HWSCFGxx configuration member, IMS Connect issues existing message HWSX0909E and abends with existing abend code U3401.

Changes to commands

The CREATE IMSCON TYPE(PORT) command issues a new completion code when the maximum number of ports is reached.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

IMS installed level enhancements

In IMS 15, IMS installed level enhancements enable you to get information about the installed IMS release, version, and modification level.

IMS installed level enhancement in the IMS Monitor log record

In IMS 15, the IMS installed level is added to the IMS Monitor's start record, the X'4E90' record.

This enhancement is delivered with APAR/PTF PH17307/UI68217.

Log record changes

The following log records are new or changed by this enhancement in IMS 15:

- X'4E90'

IMS installed level API (DFSGVRM) enhancement

In IMS 15, you can use the DFSGVRM API to get the version, release, and modification level of an IMS system.

The DFSGVRM API is provided with IMS in the DFSGVRM assembler language macro with APAR PH14457.

Changes to programming for IMS

For a list of topics about programming IMS that are changed by this enhancement, see the System Programming APIs row in the table in “IMS installed level API (DFSGVRM) enhancement” on page 158.

IMS security enhancements

IMS 15 introduces security enhancements.

RACF PassTicket support for commands from IMS Connect to IMS OM

In IMS 15, IMS Connect (ICON) clients can use RACF PassTicket authentication to issue commands to IMS Operations Manager (OM) for more secured connections.

RACF PassTickets are one-time-only passwords and are an alternative to RACF passwords and password phrases. RACF PassTickets are also more secure than RACF passwords and password phrases because PassTickets remove the need to send passwords and password phrases across the network in clear text.

Previously, when users sent commands from IMS Connect to IMS OM, the application name field could not be used. This prevented ICON users from using PassTickets for authentication.

With this enhanced support for RACF PassTicket authentication, you can use RACF PassTickets as an alternative to passwords to authenticate user IDs for ICON client connections to IMS OM. The IMS Connect API (ICON API) for Java is also enhanced to accommodate this enhancement.

This enhancement is delivered with APAR PH51844 and PH54017.

Changes to programming for IMS

For PassTicket support, you are responsible for all definitions to RACF. You need to establish the RACF PassTicket generation routine and to supply the routine to the distributed platform. To use RACF PassTickets, specify the PassTicket in the IRM in place of the password and also specify the application name.

For IMS Connect API for Java clients, the ICON API does not generate RACF PassTickets. Clients are responsible for generating the PassTickets and setting it in the command request message by issuing the `TmInteraction.setRacfPassword()` method. Clients must also specify the application name by issuing `TmInteraction.setRacfApplName()`.

For more information, see RACF PassTicket for IMS Connect Client connections to IMS OM (Communications and Connections).

Displaying RACF sign-on messages

In IMS 15, after APAR PI85328 (PTFs UI57463 and UI57462) is installed, you can configure IMS to pass RACF sign-on messages to the Greeting Message exit routine (DFSGMSG0) when sign-on is successful. You can code the DFSGMSG0 user exit routine to display or process the RACF messages to improve security and password management.

To configure IMS to pass RACF sign-on messages, such as ICH70001 and ICH70002, to the DFSGMSG0 exit routine when sign-on is successful, specify **RACFMSG=Y** in the DFSDC*xxx* PROCLIB member. When a user successfully signs on, IMS passes the storage address of the messages in the parameter list of the exit routine.

The messages are returned by IMS in the WTO format.

For more information about these RACF messages, see z/OS: RACF miscellaneous messages.

Requirements

This support requires the installation of IMS APAR PI85328 (PTFs UI57463 and UI57462).

Changes to installing and defining IMS

During IMS system definition, you can now specify **RACFMSG=Y** in the DFSDC*xxx* PROCLIB member to direct IMS to pass the RACF sign-on messages to the DFSGMSG0 user exit routine.

Changes to exit routines

The parameter list for the Greeting Message exit routine (DFSGMSG0) is updated to include the storage address of the RACF sign-on messages, if any. You can then add code to your DFSGMSG0 exit routine to process the messages as appropriate.

The following example code is from the sample DFSGMSG0 user exit routine. The code, which is shipped disabled, checks for RACF messages and sends them to the system console as WTO messages.

```
CHKTYPE  DS    0H
         J     RACFDONE
         ICM   3,15,GMSGRMSG       IS THERE A RACF MSG
         BZ    SKIPMSGS            NO, SKIP MESSAGES
         AHI   3,8                 SKIP LENGTH AND PTR TO NEXT
         WTO   MF=(E,(3))          SEND MSG
         J     RACFDONE
SKIPMSGS DS    0H
         WTO   'DFSGMSG0 NO RACF MSGS'
RACFDONE DS    0H
```

Generic return code enhancement for RACF verifications

In IMS 15, if RACF is used to provide sign-on verification for VTAM terminals or IMS Connect clients and the user ID or password provided at sign-on is invalid, you can enable a generic return code or message to be returned instead of the actual RACF or IMS return code.

With this enhancement, you can inhibit access to information about RACF-verified sign-ons until valid user IDs and passwords are provided.

The option to enable the RACF generic return code to be returned when attempts to sign on to IMS fail is delivered by the following APARs/PTFs:

- For sign-on from VTAM terminals, APAR PI95173 (PTFs UI55199 and UI55198)
- For sign-on from IMS Connect clients, APAR PI94909 (PTF UI55527)

Changes to installing and defining IMS

The **SGNGENRC=** parameter for procedures is added to allow you to specify whether a generic return code is issued by IMS if RACF is used to verify sign-ons to IMS and the user ID or password provided is invalid.

The **RACFGENRC=** parameter is added to the HWS statement of the HWSCFG*xx* member of the IMS PROCLIB data set to allow you to specify whether a generic return code or message is returned by IMS Connect. The generic return code or message is issued if RACF is used to verify sign-ons from IMS Connect clients and the user ID or password provided is invalid.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to commands

The **UPDATE IMSCON TYPE(CONFIG)** command is enhanced to add the **RACFGENRC** attribute to the **SET** keyword. You can use the **RACFGENRC** attribute to define whether a generic return code or message is returned if RACF is used to verify sign-ons from IMS Connect clients and the user ID or password provided is invalid.

The **QUERY IMSCON TYPE(CONFIG)** command is enhanced to add the **RACFGENRC** filter to the **SHOW** keyword. You can use the **RACFGENRC** filter to query whether a generic return code or message is returned if RACF is used to verify sign-ons from IMS Connect clients and the user ID or password provided is invalid.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Changes to exit routines

The Security Information Block (SAFIB) of the IMS Connect Event Recorder exit routine (HWSTECL0) is enhanced to indicate that a RACF request type is R_PASSWORD.

INQY ENVIRON2 enhancement

The new INQY call ENVIRON2 subfunction returns more information about an IMS execution environment than the ENVIRON subfunction. ENVIRON2 returns output such as primary and active JVM addressing

modes, Managed ACB activation, IMS installed version, and IMS function level. To use this enhancement, install APAR/PTF PH45098/UI90543.

The ENVIRON subfunction remains unchanged to preserve compatibility with existing application programs. The new IMS DL/I INQY call ENVIRON2 subfunction includes all the values that are returned by ENVIRON, and adds the following information:

- An integer value that represents the address mode of the Java virtual machine (JVM) requested for an IMS dependent region.
- A field to indicate whether the program is running in a Managed ACB environment.
- IMS installed release level, IMS function level, and IMS functions enabled bitmap.
- A version number for the INQY ENVIRON2 output.

Recommendation: The INQY ENVIRON2 DL/I call expands the returned output length from x'7E' (decimal 126) bytes to x'B2' (decimal 178) bytes. If the buffer provided for the output area is too short, the call completes with status code AG, and the output is truncated. To ensure that the output area is large enough, specify a length of 512 bytes, which provides sufficient length and accommodates future expansion of INQY ENVIRON2.

Non-stop PSB after an application abends in a non-message-driven BMP region

You can program the Non-Discardable Messages exit (DFSNDMX0) to control programs after an application abends in a non-message-driven BMP region. To do so, this enhancement provides new keywords that you can use with the optional **`NDMX_CALLED_FOR()`** parameter.

The DFSNDMX0 exit has been enhanced to support non-message-driven BMP region operations. You can now program the exit to specify the following transaction status:

- **1**: Do not (U)STOP the abended transaction (TRAN) and do not STOP the abended program (PSB).
- **3**: Do not (U)STOP the abended transaction (TRAN), do not STOP the abended program (PSB), and do not send the DFS555I message.

For non-message-driven BMP regions, the DFSNDMX0 exit supports **return code 0** (CONTINUE NORMAL PROCESSING).

You can use the new keywords to specify whether the NDMX exits specified on the EXITDEF=(TYPE=NDMX) statement are called for both, either, or neither message-driven and non-message-driven BMP regions. For the full list of keywords and several examples, see USER_EXITS section of the DFSDFxxx member (System Definition).

Changes to exit routines

The DFSNDMX0 exit routine has been enhanced to support non-message-driven BMP region operations. To learn more, see USER_EXITS section of the DFSDFxxx member (System Definition).

IMS JDBC Map Case enhancement

The JDBC Map Case enhancement provides an optional **`removeInvalidCaseFields`** connection property to return only valid map case columns and fields in a SQL result set.

If you use a SQL SELECT * statement and a WHERE clause with the IMS Universal JDBC driver to retrieve map case fields from a segment, the returned results include all fields by default. You can simplify your results by using the **`removeInvalidCaseFields`** property to remove case fields from the result set that do not satisfy the DEPENDINGON field condition in the WHERE clause. To learn more, see Using the removeInvalidCaseFields property (Application Programming).

IMS Connect send-only with error protocol enhancement

In IMS 15, IMS Connect clients can use the new send-only with error protocol to send transactions and receive errors that occur in IMS Connect.

When users use the existing send-only protocol, IMS Connect does not return any error response to the client. By using the send-only with error protocol, clients could receive responses for errors that occur in IMS Connect while maintaining the high throughput of the send-only protocol.

Note that IMS Connect does not return error messages from the IMS system. The IMS Connect send-only with error protocol returns only error messages from IMS Connect client back to the client.

This enhancement is delivered with APAR PH41890/PTF UI81659.

IMS compliance control blocks support

In IMS 15, the IMS compliance control blocks support provides access to compliance-related data in the Operation Manager and IMS Connect that can be collected for compliance audit purposes.

With the release of IBM z16, a new product, IBM Z Security and Compliance Center (zSCC) is launched to help take the complexity out of the compliance workflow and the ambiguity out of audits. It provides a dashboard that presents security compliance audit data obtained through automated fact collection about an IBM Z system.

In IMS, the Operation Manager (OM) and IMS Connect address spaces have configuration parameter settings that can be used for compliance audits. These settings are typically held in non-source-shipped control blocks whose format and location are not available to non-IMS programs.

However, with the enhancement delivered by APAR PH42600 in IMS 15, OM and IMS address spaces copy and consolidate internal compliance audit settings into new compliance data control blocks that are source-shipped. These address spaces then provide the address of the control blocks by using a z/OS® name and token pair with the name BPECOMPLIANCEDAT.

Any product that performs security audit compliance checks can use these new control blocks to access compliance audit data that is previously inaccessible from OM and IMS Connect. One such product is IBM Security zSecure Suite 2.5.0 with APAR OA63173 (PTF UJ08291), which captures the compliance data and makes it available for compliance tests and displays it in ISPF or in batch reports. IBM Z Security and Compliance Center then externalizes the compliance data to SMF 1154 subtype 85, 86, and 87 records and uses the SMF 1154 records to evaluate an installation's compliance state, which can be displayed on the zSCC dashboard.

For information about the new OM and IMS Connect compliance data control blocks, see IMS compliance control blocks in the System Programming APIs publication.

For more information about IBM Security zSecure Suite 2.5.0, see IBM Security zSecure Suite 2.5.0 Documentation.

For more information about IBM Z Security and Compliance Center, see IBM Z Security and Compliance Center.

Requirements

IBM Z Security and Compliance Center requires IBM z16.

Changes to troubleshooting for IMS

This enhancement introduces changes to the following message and abend code:

- HWSX0909E
- BPE ABEND 3400

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to commands

New codes are added to the following commands in **CREATE IMSCON** command:

- **CREATE IMSCON TYPE(DATASTORE)** command
- **CREATE IMSCON TYPE(IMSPLEX)** command

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Related reference

IBM Security zSecure Suite 2.5.0

Related information

IBM Z Security and Compliance Center

IMS Fast Monitor (FASTMON) user exit enhancement

IMS 15 introduces a new exit, the IMS Fast Monitor user exit (FASTMON), which provides a programming interface for you to capture the same data that is available to the IMS Monitor.

The new IMS Fast Monitor (FASTMON) user exit, like the IMS Monitor (IMSMON) user exit, provides access to the IMS Monitor data without the need to modify IMS code. However, the FASTMON exit is optimized to minimize performance overhead, in exchange for certain functional restrictions.

Compared to the IMSMON user exit, the FASTMON user exit:

- Not refreshable;
- Cannot use user exit callable services;
- Has a simpler register interface.

The FASTMON user exit is called during IMS initialization, IMS termination, and at IMS monitor call points for registered SLOG codes, regardless of whether the IMS Monitor is on or off.

Restrictions

An exit must not modify any other places in the array except for moving a 'Y' in the slot that represents the SLOG codes that the exit is interested in. Because all exit routines for the IMSMON and FASTMON exit types are passed in the same array, making other changes to the slot might unregister another exit's interest in that SLOG code if that exit also puts a 'Y' there.

Changes to installing and defining IMS

The FASTMON user exit can be specified in the EXITDEF parameter in the USER_EXITS section of the DFSDFxxx member.

Changes to administering IMS

The FASTMON user exit provides a similar exit point as the IMSMON user exit does. When FASTMON and IMSMON user exits are both defined, all the FASTMON exits are called first in the order that is listed on the EXITDEF parameter before all the IMSMON exits being called.

Changes to troubleshooting for IMS

This enhancement introduces the following new or changed IMS messages:

- DFS4570E
- DFS4573E

- DFS4588E (new)

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to commands

Support for the FASTMON exit type is added to the **QUERY USEREXIT** and **REFRESH USEREXIT** commands.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Changes to exit routines

A new IMS Fast Monitor (FASTMON) user exit is introduced.

Support for the FASTMON exit type is added to the IMS Monitor (IMSMON) user exit because the FASTMON exit might affect some of the IMSMON exit's behaviors.

ACEE creation and management enhancement for ESAF Db2 interface

In IMS 15, a new optional keyword **RLA= Y|N** is added to the SSM member of the IMS PROCLIB data set for the Db2 subsystem to reduce the overheads of ACEE creation and management. This is delivered through APAR PH33024.

The ACEE (accessor environment element) is needed for external subsystem (ESS) thread processing to avoid using Db2 internal security. Previously, an ESS created and managed the ACEE for every ESAF call whenever the ACEE was needed with the exception of using ESAF_SIGNON_ACEE for a JVM dependent region. As a result, much workload was caused in the ACEE creation and deletion for every ESAF call. To improve the ESS performance in ACEE creation and management, a **Region Level ACEE (RLA)** parameter is added to the SSM member of the IMS PROCLIB data set for the Db2 subsystem. **RLA=** is a keyword-only parameter that cannot be specified as a positional parameter.

With APAR PH33024, IMS can optionally pass the dependent region address space level ACEE to the Db2 at external subsystem (ESS) Signon. When **RLA=Y** is specified for an Db2 entry in **SSM= proclibmember**, the region level ACEE is passed to Db2 at ESS Signon if there is no ESAF_SIGNON_ACEE present and no TCB level ACEE is present.

This enhancement reduces the overhead of ACEE creation and management because the ACEE is created only once when IMS dependent region address space is initialized and the ACEE is available for future use.

Security considerations

This enhancement would allow Db2 to use external security processing rather than use the internal processing by default. Because there is a one-to-one relationship between IMS transaction code, IMS PSB name, and Db2 package names, and IMS checks the transaction code versus the actual end user ID at the transaction point of entry, it is often acceptable to use the dependent region address space user ID and not the actual end user ID to perform Db2 external security processing. The address space user ID can be controlled by customer to match the IMS/Db2 workloads running in the dependent region. Different dependent regions can have different user IDs.

Changes to troubleshooting for IMS

A new message **DFS7432I** will be issued with the subsystem name and the job name information when a dependent region is up with the parameter **RLA=Y** is specified.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to commands

The /DISPLAY SUBSYS command has been enhanced to include the parameter **RLA=** to display on the second line of the **/DIS SUBSYS** command output to show the RLA value for the IMS control region. This could be **Y**, **N**, or blank. When blank is displayed, it means the **RLA=** is not specified in the control region SSM proclibmember.

For more information about the command for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

HEX and binary literal support in JDBC SQL queries

In IMS 15, IMS Universal JDBC Drivers support the usage of HEX and binary literals in the SQL syntax. This enhancement is delivered with APAR PH25586/ UI 71410 for IMS15 and PH 25585/ UI71424 for IMS14.

IMS Universal JDBC drivers support the usage of HEX and binary literals in the SQL syntax. The supported SQL statements for literals include SELECT, INSERT, UPDATE, DELETE, and fields within the WHERE clause. This enhancement would enable an application developer to specify a standard way to specify the HEX or binary literals values in an SQL (INSERT, UPDATE, DELETE or SELECT) call. This enhancement is delivered with APAR PH25586/ UI 71410 for IMS15 and PH 25585/ UI71424 for IMS14.

Requirements

To enable the use of HEX or binary literals in JDBC SQL queries, **`UserTypeConverters`** must be updated to support `setBytes()` and `getBytes()`.

IMS support for IBM z/OS Workload Interaction Correlator

With the introduction of IMS support for IBM z/OS Workload Interaction Correlator in IMS 15, you can gain a unified view of workload performance data for an IMS system and other participating z/OS components and middleware.

Previously, diagnosing IMS performance issues could be challenging because analysis of IMS and other z/OS components and middleware was performed in silo. . In addition, analysis of the correlation between IMS and other participating z/OS components required specialized skills and manual work.

To address the issues, IMS support for IBM z/OS Workload Interaction Correlator is introduced. IBM z/OS Workload Interaction Correlator gathers statistical data from participating applications, and generates synchronized, standardized, summarized data across z/OS and middleware stack. IMS data is collected as part of the unified workload insights, which enable system administrators to reduce downtime without additional subject matter experts or specialized mainframe skills. For each workload, the performance data is captured at 5-second intervals, and exceptional jobs and activities are recorded so that you can identify abnormal jobs.

This enhancement is delivered with APAR/PTF PH15062/UI. With PH15062, IMS becomes a participating application.

IMS registers with IBM z/OS Workload Interaction Correlator during initialization and delivers statistical data to it through a z/OS System Management Facility (SMF) exit. For every normally complete transaction, Message Processing Program (MPP) regions and Java message processing (JMP) regions record both elapsed time and CPU time in a standard form and in an IBM System z Integrated Information Processor (zIIP) form.

IBM z/OS Workload Interaction Correlator generates SMF type 98 records with subtype 1025 to record these statistics. A new macro DFSSR98A maps the SMF type 98 subtype 1025 records.

DFSSR98A is also used by the z/OS Workload Interaction Navigator in the generation of graphical reports.

Hardware requirements

For the IMS support of IBM z/OS Workload Interaction Correlator added by APAR PH15062 to be effective, IMS must be running on a z14 (machine type 3906) processor, or a higher z/OS processor. IMS with APAR PH15062 may still run on a lower version processor. However, message DFS7431I will be issued and no statistics will be saved.

Software requirements

IMS must be running on a z/OS 2.3 or above operating system that has z/OS APAR OA57165 installed. IMS with PH15062 might still run on an earlier release of z/OS or on a z/OS system that does not have APAR OA57165 installed. However, DFS7431I will be issued and no statistics will be saved.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

INIT OLC TYPE(ACBMBR) command enhancement

The INIT OLC TYPE(ACBMBR) command has new a option called BLDPSBNO.

The BLDPSBNO option enables you to change DBDs that do not have structural updates.

REXXIMS MAPDEF packed decimal function enhancement

In IMS 15, the IMS adapter REXXIMS is enhanced to increase the max MAPDEF length value to 16 bytes for packed (P) and 32 bytes for zoned (Z) data types. This enhancement is delivered with APAR/PTF PH16409/UI66831.

IMS adapter REXXIMS has been enhanced to increase the max MAPDEF length value to 16 bytes for packed (P) and 32 bytes for zoned(Z) data types. In addition to the MAPDEF length values, the scale (.digit) specification has also been increased to allow 0 to 31 digits for both P and Z specifications. The scale indicates the number of digits to the right of a decimal point when converting the number. This enhancement enables REXX programs to map an entire packed decimal field or more than 12 zoned decimal digits and allows application developers to use MAPDEF instead of coding their own routines.

The MAPGET and MAPPUT commands have also been updated to support the longer P and Z length values, as well as the increased scale of a decimal number.

Changes to programming for IMS

This enhancement has updated the valid lengths of the following data types in the MAPDEF, MAPGET and MAPPUT REXXIMS extended commands:

- Zoned decimal **(Z)**: 1-32 bytes
- Packed decimal **(P)** : 1-16 bytes

Data privacy for diagnostics support for IMS 64-bit storage

To protect sensitive diagnostic data that is sent to IBM or other third-party vendors, you can use a sample job run against an IMS dump to redact 64-bit storage objects that have been tagged as SENSITIVE by IMS.

In IMS 15, after APAR PH14059, requests for certain 64-bit storage objects within IMS are made specifying the IARV64 SENSITIVE= parameter to tag the storage as possibly containing or not containing customer sensitive data. Certain areas that can contain sensitive data (for example: Fast Path 64-bit buffers and logger 64-bit buffers) are tagged as sensitive. Other areas that contain only IMS internal control type data (for example: storage tracking elements, internal performance statistics, and resource data) are tagged as not sensitive.

When IMS is run on an IBM z15 processor or later, and on z/OS 2.3 or later with z/OS APARs OA57570 and OA57633, the sensitive or not-sensitive storage tags are included as metadata in SVC dumps and stand-alone dumps (SADUMPs) of IMS storage. You can use the z/OS-provided JCL BLSJDPFD in SYS1.SAMPLIB to create a redacted copy of a dump. Storage marked as sensitive is excluded from this copy. Storage marked as not sensitive is included in this copy. See http://publibz.boulder.ibm.com/zoslib/pdf/OA57570.pdf for additional details.

Note: If you use the z/OS-provided JCL BLSJDPFD to generate a redacted SVC dump or stand-alone dump to send to IBM or another software vendor, ensure that you keep the original complete dump until your case has been resolved. Data removed by the tool may be necessary for solving a problem. IBM may request you provide specific information from the original dump, even if you do not send the complete dump to IBM for data privacy reasons.

Requirements

Hardware requirements: For the Data Privacy for Diagnostics support added by PH14059 to be effective, IMS must run on a z15 (machine type 8561) or later processor. IMS with PH14059 can still execute on a lower supported processor than z15; however, the 64-bit storage tagging will be ignored.

Software requirements: For the Data Privacy for Diagnostics support added by PH14059 to be effective, IMS must be running on a z/OS 2.3 or later operating system that has z/OS APARs OA57570 and OA57633 installed. IMS with PH14059 can still execute on a lower supported operating system, or on an operating system without the indicated z/OS APARs; however, the 64-bit storage tagging will be ignored.

ByteBuffers in the IMS Universal JDBC and DL/I Interfaces

In IMS 15, ByteBuffers have been enabled in the IMS Universal JDBC and DL/I interfaces. A new interface for issuing ICAL and enhanced support for Dynamic Arrays and `ArrayResultSets` have also been added. This feature is delivered by the APAR PH14157/UI64958.

All users of IMS Universal Driver running IMS 15 or higher can now use Byte Buffers as an I/O area to INSERT, SELECT, and UPDATE full segment areas from an SQL query.

Database segment mapping enhancement

In IMS 15, the database segment mapping enhancement allows application developers to access an IMS database segment whose schema is determined by the key feedback data from a parent segment without knowledge of the database schema. This enhancement is delivered with APAR/PI94643/UI59325 (for IMS14) and PI97302/UI59327 (for IMS15).

Starting with IMS V14, this enhancement to database segment mapping allows application developers to access an IMS database segment whose schema is determined by the key feedback data from a parent segment without knowledge of the database schema. It gives database administrators the ability to use the IMS Catalog to maintain field mappings that are dependent on the key feedback data of a segment, in the hierarchical path of the current segment, and make that mapping automatically available to consumers such as application developers and tooling. This enhancement is made available by the following APARs:/PTFs:

- IMS V14 PI96463/UI59325 and PH05093/UI61283
- IMS V15 PI97302/UI59327 and PH05433/UI61285
- V14 APAR PH03415 and V15 APAR PH03426 for IMS Universal Drivers (UDB)

The DSFMAP statement is being enhanced to support a new optional parameter called control segment name, CTLSEGNM. The control segment name parameter specifies the name of a segment in the same hierarchical path of the current segment. When CTLSEGNM is specified, the value on the DEPENDINGON parameter must be a field within the key range of the segment specified on CTLSEGNM. The control segment name will be saved in the IMS Catalog's MAP segment and can be retrieved by the IMS Universal Drivers via a GUR call. The Universal Drivers can then use the control segment value to apply the appropriate mapping to the result set that will be returned to the application.

This APAR modifies the following items:

- The DFSMAP macro in DBDGEN allows specifying the optional parameter CTRLSEGNM.
- ACBGEN can process the optional parameter CTLSEGNM that can be specified on the DFSMAP macro.
- The IMS Catalog populate utility stores the CTLSEGNM value in the MAP segment of the IMS Catalog.
- The GUR DL/I returns the CTLSEGNM value in the MAP segment of the IMS Catalog.
- The DBD XML schema for the GUR DL/I call includes the CTLSEGNM value.

Requirements

To include the new mapping information in the DBD, use the optional control segment name parameter, CTLSEGNM= in the DFSMAP macro in conjunction with the DEPENDINGON= parameter. Ensure that the control segment is in the same hierarchical path as the segment you are trying to map and the field you specify on the DEPENDINGON= parameter must be part of the key of the control segment. After the CTLSEGNM is added to the DFSMAP statement you must perform DBDGEN and ACBGEN for the affected resources as well as run the Catalog Populate Utility for IMS to write the CTLSEGNM to the IMS Catalog in the MAP segment.

Changes to utilities

IMS Catalog Populate Utility has been updated to store the CTLSEGNM value in the MAP segment of the IMS Catalog.

STOP REGION command enhancement

The /STOP REGION command has a new ABDUMP FORCE keyword to terminate regions with a TERM PENDING or WAIT-INIT-INPROG status when a CREATE THREAD is not performed on IMS.

The STOP REGION command is enhanced with APAR/ PTF PI97394/UI60483 for IMS 14 and PH05432/ UI60488 for IMS 15 to include a new ABDUMP FORCE keyword. This option terminates a range of messages processing the regions with WAIT-INIT-INPROG or TERM PENDING status when a CREATE THREAD is not performed on IMS. This enhancement is applicable to MPP and JMP regions.

Changes to commands

With this enhancement:

- You must issue a /STO REGION ABDUMP FORCE to stop a region with WAIT-INIT-INPROG when SIGN-ON and IDENTIFY are completed for the region, but a CREATE THREAD is not yet performed on IMS.
- You must issue a /STO REGION ABDUMP FORCE to stop a region with a TERM PENDING status when SIGN-ON and IDENTIFY are completed for the region, but a CREATE THREAD is not yet performed on IMS and /STOP REG could not stop the region.

Starting Common Service Layer components enhancement

In IMS 15 with APAR/PTF PH04044/UI60475, IMS is enhanced to automatically start, by using a procedure in an IMS control region, the Common Service Layer (CSL) address spaces in a Resource Manager (RM) environment. More specifically, this enhancement enables IMS to automatically start in an RM environment the Operations Manager (OM), Structured Call Interface (SCI), and RM address spaces of the CSL.

Previously in an RM environment, IMS did not automatically start the OM and SCI address spaces at IMS startup. This was true even if a procedure for the OM or SCI was defined in the IMS PROCLIB data set. In an RM environment, you had to start OM and SCI before you started IMS, manually or through automation, by using the z/OS **START** command or JCL. Also previously, you could not start RM by defining a procedure for the RM in the IMS PROCLIB data set. And, IMS did not start RM automatically at IMS startup. Instead, you could start RM only by using the z/OS **START** command from a z/OS system console or by using JCL.

With this enhancement, IMS automatically starts the OM, RM, or SCI address spaces at IMS start up if a procedure is defined in the IMS PROCLIB data set for the address space, even in an RM environment.

Changes to defining IMS

The **RMPROC=** parameter is added to the following members of the IMS PROCLIB data set. You can use the **RMPROC=** parameter to specify the member of the IMS PROCLIB data set that contains the procedure for the RM address space.

- COMMON_SERVICE_LAYER section of the DFSDF*xxx* member
- DFSCG*xxx* member

IMS restart message enhancement

In IMS 15, message DFS5055I is added to enable you to determine whether IMS restart is in progress, completed, or hung.

This enhancement is delivered with APAR/PTF PH01551/UI59302.

With this enhancement, at IMS normal or emergency restart, the first DFS5055I message is issued when the IMS system starts reading the log records. If IMS restart takes longer than 30 seconds, message DFS5055I is reissued every 30 seconds after the first DFS5055I message is issued. Message DFS5055I is issued a final time when the log read process is complete. If message DFS5055I is neither issued to indicate that the log read is completed nor is it issued at regular 30-second intervals, IMS restart is not making progress and might be hung.

Here is an example of the DFS5055I message text:

```
DFS5055I RESTART LOG READ PASS n IS IN PROGRESS; LSN=lsn
DFS5055I RESTART LOG READ PASS n HAS COMPLETED: LSN=lsn
```

In the message text, *n* is the restart log read pass number, which is 1 for normal restart, or 1 or 2 for emergency restart, and *lsn* is the log sequence number.

Previously, because a message was not issued to indicate log read progress, it was difficult to determine whether IMS restart was in progress or hung when restart was taking a long time.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Open Database Manager (ODBM) and JDBC driver support for INIT STATUS Group call

In IMS 15, support for ODBM to allow INIT STATUS GROUPx call from an application using IMS Universal Drivers (UDB) is added. This feature is delivered through the APARs PH0366 and PH02698 (for IMS Universal Drivers).

To prevent an IMS Java application from terminating abnormally with ABEND U3303 or ABEND U0777 due to an unavailable database or due to a deadlock, respectively, IMS allows the application to issue an INIT STATUS call before the database can be accessed. With APAR PH02698, IMS Universal Drivers can allow an application to issue an INIT STATUS call, in conjunction with APAR PH00366 that modifies ODBM to enable the support. Issuing the INIT STATUS GROUPA call avoids the ABEND U3303 and issuing the INIT STATUS GROUPB call avoids the ABEND U0777.

Note: This enhancement requires that the APARs PH00366 and PH02698 are applied together.

Changes to programming for IMS

The new methods initStatusGroupA(), initStatusGroupB(), and setInitStatusGroup(String) are added to the Java API specifications for IMS Universal Drivers and IMS JDR resource adapter packages to reflect the support extended for INIT STATUS GROUPx calls. To avoid ABEND U3303, use either **`initStatusGroupA()`** or **`setInitStatusGroup("A")`**. To avoid ABEND U0777 due to a deadlock condition (Abendu777) use INIT STATUS GROUPB. A new optional connection property `initStatusGroup` is also added to the JDBC DriverManager interface to connect to the IMS database. For detailed information the INIT STATUS Group calls, see Javadoc listed in the Documentation Changes table.

UPDATE TRAN command enhancement

In IMS 15, the **UPDATE TRAN** command is enhanced with APAR/PTF PH00581/UI58235. The enhancement enables you to run the **UPDATE TRAN** command with the **PLCTTIME** attribute specified whether or not dynamic resource definition (DRD) is enabled.

Previously, the **UPDATE TRAN** command with the **PLCTTIME** attribute specified was processed only if DRD was enabled.

Changes to commands

With this enhancement, return code X'00000010' and reason code X'00004300' are no longer returned when both of the following conditions are true:

- The **UPDATE TRAN** is issued with the **PLCTTIME** attribute specified.
- DRD is disabled.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Log record PARDLI flag enhancement

In IMS 15, the X'08' Log record has been enhanced to include a flag that indicates the use of the Parallel DL/I mode (PARDLI) of the IMS application region that application has been scheduled into. Install APAR/PTF PI99293/UI58053 to enable this enhancement.

Impact to troubleshooting for IMS

The IMS Logs are enhanced to include a new 1-bit flag to indicate the parallel DL/I mode (PARDLI) option(LINTPDLI), which helps to identify if application ISWITCH to DLI for processing, as parallel DL/I mode (PARDLI) is specified.

For a complete list of Log record changes in IMS 15, see Chapter 9, “Log record changes in IMS 15,” on page 95.

IMS Universal Database resource adapter connectivity enhancement for WebSphere Application Server Liberty

In IMS 15, the IMS Universal Database resource adapter is enhanced to provide type-2 and type-4 connectivity support for WebSphere Application Server Liberty.

Type-2 and type-4 connectivity support for WebSphere Application Server Liberty is added to all four types of IMS Universal Database resource adapters:

- `imsudbJLocal.rar`
- `imsudbJXA.rar`
- `imsudbLocal.rar`
- `imsudbXA.rar`

The IMS Universal drivers are also enhanced to work in the CICS OSGi environment.

This enhancement is enabled by APAR PI95663/UI57273.

IVP support for 8-character TSO/E user IDs on z/OS 2.3

In IMS 15, the IVP supports the use of 8-character TSO/E user IDs. This requires that IMS run on z/OS 2.3 or later.

Table 18. Links to topics that have new or changed content for this enhancement

Publication	Links to topics
Release planning	• IMS Version 15 enhancements – “IMS 15 system continuous delivery functions” on page 106 – “IVP support for 8-character TSO/E user IDs on z/OS 2.3” on page 171 (new) (this topic)

Function level activation control enhancement

In IMS 15 with APAR/PTF PI83839/UI52153, you can dynamically enable or disable new IMS functions that are delivered as PTFs under the IMS continuous delivery model without causing an IMS system outage. After you install a new IMS function, you control when to enable and disable the function by using the **UPDATE IMSFUNC** command.

You can continue to enable or disable IMS functions statically by using IMS PROCLIB data set members as with earlier versions of IMS.

This enhancement also provides the following features to support the continuous delivery of IMS functions:

Function level
A number that identifies a PTF containing one or more IMS functions regardless of whether the function is enabled or not in the IMS system.

Function table
Contains information about significant new or changed IMS functions delivered by IMS henceforth, including the current IMS function level and an entry for each function to provide more information about the function.

IMS functions enabled bitmap
For IMS functions that are delivered disabled, a bit for every IMS function that becomes enabled. The functions enabled bitmap also contains the current IMS function level.

QUERY IMSFUNC command
Displays one or more or all of the IMS functions that are defined in the IMS function table and information about the functions. You can also use the **QUERY IMSFUNC** command to see the current IMS function level.

This enhancement, delivered with APAR/PTF PI83839/UI52153, is the first IMS function, and has a function name of FUNCTIONLEVEL and a function level of 00000001.

Some IMS functions, due to either technical or strategic requirements or because it has no impact until you choose to use it, are enabled by default after you install the PTF. For functions that are enabled by default, you do not need to issue the **UPDATE IMSFUNC** command to start using the enhancement. This function, delivered with APAR/PTF PI83839/UI52153, is enabled by default.

Log record changes

The following log records are new or changed by this enhancement:

X'42'
Enhanced to include the IMS function level at offset X'104'.

X'4500'
Enhanced to include the IMS function level at offset X'C0'.

X'4050'
Newly added to log the following information:

- The IMS functions that are enabled so that the function enablement value can be retrieved at IMS restart.
- The current IMS function level.

X'45FF'
Enhanced to include the following information:

- At offset X'50', the current IMS function level.
- At offset X'54', the offset to the IMS functions enabled bitmap from the start of the X'45FF' log record.
- At offset X'30', some reserved space.

Changes to defining and administering IMS

With this enhancement, after you install a PTF that contains a new continuous delivery IMS function, you decide when to enable and disable IMS functions that are not enabled by default. You can change the function enablement value dynamically by using the **UPDATE IMSFUNC** command. Alternatively, you can enable the new function statically by defining the parameter for the function in the DFSDF*xxx* member of the IMS PROCLIB data set and cold starting IMS.

Tip: If you enable or disable an IMS function by using the **UPDATE IMSFUNC** command, specify the same enablement value in the parameter that defines the function in the IMS PROCLIB data set member. This ensures that the enablement value for the function is retrieved at IMS cold start.

If you change a function enablement value by using the **UPDATE IMSFUNC** command and IMS is cold started, one of the following situations occurs:

- For local functions, the enablement value is retrieved from the DFSDF*xxx* PROCLIB member during cold start. In this case, the **UPDATE IMSFUNC** command might need to be issued following the cold start to return the enablement value to a previous state.
- For global functions, if you use RM, CQS, and a resource structure, the enablement value is retrieved from the resource structure during cold start.
- For catalog functions, the enablement value is retrieved from the catalog during cold start.

Changes that you make by using the **UPDATE IMSFUNC** command are logged in the x'22' map byte x'31' log record and are recoverable across an IMS restart. For example, if a function is enabled in the

DFSDF*xxx* member and later disabled by using the **UPDATE IMSFUNC**, the disabled value is recovered if IMS restarts.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to commands

The **UPDATE IMSFUNC** command is added to allow you to dynamically enable or disable an IMS function, if the function is not enabled by default, whilst IMS remains online.

The **QUERY IMSFUNC** command is added to allow you to display one or more or all of the IMS functions that are defined in the IMS function table and information about the functions. You can also use the **QUERY IMSFUNC** command to see the current IMS function level.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Changes to exit routines

The sample IMS initialization and termination user exit DFSITRX0 is enhanced to show how to access the current IMS function level from the system contents directory (SCD) field SCDFNCE.

Consolidation of IMS logger parameters in the DFSDF*xxx* PROCLIB member

In IMS 15, the parameters that define the IMS logger function are consolidated into a new section, <SECTION=LOGGER>, in the DFSDF*xxx* member of the IMS PROCLIB data set. The LOGGER section of the DFSDF*xxx* PROCLIB member is mandatory.

The IMS logger parameters that were previously specified in the DFSVSM*xx* PROCLIB member are moved to the new LOGGER section of the DFSDF*xxx* PROBLIB member. Any logger parameters that are still specified in the DFSVSM*xx* member are ignored by the IMS system and not reported in the error log.

The **ARC=** and **WADS=** parameters, which were previously specified in the DFSPB*xxx* PROCLIB member or on the EXEC parameters of the control region JCL, are also moved to the DFSDF*xxx* PROCLIB member. If you specify **ARC=** or **WADS=** in DFSPB*xxx* or in the control region JCL, the specifications are ignored by the IMS system.

Migration considerations

IMS 15 is the first IMS release where the DFSDF*xxx* member of the PROCLIB data set is mandatory.

Log record changes

The following log records are new or changed by this enhancement in IMS 15:

- X'4507' - The following fields are added:
  - ST4507_FLG2 (X'80': ST4507_F2_ZHYPOLDS and X'40': ST4507_F2_ZHYPWADS)
  - ST4507_WADSCIS
- X'4507' - The following fields are removed:
  - ST4507_WADSTRACKS
  - ST4507_WADSBLKSTRK

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to exit routines

The control statement for the log edit user exit (LOGEDIT) is moved from the DFSVSM*xx* member of the IMS PROCLIB data set to the new LOGGER section of the DFSDF*xxx* member.

CQS return code enhancements for z/OS Logger write errors

In IMS 15, if the z/OS system logger encounters write errors in support of the IMS Common Queue Server (CQS), CQS issues new return and completion codes to identify the problem as a z/OS system logger write error.

The CQSPUT request, CQSREAD request, and CQSMOVE request can receive new reason codes.

The CQSUNLCK request and CQSCHKPT request can receive new completion codes.

Message CQS0035E can contain new return codes.

Migration considerations

Any customer- or vendor-written CQS client that processes CQS return, reason, or completion codes should be evaluated to see if it should be updated for the new codes.

Encryption support in IMS

In IMS 15, the following types of data sets can be encrypted beside those already supported in earlier versions of IMS.

Write-ahead data set (WADS) encryption

In IMS 15, you can encrypt the data on the Write-ahead data set (WADS).

APAR PI84947 must be installed to enable this feature.

To encrypt WADS data sets, define WADS as extended format and with a key label.

For online IMS operation, the ID associated with the IMS control region must have access to the key label. Additionally, the IDs associated with any utilities that read the WADS also requires access to the key label.

This enhancement offers additional security benefits. Support personnel can operate on the data sets without the authority to read the data sets.

Log record changes

In the x’4507’ record, the following 2-byte field is added: ST4507_ENC_WADS_MTX. This indicates which WADS are encrypted.

Fast Path DEDB area data sets (ADS) encryption

In IMS 15, you can encrypt Fast Path DEDB AREA data sets (ADS) by specifying a key label with it. Install APAR PI83756 to enable this feature. Fast Path DEDB area data sets (ADS) uses z/OS data set encryption, which is available in z/OS 2.2 with APAR OA50569 and dependent APARs installed, or in z/OS 2.3 or later.

Restriction

DEDB ADS encryption requires Fast Path 64-bit buffers. This is specified by FPBP64=Y in the FASTPATH section of the DFSDFxxx member in the IMS PROCLIB data set. DEDB ADS encryption is not supported when you are using 31-bit Fast Path buffers.

You must define all data sets that are encrypted by using z/OS data set encryption, including Fast Path DEDB ADS, as SMS-managed extended format data sets. Do not define Fast Path DEDB ADS with the extended addressability attribute. Ensure that the DATACLAS parameter that you use to allocate your ADS does not include the extended addressability attribute.

Migration considerations

To migrate from non-encrypted Fast Path DEDB ADS to encrypted Fast Path DEDB ADS, perform the following steps:

1. Perform one of the following methods to create encrypted ADS:
   - Define the shadow ADS with the same attributes as the non-encrypted ADS and specify key labels with the shadow ADS. Run DEDB ALTER utility.
   - Define new ADS as SMS-managed extended format DASD and specify key labels with them. Register the new ADS to DBRC by using the following command:

     INIT.ADS DBD(*xxxxxxxx*) AREA(*yyyyyyyy*) ADSN(*AREA data set name*) UNAVAIL

     Run CREATE utility.
2. Stop the non-encrypted ADS if necessary.

To fallback from encrypted Fast Path DEDB ADS to non-encrypted ADS, create new ADS without key label and use the DEDB ALTER and DEDB Area Data Set Create utilities to copy encrypted ADS to new ones.

Remember: If you use non-IMS tools or products to process the Fast Path ADS, confirm with the tool or product provider that the tool or product supports encrypted DEDBs before enabling encryption.

Coexistence considerations

Make sure all the IMS systems that share encrypted Fast Path ADS meet the following requirements:

- All the IMS systems are IMS 15 with APAR PI83756 installed.
- All the IMS systems are using Fast Path 64-bit buffers.
- All the z/OS systems are z/OS 2.2 with OA50569 installed, or z/OS 2.3 and later.

If an encrypted Fast Path ADS is shared by an IMS system that is IMS 14or earlier versions, or IMS 15 without APAR PI83756, this IMS system will not be able to open or access the ADS. Message IEC161I with return code 122 will be displayed.

Performance considerations

Additional Fast Path buffers are used when writing to an encrypted area data set. A temporary buffer is obtained at write I/O time to encrypt the data to be written. This buffer is released after the data has been written to the ADS. Each Fast Path buffer includes the buffer itself (64-bit storage) and a 31-bit ECSA control block called a DMHR, which is used to track the buffer. Therefore, encrypting ADS may increase Fast Path 64-bit buffer and ECSA usage. Use the **FPBP64M=** parameter in the FASTPATH section of the DFSDFxxx member to increase the limit for the amount of 64-bit Fast Path buffers to avoid buffer

shortages if necessary. Monitor the 64-bit buffer usage statistics in the IMS 4516 statistics log records when migrating to encrypted ADS.

Non-stop TRAN and PSB after an application abends

In IMS 15, the DFSNDMX0 exit can be programmed to control transactions and programs when IMS calls the exit after an application abends in an IFP region. This enhancement is delivered through APAR PH 31457.

A system administrator can code the Non-Discardable Messages exit **(DFSNDMX0)** exit to specify what happens to transactions and programs when IMS calls the exit after an application program abends in an IFP region. This enhancement provides the system programmer a more consistent mechanism to control the transactions and the programs after an application abends, across all dependent region types.

The DFSNDMX0 exit has been enhanced to support the message driven IFP regions operation. A system programmer can now program the exit to specify the following transactions status:

- 1 DO NOT (U)STOP TRAN OR PSB
- The following Return Codes of the DFSNDMX0 exit will be supported for IFP region.
  - 0 = CONTINUE NORMAL PROCESSING
  - 4 = DISCARD THE INPUT MESSAGE FROM THE MESSAGE QUEUE

Due to the Fastpath architecture and way of operation, all return codes of the of the DFSNDMX0 exit are not supported for IFP regions operation. Return code 0 and 4 will be supported while return code 8, 12, and 16 will not be supported. Return codes other than 0 and 4 will be treated as 0. For more information about the DFSNDMX0 exit routine, see NDMX: Non-Discardable Messages user exit (DFSNDMX0 and other NDMX exits) (Exit Routines).

Migration considerations

To enable calling the NDMX exit for IFP regions, code the new optional parameter and keyword, **NDMX_CALLED_FOR=(IFP(Y))**, on the USER_EXITS section of the DFSDFxxx member. The EXITDEF and NDMX_CALLED_FOR must be specified to enable the IFP region support.

Log record changes

The following log records are new or changed by this enhancement in IMS 15:

Table 19.

Log record	Description of enhancement
X '67D0'	**DFS67D0** A new one byte field, D0CRGTYP, has been added to the subtype x'0C' log record written by DFSNDMI0 during NDM user exit interface processing to indicate the type of IMS dependent region processed. The D0CRGTYP field will contain one of the following values: • x'88' = Java Message Processing Region (JMP) • x'80' = Message Processing Region (MPP) • x'50' = Message Driven Fast Path Region (IFP) • x'40' = Message Driven Batch Message Processing Region (BMP)

Changes to exit routines

The DFSNDMX0 exit routine has been enhanced to support the message driven IFP regions operations. To activate the support for message driven IFP regions, specify additional parameter NDMX_CALLED_FOR(IFP(Y)) in the USER_EXITS section of the DFSDF member. An example can be found in the USER_EXITS section of the DFSDFxxx member in the IMS Systems Definition Manual.

Program Creation user exit routine (PGMCREAT) enhancement

In IMS 15, you can use the new PGMCREAT type exit to dynamically create the runtime control block (PDIR) for an application program when the application program is scheduled by IMS. The program creation user exit routine (PGMCREAT) can also create the runtime control block for an associated database (DDIR). The Program Creation user exit routine (PGMCREAT) enhancement simplifies the creation of runtime program resources for application programs that run in BMP and JBP regions. With the Program Creation user exit, an IMS system programmer can schedule a BMP or JBP region without having to define the application program to IMS using the stage-1 APPLCTN macro or the IMS type-2 **CREATE PGM** command.

Instead of defining the program resource to IMS during IMS SYSGEN or with the **CREATE PGM** command, the Program Creation user exit can be used to postpone the creation of the program resource until the program is to be scheduled in a BMP or JBP region. When the program is created, the user exit can also optionally create a database resource.

Log record changes

The PGMCREAT user exit can return to IMS to create a new runtime program or database resource. When a program resource is created, an X'22' map byte X'21' log record is written. When a database resource is created, an X'22' map byte X'20' log record is written.

Requirements

Dynamic resource definition must be configured and enabled by specifying MODBLKS=DYN in the DFSDF*xx* or DFSCG*xxx* PROCLIB member.

Restrictions

If a program resource is created, the PSB associated with the program must reside in ACBLIB or the IMS Catalog. If a database resource is created, the DBD associated with the database must also reside in ACBLIB or the IMS Catalog.

Changes to system definition

To work with this exit, the system programmer needs to add the USER_EXITS section in the DFSDFxxx member of the PROCLIB data set. In the USER_EXITS section, specify the PGMCREAT exit type and the name of the user exit routine. For example,

```
<SECTION=USER_EXITS>
           EXITDEF=(TYPE=PGMCREAT,
             EXITS=(exitname))
```

Changes to administering IMS

Define the PGMCREAT user exit routines to IMS specifying EXITDEF=(TYPE=PGMCREAT,EXITS=()) in the DFSDF*xxx* member.

The **QUERY USEREXIT** command can be used to query the information of the PGMCREAT exit.

The **REFRESH USEREXIT** command can be used to bring in a new copy of the program create user exit.

Changes to operating and automating

IMS system programmer can schedule a BMP or JBP region without having to define the application program to IMS using the stage-1 APPLCTN macro or the IMS type-2 **CREATE PGM** command. When the program is created the user exit can specify to optionally create a database resource.

The **REFRESH USEREXIT** command can be used to bring in a new copy of the updated program create user exit without having to bring IMS down. For example,

```
REFRESH USEREXIT TYPE(PGMCREAT) MEMBER(PX0).
```

PGMCREAT is the user exit type and PX0 is the suffix for DFSDF*xxx* member. For more details, see IMS commands (Commands).

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

Changes to commands

QUERY DB and **QUERY PGM** commands can now display a new definition type of PGMCREAT.

QUERY USEREXIT and **REFRESH USEREXIT** commands can show PGMCREAT as new Type. For example,

```
TYPE(exit_type)
PGMCREAT - Program Creation User Exit
```

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

Changes to exit routines

The Program Creation user exit routine can request that IMS dynamically create the runtime program resource for a program that is to be scheduled in a BMP or JBP dependent region. Optionally, the exit can also request that IMS create a runtime database resource. The program and optional database resource are created without requiring a restart of IMS or a type-2 **CREATE** command to be issued.

Reduce need for IMS system definition enhancements

In IMS 15, the IMS system programmers can define and generate an IMS system more easily with the following enhancements.

IMS.OPTIONS data set removal

The IMS.OPTIONS data set removal enhancement simplifies IMS system definition and generation in IMS 15.

The IMS.OPTIONS data set contains only one member, DFSVTAM, which is used to define and set the *&DFSVTAM* and *&DFSBTAM* global variables.

The DFSVTAM member is not used during system generation, so the IMS.OPTIONS data set is removed.

Changes to installing and defining IMS

The IMS.OPTIONS data set is not created during IMS system generation.

The following sample installation jobs no longer references the IMS.OPTIONS data set:

- DFSALOC1, which allocates target and distribution libraries
- DFSDDEF1, which defines SMP/E DDDEFs for the IMS system

The JCL that is generated as the output of stage 1 or during stage 2 no longer references the IMS.OPTIONS data set.

BUFPOOLS macro removal

In IMS 15, the BUFPOOLS macro removal enhancement simplifies IMS system definition and generation.

The BUFPOOLS macro is an IMS System Definition Stage 1 macro that allows the customer to specify default storage buffer pool sizes in DB/DC and DBCTL environments.

For versions earlier than IMS 15, customers can define buffer pool sizes by using corresponding keywords in the DFSPBxxx member of the IMS PROCLIB data set or JCL instead of the BUFPOOLS macro.

In IMS 15, the BUFPOOLS macro will be ignored. If the BUFPOOLS macro is included in the IMS Definition Stage 1, IMS will generate an MNOTE return code 2 with message G116 issued.

Because IMS no longer processes the BUFPOOLS macro, the only way to specify buffer pool sizes is to use the corresponding keywords in the DFSPBxxx member of the IMS PROCLIB data set or in the JCL. If no value is provided, IMS will assign default sizes for each buffer pool. The following table shows the BUFPOOLS macro keywords, their corresponding overrides in the DFSPBxxx member of the IMS PROCLIB data set or JCL, and the default value IMS will assign if no value is provided. For detailed description of the keywords in the BUFPOOLS macro, see BUFPOOLS macro (System Definition).

Attention:

- BUFPOOLS values are specified in bytes but the values in DFSPBxxx are specified in KB by default. Ensure that the BUFPOOLS values are divided by 1024 before they are added in the DFSPBxxx member of the IMS PROCLIB data set or in the JCL.
- If you have already specified the DFSPBxxx parameters, do not replace them with the values in the BUFPOOLS macro of a previous IMS version. Instead, use the values in the DFSPBxxx member of the IMS PROCLIB data set or JCL of the previous version.

Table 20. Default value for DFSPBxxx or JCL keywords

BUFPOOLS keyword	DFSPBxxx member or JCL override	Default value	Description
DMB=	**DMB=**	12288 bytes	Size of the DMB control block pool
EPCB=	**EPCB=**	8192 bytes	Size of the EPCB pool
FORMAT=	**FBP=**	20480 bytes	Size of the message format buffer pool
FRE=	**FRE=**	30	Number of fetch request elements (FREs) for loading MFS control blocks into the message format buffer pool
PSB=	**PSB=**	12288 bytes	Size of the PSB control block pool in subpool 231 storage if the DL/I address space option is not used
PSBW	**PSBW=**	12288 bytes	Size of the PSB work area pool

Table 20. Default value for DFSPBxxx or JCL keywords (continued)

BUFPOOLS keyword	DFSPBxxx member or JCL override	Default value	Description
SASPSB=(size1,)	**CSAPSB=**	4096 bytes	Size of the PSB control block pool in the z/OS common storage area (CSA) if the DL/I address space option (LSO=S) is used
SASPSB=(,size2)	**DLIPSB=**	8192 bytes	Size of the PSB control block pool in the DL/I address space if the DL/I address space option (LSO=S) is used

To override the IMS defaults, provide the keyword values in the DFSPBxxx member of the IMS PROCLIB data set or in the JCL. If you used the BUFPOOLS macro, move the BUFPOOLS macro definitions into the DFSPBxxx member of the IMS PROCLIB data set or the JCL so that IMS uses the correct buffer pool definitions after the next cold start.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

IMSCTF macro removal

In IMS 15, the IMSCTF macro is removed to simplify IMS system definition and generation.

If the IMSCTF macro is specified, IMS System generation stage 1 assembly issues message G122 in an MNOTE 2, which results in a return code of 2 for the assembly.

Migration considerations

With this enhancement, options that you previously defined in the IMSCTF macro can be defined in IMS 15 by using the DFSPB*xxx* member of the IMS PROCLIB data set, JCL, or the DFSIDEF0 module. If you do not migrate the values that you previously specified on the IMSCTF macro, default values are used by IMS instead.

Table 21. Methods you can use in IMS 15 to specify previously defined IMSCTF macro parameters, and default values for the parameters in IMS 15

IMSCTF macro parameter	How to specify the parameter for IMS 15	Default value in IMS 15
CPLOG=	Use one of the following methods: • The **CPLOG=** parameter in the DFSPB*xxx* member • The **CPLOG=** parameter in JCL • The **/CHANGE CPLOG** command In previous IMS versions, the CPLOG in the IMSCTF macro could be coded as an exact value. In IMS 15, you can no longer do this. You must use K or M. K means 1024, and M means 1024*1024.	500,000
LOG=	If you specified **LOG=(DUAL)** in the IMSCTF macro, use the sample DBBBATCH, DLIBATCH, IMSCOBGO, or IMSPLIGO procedures and remove the asterisk (*) for the IEFRDER2 DD statement. If you specified **LOG=(,MONITOR)** in the IMSCTF macro, use the sample DBC, DCC, or IMS procedures and remove the asterisk (*) for the IMSMON DD statement.	No default values are provided.
PRDR=	Use one of the following methods: • The **PRDR=** parameter in the DFSPB*xxx* member • The **PRDR=** parameter in JCL	IMSRDR
RDS=	Use one of the following methods: • The **RDS=** parameter in the DFSPB*xxx* member • The **RDS=** parameter in JCL	4096

Table 21. Methods you can use in IMS 15 to specify previously defined IMSCTF macro parameters, and default values for the parameters in IMS 15 (continued)

IMSCTF macro parameter	How to specify the parameter for IMS 15	Default value in IMS 15

SVCNO=	Use one of the following methods to specify a type 2 SVC number:
	Important: If you use the Open Database Access (ODBA) interface or the database resource adapter (DRA) and you do not want to use the default value of 254 for the type 2 SVC number, you can define the number only by using the DFSIDEF macro of the DFSIDEF0 module.
	• The **SVC2=** parameter in the DFSPB*xxx* member
	• The **SVC2=** parameter in JCL
	• Specify the following code in the DFSIDEF0 module:
	`DFSIDEF TYPE=PARM SVC2=`
	To specify a type 4 SVC number, specify the following code in the DFSIDEF0 module:
	`DFSIDEF TYPE=PARM SVC4=`
		The default value for the type 2 SVC number is 254.
		The default value for the type 4 SVC number is 255.

For detailed information on how to migrate the parameters that you specified on the IMSCTF macro, see "IMSCTF macro removal migration considerations" on page 45.

Changes to installing and defining IMS

The Installation and Verification Program (IVP) is modified to assist in re-linking the type 2 and type 4 SVC routines.

The Syntax Checker is modified to assist in specifying the new DFSPBxxx member parameters.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, "Message and code changes in IMS 15," on page 85.

SDFSPROC data set for sample procedures removal

The IMS system definition process no longer generates sample procedures. Instead, most of the procedures that were generated by system definition are now built during SMP/E processing and placed in the new ADFSPROC and SDFSPROC library data sets.

The following procedures are removed from SYSGEN.

Table 22. Sample procedures that are removed from SYSGEN

ACBGEN to DFSMPR	**DFSMREC to IMS**	**IMSBATCH to IMSWTxxx (can be multiple)**	**INITMOD to REFCPY**
ACBGEN	DFSMREC	IMSBATCH	INITMOD
CBLTDLI	DFSPBDBC	IMSCOBGO	MFSBACK
DBBBATCH	DFSPBDCC	IMSCOBOL	MFSBTCH1
DBC	DFSPBIMS	IMSDALOC	MFSBTCH2
DBDGEN	DFSUOLC	IMSFP	MFSDCT
DBRC or from IMSCTRL DBRCNM=	DFSVSM00	IMSJBP	MFSREST
DCC	DFSWTxxx (can be multiple)	IMSJMP	MFSRVC
DFSACBCP	DLIBATCH	IMSMSG	MFSTEST
DFSBMP	DLISAS or from IMSCTRL DLINM=	IMSMSV	MFSUTL
DFSIFP	FDR	IMSPLI	OLCUTL
DFSJBP	FMTCPY	IMSPLIGO	PLITDLI
DFSJMP	FPUTIL	IMSRDR or from IMSCTF PRDR=	PSBGEN
DFSMPR	IMS	IMSWTxxx (can be multiple)	REFCPY

The following procedures from the table are created by DFSPROCB JCL and placed in the ADFSPROC and SDFSPROC data sets.

- DFSACBCP
- CBLTDLI
- DFSMREC
- FMTCPY
- PLITDLI
- REFCPY

The following procedures from the table are renamed by DFSPROCB JCL and placed in the ADFSPROC and SDFSPROC data sets.

- DFSDBDGN is renamed as DBDGEN.
- DFSIMSBT is renamed as IMSBATCH.
- DFSPSBGN is renamed as PSBGEN.

The rest of the procedures from the table are now built during SMP/E processing and placed in the ADFSPROC and SDFSPROC data sets

The sample procedures that were generated by SMP/E before IMS 15 are unchanged and are not placed into the ADSFPROC and SDFSPROC libraries.

Before IMS 15, certain variables in the procedures that were specific to your installation were set based on specifications that are provided in your stage-1 system definition macros. In IMS 15, SMP/E sets those variables to the IMS system defaults, so when you tailor the procedures to your environment, be sure to include these variables also.

Migration considerations

Sample procedures are no longer generated during the SYSGEN processing but installed in the IMS.SDFSPROC and IMS.ADFSPROC data sets during SMP processing. These sample procedures contain default values for variables that the IMS system used to set based on the specifications during IMS stage 1 system definition. The variables should be modified to match what they would have been if generated by the SYSGEN processing. Use the DFSPROCB JCL to modify the sample procedures. Then copy the procedures to the IMS.PROCLIB data set.

Before IMS 15, the **PROCLIB** parameter in the IMSGEN macro determined whether the sample procedures were generated during system definition. In IMS 15, the **PROCLIB** parameter is obsolete. Specifications of **PROCLIB=YES** or **PROCLIB=IMS** trigger a warning message. Specifications of **PROCLIB=NO** are ignored.

The installation verification program (IVP) is modified to accommodate the changes to the sample procedures.

Changes to installing and defining IMS

The IVP is modified to use the sample procedures that are now provided during the SMP processing. The IVP copies the sample procedures from the IMS.SDFSPROC to IMS.PROCLIB data set and uses the symbolic variables that are introduced in the sample procedures in the IMS.SDFSPROC data set. Some IVP steps are modified because of this enhancement.

The **PROCLIB** parameter of the IMSGEN macro is ignored. The default value of this parameter is set to **PROCLIB=NO**. Only **PROCLIB=NO** is allowed.

If PROCLIB=YES or PROCLIB=IMS is specified, the IMS system generates an MNOTE return code 2, with message G918 issued.

Changes to administering IMS

The sample procedures are installed by the SMP processing in the IMS.SDFSPROC. Copy the sample procedures to IMS.PROCLIB data set. Rename and modify them so that the variable values match what they would have been if generated by the SYSGEN processing.

The IVP is modified to accommodate the changes to the sample procedures.

Changes to utilities

This enhancement does not change any utilities; however, it does change how the sample procedures that a small number of utilities can use are created.

User exit routine specification removed from system definition

In IMS 15, to simplify the IMS system definition process and make system configurations more flexible, you no longer specify the use of certain user exit routines in stage-1 system definition macros. Instead, IMS loads these user exits dynamically during startup, and you can specify the use of many of these user exits by using execution parameters.

Type-1 Automated Operator Interface enhancement for 31-bit storage support

For IMS 15, the Type-1 Automated Operator Interface (AOI) exit routine interface module is enhanced to support obtaining 31-bit private storage from the Automated Operator Interface buffer pool (AOIP).

To pass information to the DFSAOUE0 exit routine, the AO exit routine interface module is modified to obtain 31-bit private storage from the AOI buffer pool, instead of obtaining 24-bit private storage from the communication I/O buffer pool (CIOP). If available space is not sufficient in the AOI buffer pool, the new DFS3458 message is issued.

Migration considerations

IMS 15 and later systems obtain the user exit header block (UEHB) and any additional buffers that are passed to the DFSAOUE0 exit routine from 31-bit private storage.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

MODBLKS data set enhancement

In IMS 15, the MODBLKS data set enhancement allows you to define your MODBLKS data set as partitioned data sets extended (PDSEs) to store more resources.

Previously, a MODBLKS data set could be defined only as a partitioned data set (PDS), which limited the size of a MODBLKS data set member to 16 M. However, because a PDSE member can be up to 2 G in size, you can define a MODBLKS data set as a PDSE to store a greater quantity of the IMS system definition output for the control block modules that are affected by online change.

This enhancement is delivered with APAR PI90417 (PTFs UI57447 and UI57448).

Coexistence considerations

The active MODBLKS data set can be a PDS, and the inactive MODBLKS data set can be a PDSE, and vice versa.

Both the active and inactive MODBLKS data sets that IMS cold started with can be PDSs or PDSEs.

Online change supports switching between a MODBLKS PDS and a MODBLKS PDSE and vice versa.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15, see Chapter 8, “Message and code changes in IMS 15,” on page 85.

IMS system enhancements

The enhancements to the IMS 15 system are not specific to either the IMS Database Manager or the IMS Transaction Manager and might impact both.

Part 3. IBM IMS Tools support for IMS 15

The IBM IMS Tools products are designed to enhance the performance and operation of IMS, and are upgraded and enhanced to work with IMS 15.

The IMS Tools products are categorized by function. The information describes the minimum version and release levels of the IBM IMS Tools products that support IMS 15.

For more information about these tools, go to IMS tools.

For a list of IBM IMS Tools PTFs that are required for compatibility with IMS 15.1, go to IBM IMS Tools and IMS Version 15.1 Compatibility.

For a list of current PTFs for these tools, go to IBM Db2 and IMS Tools PTF Listing.

Chapter 14. IBM IMS Tools Solution Packs for z/OS

The IMS Tools Solution Packs consolidate and integrate related tools, utilities, and functions into single, lower-cost offerings to provide complete solutions that improve systems and data management, enhance performance, and support increased availability of IMS DB and TM systems.

IBM IMS Database Solution Pack for z/OS, 2.2

The IBM IMS Database Solution Pack for z/OS is a utilities management tool that combines the entire set of IBM IMS Tools database products that are needed to manage IMS full-function and HALDB databases into a single, consolidated solution.

IMS Database Solution Pack for z/OS helps keep databases operational and tuned. It helps reduce the operational complexity and the impact of database reorganization on system resources.

It provides a comprehensive set of high-performance utilities to unload, load, index build, reorganize, backup, verify, and report on full-function databases.

The IMS Database Solution Pack for z/OS includes the following tools:

- Chapter 15, “IBM IMS Administration Tool for z/OS 1.1,” on page 193
- “IBM IMS Database Reorganization Expert for z/OS, 4.1” on page 201
- “IBM IMS High Performance Image Copy for z/OS, 4.2” on page 199
- “IBM IMS High Performance Load for z/OS, 2.1” on page 202
- “IBM IMS High Performance Pointer Checker for z/OS, 3.1” on page 203
- “IBM IMS High Performance Prefix Resolution for z/OS, 3.1” on page 203
- “IBM IMS High Performance Unload for z/OS, 1.2” on page 202
- “IBM IMS Index Builder for z/OS, 3.1” on page 199
- “IBM IMS Library Integrity Utilities for z/OS, 2.2” on page 204

The elements of both IBM IMS Online Reorganization Facility for z/OS and IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS are also assimilated into IMS Database Solution Pack for z/OS, 2.1 and are new components of the Solution Pack.

Program number: 5655-DSP

IBM IMS Fast Path Solution Pack for z/OS, 1.3

The IBM IMS Fast Path Solution Pack for z/OS delivers extensive utilities that include functions a database administrator can use to analyze, maintain, and tune IMS Fast Path databases. Included are features that can help boost system availability by enabling the operations of a variety of key functions without taking the IMS database offline.

The IBM IMS Fast Path Solution Pack for z/OS includes:

- IMS Database Repair Facility
- IMS High Performance Fast Path Utilities
- “IBM IMS High Performance Image Copy for z/OS, 4.2” on page 199
- “IBM IMS Library Integrity Utilities for z/OS, 2.2” on page 204

Program number: 5655-W14

IBM IMS Performance Solution Pack for z/OS, 2.2

The IBM IMS Performance Solution Pack for z/OS delivers a more affordable, comprehensive portfolio of IBM database management tools. The product combines the features and functions of several separate

tools. The products are tightly integrated, making the end-to-end analysis of IMS transactions faster and easier than ever, supporting improved productivity for problem analysts, improved IMS application performance, more efficient IMS resource utilization, and higher system availability.

The IBM IMS Performance Solution Pack for z/OS includes the following tools:

- "IBM IMS Connect Extensions for z/OS, 2.4" on page 211
- "IBM IMS Performance Analyzer for z/OS, 4.4" on page 212
- "IMS Problem Investigator for z/OS, 2.4" on page 212

Program number: 5698-P21

IBM IMS Recovery Solution Pack for z/OS, 2.1

IBM IMS Recovery Solution Pack for z/OS combines all the features, functions, and processes to support efforts to implement best practices backup and recovery scenarios. It also allows for the simultaneous backup and recovery of multiple data sets and Fast Path areas. This solution can help reduce the operational complexity and the impact of database backup and recovery on system resources.

The IBM IMS Recovery Solution Pack for z/OS includes the following tools:

- IMS Database Recovery Facility
- IMS Database Recovery Facility: Extended Functions
- IMS High Performance Change Accumulation Utility
- IMS Recovery Expert
- "IBM IMS High Performance Image Copy for z/OS, 4.2" on page 199
- "IBM IMS Index Builder for z/OS, 3.1" on page 199

Program number: 5655-ISR

IBM IMS Tools Base for z/OS, 1.6

IBM IMS Tools Base for z/OS consists of various components that support key strategic architectures, technologies, and services that are utilized by IMS tools.

IBM IMS Tools Base provides common functions that are required in all IMS Tools solution pack environments. IMS Tools Base must either already be installed or installed at the same time as a Solution Pack.

IMS Tools Base is a no-charge PID that you must order from ShopZ when you order other IMS Tools solution packs. IMS Tools Base requires a license and must be installed before installing the first IMS Tools solution pack.

For a list of current PTFs for IBM IMS Tools Base, go to IBM Db2 and IMS Tools PTF Listing.

IMS Tools Base components provide the infrastructure that supports key solution strategies for IMS Tools.

Autonomics component tools simplify common database maintenance tasks by collecting database state information, analyzing this data, and providing passive or active responses to conditions that exceed specified threshold values. Common services components provide functions that facilitate the interactions among tools, and between tools and IMS. IMS Tools Base also provides supplementary tools.

IMS Tools Base 1.6 includes the following components:

Autonomics Director

Autonomics Director is a core solution for scheduling and automating common database maintenance tasks. Sensor-enabled IMS Tools products capture the state of specific database conditions and store this data in a centralized repository. Autonomics Director uses Policy Services to evaluate this data and then makes recommendations, such as indicating a need to reorganize a database.

Policy Services
Policy Services use policies and rules to evaluate the sensor data that is collected by IMS Tools products, and then provides a response to any condition that exceeds the specified threshold values.

IMS Tools Knowledge Base
IMS Tools Knowledge Base manages centralized repositories that are created to store and view a variety of data including reports, policies, rules, notification lists, database state (sensor) data, exceptions, recommendations, and evaluation schedules.

Distributed Access Infrastructure
Distributed Access Infrastructure enables distributed clients to access IMS Tools through TCP/IP socket communication.

IMS Tools Common Services
IMS Tools Common Services includes the Generic Exits for calling multiple exit routines from a single exit point, and the Tools Online System Interface that provides a command interface between IMS and IMS Tools.

Connection Server
Connection Server extends ISPF functions for specific IMS Tools to Eclipse-based applications and the IMS Records User Data Utility for scanning and removing from IMS log records any sensitive or confidential user data, such as customer business information.

IMS Hardware Data Compression Extended
IMS Hardware Data Compression Extended provides functions for compressing IMS data by using the z/OS hardware data compression (HDC) that is available on IBM processors.

IMS Batch Terminal Simulator GUI plug-in
The BTS GUI plug-in provides a graphical user interface that allows distributed Eclipse-based clients to access IMS Batch Terminal Simulator in an Eclipse-integrated development environment.

IMS Batch Terminal Simulator Resource Adapter
The BTS Resource Adapter allows you to use IMS Batch Terminal Simulator to test J2C applications that drive IMS Transactions from the WebSphere Application Server environment. Customers use the BTS Resource Adapter to allow their J2C applications to be tested as an inexpensive alternative to testing on a real IMS system.

Program number: 5655-V93

Related concepts

“IBM Management Console for IMS and Db2 for z/OS, 1.1” on page 195
IBM Management Console for IMS and Db2 for z/OS (Management Console) is a lightweight web server that consolidates and simplifies information from IMS and Db2 for z/OS into a single, holistic, web-based interface that is accessible from a standard web browser.

Chapter 15. IBM IMS Administration Tool for z/OS 1.1

IBM IMS Administration Tool for z/OS centralizes the control of key functions for IMS database administrators, giving you the tools you need to manage IMS DBD and PSB resources.

IMS Administration Tool includes reports on IMS catalog space usage that help you compare catalog contents to your current ACB libraries. You can also issue IMS commands, generate simple, task-based JCL for IMS maintenance, and run SQL statements to access your IMS data. All of this is available in one tool through a graphical web user interface or a traditional ISPF interface.

Related information

IBM IMS Administration Tool for z/OS

Chapter 16. IBM Management Console for IMS and Db2 for z/OS, 1.1

IBM Management Console for IMS and Db2 for z/OS (Management Console) is a lightweight web server that consolidates and simplifies information from IMS and Db2 for z/OS into a single, holistic, web-based interface that is accessible from a standard web browser.

The Administration Console component and its embedded IMS Explorer for Administration extension in IMS Tools Base for z/OS, 1.4 are no longer delivered as part of Tools Base for z/OS, 1.5. They are integrated into Management Console with additional functions.

Management Console, a replacement for IMS Control Center, connects to the IMS Operations Manager through IMS Connect. If you are using the IMS Control Center function, use Management Console instead.

Use of Management Console can help simplify and consolidate presentation of complex information that is gathered across all of the IMS and Db2 for z/OS systems.

- With a single installation of Management Console, you can get an enterprise-wide presentation of system health data, including autonomic symptoms, exceptions, and recommended actions through a standard web browser.
- You can progressively drill down from the enterprise or system level down to individual objects.
- The enterprise-wide view displays the resources with the highest severity symptoms and exceptions and provides the ability to navigate directly to those resources with recommended actions.
- Embedded help provides details and concepts to reduce the learning curve and build the essential foundation for new IMS and Db2 for z/OS system programmers and database administrators.
- You can also view, filter, and search IMS Tools reports that are stored within IMS Tools Knowledge Base repositories.
- You can define and optionally schedule active autonomic maintenance windows to automatically perform recommended actions through the graphical calendaring support.

For IMS, with a defined IMS Connect connection and a specified IMSplex name, related resources are discovered.

- Individual resource dashboards are provided for viewing and accessing each IMSplex, IMS subsystem, IMS Connect, IMS database (full function or Fast Path), IMS transaction, IMS program, or IMS routing code.
- You can search for IMS resources, or query, start, and stop IMS resources, individually or in groups.
- You can update transactions, databases, Fast Path routing codes, and application programs.
- You can issue IMS commands from the embedded IMS command console. The command result is displayed in text, and results from type-2 commands can also be viewed in grid mode (table format). Results in both modes can be printed.

Program number: 5655-TAC

Related information

Configuring Management Console for IMSplex management

Configuring Management Console for autonomic maintenance of IMS databases

Chapter 17. IMS application management tools

IBM tools provide the reliability and affordability you need to maximize the value of your IMS application management.

IBM IMS Batch Terminal Simulator for z/OS, 4.1

The IBM IMS Batch Terminal Simulator for z/OS tool:

- Provides a comprehensive way to test and check IMS application program logic, IMS application interfaces, teleprocessing activity, 3270 format control blocks, and database activity.
- Simulates the operation of IMS applications in TSO and batch environments.
- Operates transparently to the applications, requiring no changes to IMS code, control blocks, libraries, or application load modules.
- Provides a trace of all DL/I calls, SQL calls and IBM MQ calls with related details.
- Provides a stable online system in test and production environments to execute applications properly before they are put online.
- Provides Java language application support under JBP regions.
- Provides a Playback function which creates a file of screen images that correspond to the transaction activities captured in an IMS OLDS or SLDS.
- Can include or exclude by LTERM, transaction, and MODname.
- Include by user ID and time range.
- Output listings include a list of the transaction codes that have been executed, user IDs, transaction code/user ID mapping, listing of the MFS MODnames used, and the transaction screen images.

Program number: 5655-BT4

IBM IMS Program Restart Facility for z/OS, 2.2

The IBM IMS Program Restart Facility for z/OS helps to automate the backout and restart of abended IMS Batch Message Processing (BMP) regions and Data Language/I (DL/I) batch jobs.

The IMS Program Restart Facility for z/OS assists with the following actions:

- A batch job that requires a restart is restarted in accordance with proper restart procedures.
- Identifies and uses the correct log data set and the correct checkpoint ID.
- Automates the backout of abended DL/I batch jobs without the need to manually code and execute multiple IMS utility jobs.
- Automates IMS DL/I batch backout processing at the time an abend occurs (or when the job is restarted if backout cannot be done at abend time). The backout process releases database locks and makes database segments available to other tasks.

In a data sharing IMSplex environment, IMS Program Restart Facility for z/OS provides the additional feature of allowing a BMP to be restarted using a different IMS system. Taking advantage of this feature helps to provide improved restart times in the event of a system outage.

In addition, IMS Program Restart Facility for z/OS provides the ability to restart an IMS job on a different version of IMS than was in use when the job abended. This allows the implementation of an IMS version upgrade by simply abending running IMS jobs before the upgrade, and restarting the jobs after the upgrade is completed.

IMS Program Restart Facility for z/OS is easily implemented and typically requires no application changes. While an IMS batch job is running, IMS Program Restart Facility for z/OS intercepts and writes checkpoint

records to two data sets. These data sets are deleted when the batch job completes successfully. In the event of an abend, however, the data sets remain in place and are used to restart the job.

IBM IMS Program Restart Facility for z/OS offers:

- New ISPF interface.
- Significant reduction of contention when options are updated.
- Support for restarting jobs across different versions of IMS.
- Capability to specify options that are based on job name, step name, and IMSID instead of only by job name.

All functions of IBM IMS Batch Backout Manager for z/OS (5697-H75) are now incorporated into IMS Program Restart Facility for z/OS, 2.2.

Program number: 5655-E14

Chapter 18. IMS backup and recovery management tools

The following sections describe the IBM IMS backup and recovery management tools.

IBM IMS DEDB Fast Recovery for z/OS, 2.2

The IBM IMS DEDB Fast Recovery for z/OS tool:

- Assists in the operation and maintenance of data integrity of IMS databases.
- Is designed as a fast alternative to emergency restart (ERE) failure recovery.
- Corrects online log data sets (OLDSs) by invalidating logging for transactions that did not reach the synch point.
- Significantly reduces the amount of time needed to recover DEDBs after an IMS failure.
- Generates the JCL for the MSDB Dump Recovery utility to be processed before an IMS cold start for MSDB (main storage database) recovery.
- Shortens the recovery time of an unscheduled IMS cold start while maintaining the integrity of the IMS databases.
- Supports multiple IMS releases from a single load Library.

Program number: 5655-E32

IBM IMS High Performance Image Copy for z/OS, 4.2

The IBM IMS High Performance Image Copy for z/OS tool functions are:

- Running an image copy function with the hash checking of IMS HP Pointer Checker.
- Performing accuracy checking of an image copy.
- Allocating all input and output data sets dynamically.
- Optionally compressing output image copies.
- Creating image copies.
- Providing advanced copy services; concurrent copy, FlashCopy and SnapShot copies.
- Reducing image copy and recovery time. Reduces elapsed time and CPU utilization.
- Providing automatic checkpoint and restart.
- Stopping and starting databases automatically.
- Integrating with other IMS Tools utilities.

Program number: 5655-N45

IBM IMS Index Builder for z/OS, 3.1

The IBM IMS Index Builder for z/OS:

- Offers several features that improve overall performance and enhance ease of use.
- Builds or rebuilds primary and secondary indexes quickly.
- Allows the user to specify an optional output file where records that are needed for prefix resolution can be split off and written as they are read in.
- Eliminates the need to image copy indexes.
- Recognizes index records that have duplicate keys and writes the duplicate keys to a SYSOUT data set.

- Supports building IMS HALDB primary indexes.
- Integrates with the IMS Database Recovery Facility, which enables the building of primary and secondary indexes during a database recovery.

Program number: 5655-R01

IBM IMS Recovery Expert for z/OS, 2.2

The IBM IMS Recovery Expert for z/OS is a storage-aware backup and recovery solution that integrates storage processor fast-replication facilities with IMS backup and recovery operations to allow instantaneous backups with no application downtime and to help reduce recovery time, and simplify disaster recovery procedures while using fewer processor I/O and storage resources. The IMS Recovery Expert product belongs to the family of IMS Tools that provides backup and recovery solutions.

Program number: 5655-S98

IBM IMS Recovery Solution Pack for z/OS, 2.1

IBM IMS Recovery Solution Pack for z/OS combines all the features, functions, and processes to support efforts to implement best practices backup and recovery scenarios. It also allows for the simultaneous backup and recovery of multiple data sets and Fast Path areas. This solution can help reduce the operational complexity and the impact of database backup and recovery on system resources.

The IBM IMS Recovery Solution Pack for z/OS includes the following tools:

- IMS Database Recovery Facility
- IMS Database Recovery Facility: Extended Functions
- IMS High Performance Change Accumulation Utility
- IMS Recovery Expert
- “IBM IMS High Performance Image Copy for z/OS, 4.2” on page 199
- “IBM IMS Index Builder for z/OS, 3.1” on page 199

Program number: 5655-ISR

Chapter 19. IMS database management tools

The following sections describe the IBM IMS database management tools.

IBM IMS Database Solution Pack for z/OS, 2.2

The IBM IMS Database Solution Pack for z/OS is a utilities management tool that combines the entire set of IBM IMS Tools database products that are needed to manage IMS full-function and HALDB databases into a single, consolidated solution.

IMS Database Solution Pack for z/OS helps keep databases operational and tuned. It helps reduce the operational complexity and the impact of database reorganization on system resources.

It provides a comprehensive set of high-performance utilities to unload, load, index build, reorganize, backup, verify, and report on full-function databases.

The IMS Database Solution Pack for z/OS includes the following tools:

- Chapter 15, “IBM IMS Administration Tool for z/OS 1.1,” on page 193
- “IBM IMS Database Reorganization Expert for z/OS, 4.1” on page 201
- “IBM IMS High Performance Image Copy for z/OS, 4.2” on page 199
- “IBM IMS High Performance Load for z/OS, 2.1” on page 202
- “IBM IMS High Performance Pointer Checker for z/OS, 3.1” on page 203
- “IBM IMS High Performance Prefix Resolution for z/OS, 3.1” on page 203
- “IBM IMS High Performance Unload for z/OS, 1.2” on page 202
- “IBM IMS Index Builder for z/OS, 3.1” on page 199
- “IBM IMS Library Integrity Utilities for z/OS, 2.2” on page 204

The elements of both IBM IMS Online Reorganization Facility for z/OS and IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS are also assimilated into IMS Database Solution Pack for z/OS, 2.1 and are new components of the Solution Pack.

Program number: 5655-DSP

IBM IMS Fast Path Solution Pack for z/OS, 1.3

The IBM IMS Fast Path Solution Pack for z/OS delivers extensive utilities that include functions a database administrator can use to analyze, maintain, and tune IMS Fast Path databases. Included are features that can help boost system availability by enabling the operations of a variety of key functions without taking the IMS database offline.

The IBM IMS Fast Path Solution Pack for z/OS includes:

- IMS Database Repair Facility
- IMS High Performance Fast Path Utilities
- “IBM IMS High Performance Image Copy for z/OS, 4.2” on page 199
- “IBM IMS Library Integrity Utilities for z/OS, 2.2” on page 204

Program number: 5655-W14

IBM IMS Database Reorganization Expert for z/OS, 4.1

The IBM IMS Database Reorganization Expert for z/OS tool:

- Supports the creation, customization, and centralized storage of policies on database exception detection and conditional reorganization.

- Provides a Smart Reorganization utility with the capabilities of the exception notification and conditional reorganization based on policies stored in a centralized policy repository.
- Collects statistical data about databases and determines the reorganization needs of the databases based on the reorganization policy selected for the database.
- Detects database exceptions and notifies the TSO users or z/OS operators that are specified in the relevant policy of the exceptional state.

Program number: 5655-S35

IBM IMS High Performance Image Copy for z/OS, 4.2

The IBM IMS High Performance Image Copy for z/OS tool functions are:

- Running an image copy function with the hash checking of IMS HP Pointer Checker.
- Performing accuracy checking of an image copy.
- Allocating all input and output data sets dynamically.
- Optionally compressing output image copies.
- Creating image copies.
- Providing advanced copy services; concurrent copy, FlashCopy and SnapShot copies.
- Reducing image copy and recovery time. Reduces elapsed time and CPU utilization.
- Providing automatic checkpoint and restart.
- Stopping and starting databases automatically.
- Integrating with other IMS Tools utilities.

Program number: 5655-N45

IBM IMS High Performance Load for z/OS, 2.1

The IBM IMS High Performance Load for z/OS tool:

- Provides a high performance database reloading capability for IMS full-function databases.
- Initializes empty HDAM and HIDAM databases.
- Supports IMS Database Reorganization Expert capabilities, such as image copy creation during database reorganization.
- Supports reorganization reload of HALDB partitions, including online-reorganization-capable HALDB partitions.
- Automatically initializes HALDB partition data set before reload.
- Provides a performance replacement for IMS Partition Initialization utility.
- Creates ILDSs.
- Supports various formats of the unloaded data sets.
- Includes the Physical Sequence Sort for Reload (PSSR) utility.
- Includes the Bitmap Resetter utility.
- Gives you the option to load compressed data that was previously unloaded by IBM IMS High Performance Unload for z/OS in a compressed format.

Program number: 5655-M26

IBM IMS High Performance Unload for z/OS, 1.2

The IBM IMS High Performance Unload for z/OS tool:

- Unloads HALDB, HDAM, HIDAM, HISAM, and SHISAM databases.
- Allows you to unload broken data sets.

- Gives you the option to unload compressed data without decompression overhead.
- Provides multiple standard formats for unload data sets.
- Includes a variety of statistical reports for improved tuning.
- Provides an API that enables application programs to leverage the tool's high performance retrieval techniques efficiently.
- Provides a user exit facility for additional processing of each segment.
- Provides a Sequential Subset Randomizer utility.

Program number: 5655-E06

IBM IMS High Performance Prefix Resolution for z/OS, 3.1

The IBM IMS High Performance Prefix Resolution for z/OS tool:

- Enables you to resolve and update prefixes of IMS databases involved in logical relationships as a single job step.
- Eliminates the intermediate Work File 2 (WF2) and Work File 3 (WF3) data sets.
- Helps you avoid much of the I/O, tape handling, and DASD requirements that are often associated with prefix resolution and prefix update.
- Executes the prefix resolution and prefix update functions as replacements for the IMS Prefix Resolution and IMS Prefix Update utilities.
- Supports IMS Database Reorganization Expert for z/OS single job step execution of database reorganization, prefix resolution, and prefix update tasks.

Program number: 5655-M27

IBM IMS High Performance Pointer Checker for z/OS, 3.1

The IBM IMS High Performance Pointer Checker for z/OS:

- Enables you to analyze corrupt databases quickly and reduce the amount of time spent to diagnose and repair them.
- Generates reports that facilitate system tuning, report space utilization, and detect and report problems in primary and secondary indexes.
- Provides the ability to set several new thresholds, including available extents, CA and CI splits, and database and data set last extents.
- Provides significant improvements in performance to full checking capabilities: improved usability with simplified setup and operation; parallel processing of databases; and improved reporting.
- Provide ease of use and fast, easy detection of database status.
- Interactively and in batch mode repairs VSAM- and OSAM-organized IMS databases that contain pointer or data errors.
- Performs repairs quickly, thereby reducing the amount of time that the affected database is taken offline.
- Features VSAM and OSAM pointer repair, pointer navigation, a backout safety feature, and an ISPF front end.
- Runs in interactive mode, in which you can view entire blocks of data or individual IMS segments and you can navigate to other segments. Any changes made are tracked and can be undone.
- Runs in batch mode, in which you can dump blocks from the data set or submit changes to the block data.
- Integrates with IMS Database Reorganization Expert and IMS High Performance Image Copy.

Program number: 5655-U09

IBM IMS Index Builder for z/OS, 3.1

The IBM IMS Index Builder for z/OS:

- Offers several features that improve overall performance and enhance ease of use.
- Builds or rebuilds primary and secondary indexes quickly.
- Allows the user to specify an optional output file where records that are needed for prefix resolution can be split off and written as they are read in.
- Eliminates the need to image copy indexes.
- Recognizes index records that have duplicate keys and writes the duplicate keys to a SYSOUT data set.
- Supports building IMS HALDB primary indexes.
- Integrates with the IMS Database Recovery Facility, which enables the building of primary and secondary indexes during a database recovery.

Program number: 5655-R01

IBM IMS Library Integrity Utilities for z/OS, 2.2

The IBM IMS Library Integrity Utilities for z/OS:

- Manages IMS ACB, PSB, and DBD libraries:
  - DBD/PSB/ACB Compare, DBD/PSB/ACB Reversal, and DBD/PSB/ACB Mapper
  - Reporting information in a tabular form
  - Checking results from your desktop and ensuring that all PSBs and DBDs were processed as expected
  - Advanced ACBGen
  - Providing a high-speed generation process that greatly reduces the time needed to process large volumes of IMS ACBs
- Includes an Integrity Checker to help prevent system outages caused by databases corrupted by using the wrong DBD.
- Includes a Consistency Checker function to ensure that all the necessary definitions have been created for a database.
- Includes the Catalog Manager utility, which provides the capabilities to ensure that the IMS catalog and the IMS directory are maintained correctly.
- Includes the MFS Reversal and MFS Compare utilities.
- Converts Message Format Services MID, MOD, DIF, and DOF control blocks back into Message Format Services utility control statements.
- Helps you recover the source and compare deltas if you lose your MFS source library or suspect a difference between the generated control blocks and the source.
- Provides useful summary reports of the IMS FORMAT library that show the relationships among the members.
- Cross tool integration provides IMS Library Integrity Utilities reporting in IMS Tools utilities.

Program number: 5655-U08

IBM IMS Cloning Tool for z/OS, 1.2

The IBM IMS Cloning Tool for z/OS provides a faster and simpler cloning solution that can help improve productivity and support efforts to reduce total cost. It automates the cloning process to provide usable IMS clones within minutes, which helps boost efficiency and free up DBA time.

Program number: 5655-U91

IBM IMS Sequential Randomizer Generator for OS/390, 1.1

The IBM IMS Sequential Randomizer Generator for OS/390 tool:

- Creates a randomizer that enables the user to access HDAM and DEDB database segments either directly or sequentially.
- Allows access to HDAM and DEDB databases in logical key sequence without sacrificing their efficient direct access capabilities.
- Optimizes the distribution of database records by adjusting the randomizing module if the number of synonyms or the control interval (CI) or block utilization exceeds the user-specified value.

Program number: 5655-E11

Chapter 20. IMS data replication tools

The following sections describe the IBM IMS data replication tools.

IBM IMS Cloning Tool for z/OS, 1.2

The IBM IMS Cloning Tool for z/OS provides a faster and simpler cloning solution that can help improve productivity and support efforts to reduce total cost. It automates the cloning process to provide usable IMS clones within minutes, which helps boost efficiency and free up DBA time.

Program number: 5655-U91

InfoSphere Data Replication for IMS for z/OS, 11.3

IBM InfoSphere® Data Replication for IMS for z/OS helps increases the availability of IMS data whether it is for a continuous availability strategy or ensuring the timely distribution of critical enterprise information.

This tool:

- Helps eliminate geographic limitations
- Helps achieve minimal recovery time objectives (RTOs)
- Provides support for mixed IMS workloads
- Provides flexible, unified monitoring
- Can import or export metadata
- Provides high scalability and performance
- Supports the IBM Change Data Capture Solutions

Program number: 5655-IM1

Chapter 21. InfoSphere IMS tools

The following sections describe the IBM InfoSphere IMS tools.

IBM InfoSphere Classic Change Data Capture for z/OS, 11.3

IBM InfoSphere Classic Change Data Capture for z/OS (InfoSphere Classic CDC for z/OS) is a replication solution that captures changes to non-relational mainframe data and delivers them to relational databases, producing an accurate relational replica of your mainframe data on supported target databases in near-real time.

This tool:

- Helps eliminate geographic limitations
- Helps achieve minimal recovery time objectives (RTOs)
- Provides support for mixed IMS workloads
- Provides flexible, unified monitoring
- Can import or export metadata
- Provides high scalability and performance
- Supports the IBM Change Data Capture Solutions

Program number: 5655-IM5

IBM InfoSphere Classic Federation Server for z/OS, 11.3

The IBM InfoSphere Classic Federation Server for z/OS tool provides the following functions:

- Provides SQL access to mainframe databases and files with transactional speed and enterprise scale without mainframe programming.
- Allows applications and tools to issue SQL SELECT, INSERT, UPDATE, and DELETE commands using ODBC, JDBC, or a CLI (Command Level Interface) to access System z data.
- Stores System z accessed data in VSAM, IAM, and sequential files, as well as Db2 for z/OS, IMS, Software AG Adabas, and CA-Datacom and CA-IDMS databases all without mainframe programming.

Program number 5655-IM4

IBM InfoSphere Optim Test Data Management Solution for z/OS, 11.7

The IBM InfoSphere Optim™ Test Data Management Solution for z/OS tool:

- Creates test databases that are relationally intact subsets of an existing production database.
- Migrates subsets of data that require data transformations as part of the migration. This feature is especially useful for masking data used in testing applications or to introduce altered data to the production database.
- Provides for aging all types of date columns, regardless of initial format, and adjusting the resulting dates to suit site-specific business rules. An extensive set of sample definitions to handle these business rules is distributed with Move. Definitions can be customized to accommodate organization-specific business rules.

Program number: 5655-O21

InfoSphere Data Replication for IMS for z/OS, 11.3

IBM InfoSphere Data Replication for IMS for z/OS helps increases the availability of IMS data whether it is for a continuous availability strategy or ensuring the timely distribution of critical enterprise information.

This tool:

- Helps eliminate geographic limitations
- Helps achieve minimal recovery time objectives (RTOs)
- Provides support for mixed IMS workloads
- Provides flexible, unified monitoring
- Can import or export metadata
- Provides high scalability and performance
- Supports the IBM Change Data Capture Solutions

Program number: 5655-IM1

Chapter 22. IMS performance management tools

The following sections describe the IBM IMS performance management tools.

IBM IMS Buffer Pool Analyzer for z/OS, 1.4

The IBM IMS Buffer Pool Analyzer for z/OS tool:

- Provides modeling facilities to assist with making informed decisions about the addition of buffers to an existing pool, or sizing requirements for a new buffer pool.
- Helps you determine the impact of buffer pool changes before they are made to take the guess work out of the process.
- Analyzes IMS database buffer pools (OSAM and VSAM) to provide statistical analysis of the impact of changes that affect the buffer pools.
- Provides I/O rates and buffering requirements for a specific database.
- Allows for better allocation of real memory resources.
- Identifies databases that most heavily use each database subpool.
- Performs "what if" scenario analysis, such as identifying the impact of splitting a specific database into a new buffer pool.
- Determines the performance effects for a given buffer pool when you add or reduce the number of buffer pools.

Program number: 5697-H77

IBM IMS Connect Extensions for z/OS, 2.4

IBM IMS Connect Extensions for z/OS tool:

- Improves the availability, reliability, and performance of TCP/IP access to IMS through IMS Connect.
- Dynamically manages workload through rules-based routing of TCP/IP OTMA transactions or TCP/IP DRDA requests.
- Records and reports IMS Connect events, activities, and utilization in real time.
- Provides a single point of control for multiple IMS Connect systems.
- Includes an REXX interface for automated operations.
- Dynamically responds to changes in data store availability and flood conditions.
- Improves system security with flexible access control.
- Complements IBM IMS Performance Analyzer for z/OS and IMS Problem Investigator for z/OS tools to aid reporting and accelerate problem determination.

Program number: 5655-S56

IBM IMS Network Compression Facility for z/OS, 1.2

The IBM IMS Network Compression Facility for z/OS:

- Provides several new options for compression of 3270 data streams:
  - Compresses all repeated characters, not just spaces, nulls, asterisks, and dashes
  - Allows 3270 Field Merge, blank elimination, and elimination of non-display fields
  - Eliminates redundant 3270 Set Buffer Address (SBA) commands
- Makes installation easier by eliminating the need for the XCM address space and subsystem, and for SYS1.PARMLIB updates, except APF authorization of one data set.

- Includes a utility to convert current options to the new PROCLIB member format.
- Improves flexibility by allowing cross-MVS system inquiries and updates to IMS Network Compression Facility information and options.

Program number: 5655-E41

IBM IMS Performance Analyzer for z/OS, 4.4

IBM IMS Performance Analyzer for z/OS tool:

- Delivers end-to-end transit analysis for all types of transaction workloads, including shared queues, across the IMS enterprise.
- Provides comprehensive reporting for IMS Log and IMS Monitor, IMS Connect Extensions for z/OS, and OMEGAMON® ATF records.
- Provides a wide variety of reports at various levels of detail, from high-level management summaries and graphical reports to detailed traces for in-depth analysis. These reports can help analyze transaction response time and measure the usage and availability of important resources.
- Provides a complete end-to-end picture of the transaction lifecycle by combining reports from IMS logs and IMS Connect Extensions journals.
- Allows you to design your own form-based transit reports and export these reports to Db2 or in CSV format for input to a business analytics tool such as IBM Cognos® Insight®.
- Automatically selects log file using Database Recovery Control (DBRC) for quick and easy report requests.
- Includes comprehensive specialized reporting of Database Control (DBCTL) and Fast Path.

Program number: 5655-R03

IMS Problem Investigator for z/OS, 2.4

IBM IMS Problem Investigator for z/OS tool:

- Enhances problem-determination and diagnostic capabilities for IMS TM and IMS DB systems.
- Use the information about IMS and the following related subsystems:
  - IMS Log and IMS Monitor data sets
  - Common Queue Server (CQS) log stream and extracts
  - OMEGAMON ATF
  - Db2 and IBM MQ
  - IMS and IMS Connect transaction indexes that IMS Performance Analyzer creates
  - IMS Connect event data from IMS Connect Extensions journals
- Determines transaction times and event latencies to help identify bottlenecks.
- Provides an end-to-end replay of an IMS transaction on a single screen, including Db2 and MQ events.
- Connects records that are associated with the same transaction across all logs, allowing tracking of all records associated with the transaction while hiding unrelated records.
- Drills down to field level to help analyze the causes of problems that are highlighted in the high-level transaction response time and resource utilization. These problems are reported by IMS Performance Analyzer.
- Provides a REXX command interface for you to customize log record analysis and extracts.

Program number: 5655-R02

IBM Transaction Analysis Workbench, 1.3

The IBM Transaction Analysis Workbench helps you analyze problems with the performance or behavior of transactions on z/OS and includes the following features:

Coverage across z/OS subsystems

Uses the logs and other historical data generated by each subsystem during normal transaction processing and system operations. No special agents are required.

Supported data sources include CICS, Db2, IMS, IBM MQ, WebSphere Application Server for z/OS, various SMF records, and OPERLOG.

Consolidation of different subsystem logs in a single interface

Tracks individual transactions across multiple subsystems and analyzes different logs in the same consistent user interface.

Collaboration between users

Saves information about a problem, such as locations of log files and log records of interest, and then shares that information with other users, enabling collaborative analysis without rework.

Log forwarding

Converts log data to CSV or JSON format and forwards the data to analytics platforms such as Splunk, Elastic, or Hadoop.

Mobile Workload Pricing for z/OS (MWP)

Creates the CSV and SMF files that are required by the Mobile Workload Reporting Tool (MWRT).

Program number: 5697-P37

IBM IMS Performance Solution Pack for z/OS, 2.2

The IBM IMS Performance Solution Pack for z/OS delivers a more affordable, comprehensive portfolio of IBM database management tools. The product combines the features and functions of several separate tools. The products are tightly integrated, making the end-to-end analysis of IMS transactions faster and easier than ever, supporting improved productivity for problem analysts, improved IMS application performance, more efficient IMS resource utilization, and higher system availability.

The IBM IMS Performance Solution Pack for z/OS includes the following tools:

- “IBM IMS Connect Extensions for z/OS, 2.4” on page 211
- “IBM IMS Performance Analyzer for z/OS, 4.4” on page 212
- “IMS Problem Investigator for z/OS, 2.4” on page 212

Program number: 5698-P21

Chapter 23. IMS regulatory compliance tools

The following sections describe the IBM IMS regulatory compliance tools.

IBM InfoSphere Guardium Data Encryption for Db2 and IMS Databases, 1.2

Formerly known as IBM Data Encryption for IMS and Db2 Databases, InfoSphere Guardium® Data Encryption leverages the System z Crypto Hardware to efficiently secure sensitive and private data at the Db2 row level and the IMS segment level.

The IBM InfoSphere Guardium Data Encryption for Db2 and IMS Databases tool:

- Provides Db2 Edit routines and IMS Exit routines that invoke the z/OS Integrated Cryptographic Service Facility (ICSF) which exploits the Crypto Hardware for data encryption and decryption.
- Contains sample implementation jobs.
- Includes an ISPF front end to build implementation jobs.
- Provides the capability to specify unique encryption keys.

Program number: 5655-P03

IBM Security Guardium S-TAP for IMS

The IBM Security Guardium S-TAP® for IMS tool (formally known as IBM InfoSphere Guardium S-TAP for IMS) includes support for:

- Capture of database and segment reads and changes (insert, update, and delete)
- Capture of segment concatenated keys and segment data on request to provide before and after images of updated segments
- Capture of access to IMS data sets outside the control of IMS services (database data sets, image copy data sets, IMS log data sets, and RECON data sets)
- Direct streaming of audit data from z/OS process to a networked Guardium appliance to support near real-time reporting
- System STOP and START activity as recorded in the IMS log

Program number: 5655-ST9

Chapter 24. IMS system management tools

The following sections describe the IBM IMS system management tools.

IBM IMS Command Control Facility for z/OS, 2.2

The IBM IMS Command Control Facility for z/OS:

- Issues commands for DBCTL, DCCTL, or DB/DC regions.
- Issues IMS commands from a batch utility or from a TSO session via an ISPF interface, or from a Callable Application Program Interface (API).
- Ensures successful processing of database START, STOP, DBR, and DBD commands.
- Synchronizes online change and database commands across all regions in a sysplex using the batch interface or callable API.
- Keeps members of an IMSplex synchronized by storing commands that failed due to an IMS being unavailable, and issuing the stored commands at IMS startup.
- Enhanced CCF Message Log improved problem determination and system operation whether running a single IMS or multiple IMS systems within a sysplex.
- Contains added IMS Operations Manager command support that provides more flexibility by enabling users that do not want to use APPC to be able to use the tool.
- Contains message disposition determination which enables users to improve or eliminate user written code.

Program number: 5655-R58

IBM IMS Extended Terminal Option Support for z/OS, 3.2

The IBM IMS Extended Terminal Option Support for z/OS tool:

- Provides a front-end to the IMS Extended Terminal Option (ETO) feature.
- Offers capabilities to help manage, implement, customize, and exploit the benefits of ETO in your systems environment to manage resources effectively.
- Supports tailoring of all parts of ETO, including sign-on processing.
- Lets you set global options for the entire user community and override options for specific terminals or user IDs.
- Allows LTERM names that start with a numeric value.
- Extends shared queues support to issue SYSTEMS level ENQ for all LTERM names that are associated with a user at sign-on.
- Offers SLU type P support and SLU 1 console support that allow you to supply a variety of options on an LU-by-LU basis (for example, Logmode, Logon Description, ASOT, ALOT).

Program number: 5655-L61

IBM IMS High Performance System Generation (SYSGEN) Tools for z/OS, 2.3

The IBM IMS High Performance System Generation (SYSGEN) Tools for z/OS:

- Offers an integrated solution that helps reduce the requirement for IMS SYSGENs.
- Provides DBAs and System Programmers with a reliable, easy-to-use IMS management tools to make application resource changes faster using fewer resources.

- Includes IMSplex support which provides the capability to simultaneously update multiple IMS control regions when executing a resource update list.
- Provides additional options for reverse sysgen, including the capability to select either in-core control blocks or MODBLKS data set resource definitions.
- Contains IMS storage display and zap which provides the capability to display and alter IMS control blocks and storage. A storage map provides z/OS virtual storage boundaries and percent utilization for common storage areas.
- Reloads ACBLIB definitions for database descriptions (DBDs) and program specifications blocks (PSBs) without using online change for ACBLIB.
- Generates a resource update list that will make IMS control blocks match IMS sysgen source macros.
- Manages your IMS SYSGEN definitions using ISPF panels (database, program, transaction, and route code definitions).
- Enables changes, additions, or deletions of resource definitions.
- Updates IMS security definitions, reload ACBs, and issue IMS commands.
- Dynamically makes changes to definitions.
- One user can define what changes are required, and have another user implement the change at a later time, via ISPF or batch.
- Backs out changes installed by IMS HP Sysgen Tools.

Program number: 5655-P43

IBM IMS Workload Router for z/OS, 2.7

The IBM IMS Workload Router for z/OS tool:

- Works with IMS TM to provide transparent routing or balancing of a transaction workload among two or more IBM systems.
- Uses IMS Multiple Systems Coupling (MSC).
- Is adaptable to a variety of system configurations.

Program number: 5697-B87

Chapter 25. Tivoli IMS tools

The following sections describe the IBM Tivoli® IMS tools.

Tivoli Decision Support for z/OS V1.8 or later

IBM Tivoli Decision Support for z/OS is designed to help you understand your performance challenges by collecting raw systems metrics data, consolidating them in a repository, providing tools to help you improve operational planning, cost management, responsiveness, and decision making.

Program number: 5698-B06

Tivoli Monitoring, V6.3.0

IBM Tivoli Monitoring can monitor and manage system and network applications on a variety of operating systems, track the availability and performance of your enterprise system, and get reports to track trends and troubleshoot problems.

Program number: 5724-C04

Tivoli AF/OPERATOR on z/OS, 3.4.1

IBM Tivoli AF/OPERATOR on z/OS is a robust console automation solution for z/OS environments. Use it to streamline common tasks, optimize system performance and reduce avoidable errors, so that your staff only focuses on events or tasks that require human intervention.

Program number: 5608-C03

Tivoli AF/Integrated Resource Manager, 5.0.0

IBM Tivoli AF/Integrated Resource Manager (AF/IRM) simplifies system automation and resource management through an intuitive console-driven interface that provides comprehensive subsystem management without additional coding.

AF/IRM represents a streamlined paradigm in automation implementation and management that leverages packaged automation objects based on IBM Tivoli best practices. AF/IRM eases automation implementation and maintenance for z/OS and Parallel Sysplex environments, applications and network resources.

Program number: 5608-AFI

Tivoli OMEGACENTER Gateway on z/OS, 3.4.1

IBM Tivoli OMEGACENTER Gateway on z/OS

IBM Tivoli OMEGACENTER Gateway on z/OS is a system automation tool for z/OS environments. It integrates your console automation solutions, availability monitors and Tivoli OMEGAMON solutions to provide automated responses to system events.

Program number: 5608-C04

Tivoli OMEGAMON XE for Db2 Performance Expert on z/OS, 5.2 or later

IBM Tivoli OMEGAMON XE for Db2 Performance Expert on z/OS combines the sophisticated reporting, monitoring and buffer pool analysis features of the IBM Tivoli OMEGAMON XE for Db2 Performance Monitor on z/OS and IBM Db2 Buffer Pool Analyzer products.

Tivoli OMEGAMON XE for Db2 Performance Expert on z/OS also adds expert database analysis functions to help you maximize performance and enhance productivity.

Program number: 5655-W37

Tivoli OMEGAMON XE for Db2 Performance Monitor on z/OS, 5.2 or later

Tivoli OMEGAMON XE for Db2 Performance Monitor on z/OS enables you to monitor, analyze and optimize the performance of Db2 for z/OS and Db2 applications online in real time and in batch reports.

Program number: 5655-W38

IBM OMEGAMON for IMS on z/OS, 5.5

IBM OMEGAMON for IMS on z/OS monitors and manages the availability, performance, and resource utilization of your IMS systems, either at a system level or within an IMSplex.

Program number: 5698-T02

IBM Z System Automation, 4.1

IBM Z System Automation is an IBM Z NetView® base software product that provides a single point of control for a various range of systems management functionality.

It plays a key role in providing end-to-end automation solutions. It is a policy-based, self-healing, high-availability solution to maximize efficiency and availability of critical system elements, applications and hardware & software resources.

Program number: 5698-SA4

Related concepts

IBM Z System Automation

Chapter 26. IMS Transaction Manager management tools

The following sections describe the IBM IMS Transaction Manager (IMS TM) management tools.

IBM IMS Configuration Manager for z/OS, 2.2

You can use IBM IMS Configuration Manager for z/OS to analyze, modify, and deploy IMS resources and parameters.

IMS Configuration Manager helps you to achieve the following benefits:

- Automated mapping of your entire IMS environment, including resources and parameter configurations.
- Create a common, consistent configuration across your enterprise by identifying inconsistencies.
- Simpler transition to DRD. Integrate DRD with your current change control practices.
- Optimized online installation of resources.
- A unified, structured, and secure change management system and associated processes.
- A faster time-to-production for new IMS applications.
- A better understanding of your parameter configurations across all the IMS systems in your enterprise.

Program number: 5655-WR2

Related information

IMS Configuration Manager overview

IBM IMS Queue Control Facility for z/OS, 3.2

The IBM IMS Queue Control Facility for z/OS tool:

- Manages IMS message queues in both shared and non-shared queue environments.
- Defines up to ten areas of the total queue space to monitor for small or large messages, using the new Queue Space Utilization Notification mechanism.
- Detects (automatically) an IMS cold start and initiates the requeue of messages that were in the queue before the cold start.
- Detects (automatically) an IMS warm start and initiates the requeue of messages (or offloads the messages) that were in the dead letter queue before warm start.
- Offloads (automatically) any messages that were on the queue during message overflow.
- Select messages based on a data string for faster problem determination.
- Contains a new filter for the dead letter queue.
- Contains multiple new console commands to display the top number of destinations that are using the message queues. These commands can display the destinations using the message queues over last number minutes and initiate the requeue or offload of the messages that were in the queue.

Program number: 5697-N50

IBM IMS Sysplex Manager for z/OS, 1.3

The IBM IMS Sysplex Manager for z/OS tool provides:

- Real-time management of the IMS sysplex environment.
- Single point of control.
- Single system image through local and aggregate view of data.

- Simplified user interface (TSO/ISPF).
- Structured displays of IMS resources and CF structures.
- Global support of type-1 commands, OM type-2 commands, and the IMS TSO SPOC.
- Basic z/OS performance information and SVC dump capture.
- Statistics for CSL (OM, RM and SCI), IRLM, and CQS.
- Dashboard with key system indicators and threshold monitoring.
- Management functions.
- Intercept of system exceptions and generates console alerts.
- Real-time IRLM Long Lock Report.
- Automatic real-time recognition when IRLM detects long locks.
- Consolidated and analyzed information for the top blocker, which is recorded in an exceptions file and sent to the z/OS console for automated operations.
- Browse, delete, and recover capability for messages on shared queues.
- Delete capability for RM resource structure entries.
- Assign affinity capability for transactions in shared-queues environment.
- Support for IMS DB/TM, DBCTL, and DCCTL for IMS.

Program number: 5655-P01

Chapter 27. Miscellaneous IBM tools that support IMS

The following IMS tools also support IMS 15.

IMS Application Development Facility (ADF), V2.2
IMS Application Development Facility is an architectural framework within which IMS application development and processing is accomplished.

IBM Application Performance Analyzer for z/OS, V14.1
The IBM Application Performance Analyzer for z/OS measures and reports how your applications use resources. The tool:

- Helps your business maximize the performance of your existing applications and improve the response time of your online transactions and batch turnaround times.
- Gives you the information you need to isolate performance problems in applications and test the effect of increased workloads on your systems.
- Monitors, analyzes and reports the performance of CICS, Assembler, COBOL, PL/I, C/C++, Db2, IMS and IBM MQ applications.
- Collects samples from the monitored address space and analyzes the system or resource application usage of CPU, DASD, I/O or the total address space.
- Features online analysis and reports that can be created as PDF or XML files, so that you can view them on workstations or transfer easily to other applications.
- Integrates with Fault Analyzer for z/OS and Debug Tool for z/OS.

Program number: 5697-Q09

IBM Debug for z/OS, 15.0 and 16.0
IBM Debug for z/OS is an interactive source-level debugging tool for compiled applications in a variety of environments.

With this tool, you can complete the following tasks:

- Debug an application interactively as it runs.
- Perform seamless debugging of mixed-language applications.
- Adjust an application while debugging.
- Display, monitor, and alter program variables.
- Use code coverage to optimize testing resources.

The debug functions are also provided in other products with more IDE choices and capabilities, see Products that include IBM z/OS Debugger on IBM Support.

Program number: 5755-Q50, 5755-A06

IBM Fault Analyzer for z/OS, 14.1 or 15.1
The IBM Fault Analyzer for z/OS assists developers in analyzing and fixing application and system failures. It offers developers information to help determine the cause of failure and assist in resolving the problem.

Program number: 5655-Q41, 5755-A02

IBM File Manager for z/OS for IMS Data, 14.1 or 15.1
The IMS component of File Manager (FM/IMS) is an ISPF application with which you can display, edit, update, create, copy, compare, print and erase your data files. This tool is a member of the IBM Problem Determination Tools suite.

Program Number: 5655-Q42, 5755-A03

IBM Hourglass, V7.1

HourGlass is a z/OS system application, allowing sites to alter the Date/Time returned to a z/OS application when a time request is made (SVC 11 or PC Time Requests). The tool:

- Patterns or specific applications, transactions, users, and address space names can be specified to limit the scope at which HourGlass will alter returned date/time information.
- Accurately simulates date and time processing for thorough application testing.
- Coordinates reporting and data transfers across time zones.
- Identifies applications that request the system date and time, and resolve potential problems before they occur.

Program Number: 5655-U59

IBM MQ for z/OS V8.0.0 and V9.0.0

IBM MQ for z/OS V8.0.0 and V9.0.0 offers a messaging powerhouse for the IBM System z platform as part of the universal messaging backbone. It delivers robust connectivity for flexible, reliable messaging for applications including Web services and Web 2.0. It includes market-leading JMS and now also offers publish and subscribe messaging.

Program Number 5655-W97, 5655-MQ9

WebSphere MQ for z/OS, V7.1.0

WebSphere MQ for z/OS V7.1.0 offers a messaging powerhouse for the IBM System z platform as part of the universal messaging backbone. It delivers robust connectivity for flexible, reliable messaging for applications including Web services and Web 2.0. It includes market-leading JMS and now also offers publish and subscribe messaging.

Program Number 5655-R36

Part 4. Featured integration solutions for IMS 15

IMS provides a wide variety of options for other software, middleware, and hardware products to connect to and integrate with both IMS transactions and data. Many of these products provide integrated connectivity features specific to IMS. A select few of the integration solutions provided by these products in coordination with IMS are featured here.

Chapter 28. Mobile and REST API solution with IBM z/OS Connect Enterprise Edition

You can build REST services and APIs to access your IMS assets by using the IMS service provider in IBM z/OS Connect Enterprise Edition (z/OS Connect EE). Your IMS™ applications can also make REST API calls through z/OS® Connect EE.

z/OS Connect EE provides a framework that enables z/OS-based programs and data to participate fully in the new API economy for mobile and cloud applications.

z/OS Connect EE is designed to provide a fast, secure, and reliable connector that accepts standard protocols and can interact with multiple z/OS backend programs and systems. z/OS Connect EE provides a standard interface for these assets to be identified and reached by using the Representational State Transfer (REST) technology, and services are represented in the JavaScript Object Notation (JSON) format. This interface also handles data conversion as needed and provides authorization services to allow or deny users that are based on roles. In other words, z/OS Connect EE is the API gateway into z/OS, with a single, configurable, high throughput REST/JSON interface into CICS, IMS, Db2, and WebSphere Application Server.

In the latest release, z/OS Connect EE V3, tooling support for creating IMS services and developing, deploying, and testing REST APIs to access the services is provided through z/OS Connect EE V3 API toolkit, an Eclipse-based workstation tool that is installed into IBM Explorer for z/OS. After an API is tested and deployed, it can be published to a developer portal. API subscription and management can be handled products such as IBM API Connect®.

z/OS Connect EE V3.0.1 adds the support for z/OS applications to act as an API consumer, issuing RESTful API calls to utilize the underlying services and data from external request endpoints.

IMS as an API provider

IMS service provider that is included in z/OS Connect EE is known as the *IMS Mobile feature* for building mobile services to access your IMS assets. The IMS service provider handles the communications with IMS and data transformation between JSON and byte arrays.

For more information about z/OS Connect EE and the IMS service provider, see Using the IMS service provider.

IMS as an API consumer

z/OS Connect EE provides a Build toolkit that generates, from the API documentation (Swagger document), a set of files to enable an IMS application to call a REST API through z/OS Connect EE. These files include what the z/OS Connect EE server needs to handle data mapping and data transformation, and what the IMS application needs to send the API request and process the response.

For more information, see z/OS applications to call REST APIs.

IBM z/OS Connect Enterprise Edition V3.0 Program number: 5655-CE3

Chapter 29. Application development with IMS Explorer for Development

IMS Explorer for Development (IMS Explorer) is a component in IMS Enterprise Suite that facilitates application development and extends access to IMS transactions and data through an Eclipse-based user interface.

Version 3.3 of IMS Enterprise Suite is made available for the distributed platform only to provide a new release of IMS Explorer that is based on Eclipse Neon V4.6. For shell-sharing with Eclipse Luna V4.4-based IBM products, use the IMS Explorer in IMS Enterprise Suite Version 3.2 instead.

IMS Explorer enables IMS application developers and database architects and developers to:

- Perform common and essential tasks in an end-to-end application development lifecycle
- Simplify the development and visualization of database description (DBD) and program specification block (PSB) resource definitions
- Import COBOL and PL/I data structures to an IMS database by using the importers of, and shell-sharing with, IBM Developer for System z, to generate PSB source, and to import and export DBD and PSB source from or to a z/OS remote system
- Leverage the IMS Universal drivers, thus offering a relational view of IMS data and offering new function, such as graphical assistance to build SQL statements
- Populate the IMS catalog

Version 3.3 adds the support for IMS V15.

Related reference

"IMS Enterprise Suite software requirements" on page 14
IMS Enterprise Suite provides APIs, tools, and a web service solution for facilitating application development and extending access to IMS transactions and data.

IMS Explorer for Development overview

Chapter 30. Data discovery with IBM Watson Explorer

You can connect IBM Watson™ Explorer directly to IMS operational data to explore your critical business data.

An IMS database typically contains operational data for high-volume transactional workloads. These workloads include finance, insurance, and retail applications that contain a wealth of valuable data about customers, interactions, and business trends. IBM Watson Explorer provides users with a 360 degree view of their enterprise data.

This solution requires the following IMS components:

- IMS Catalog
- IMS Common Service Layer (CSL)
- IMS Open Database Manager (ODBM)
- IMS Connect

Program number: 5725-I17

Related information

IBM Watson Explorer V11

Chapter 31. Integrated access with IBM DataPower Gateway

The IBM DataPower Gateway provides integrated support for IMS 15. The DataPower Gateway supports both access to IMS databases and transactions from web-based clients, and synchronous callout requests to web services from IMS application programs.

The DataPower Gateway provides a single point of control to simplify, govern, and optimize the delivery of services and applications and enhance the security of XML and IT services. They extend and strengthen the capabilities of an infrastructure by providing a multitude of functions that can be managed through a web browser interface.

The DataPower Gateway provides three types of support for IMS: Access to databases in IMS DB.

- Access to IMS DB allows an external application to issue SQL calls against IMS databases by using the integrated IMS Universal JDBC driver that is delivered with DataPower Gateway.
- Access to IMS transactions that are running in IMS TM. Access to IMS TM through DataPower allows an external application to initiate a transaction request to an application program that is running in an IMS dependent region and fetch data back.
- Support for synchronous callout requests from application programs that are running in IMS to data or service providers that are running on the DataPower backend.

DataPower Gateway provides plug-in usability with little to no changes to an existing network or application software. No proprietary schemas, coding, or APIs are required to install or manage the device. DataPower Gateway supports XML integrated development environments to help reduce the number of hours that are spent in developing and debugging XML applications.

Related concepts

DataPower for IMS Implementation Guide

IBM DataPower Gateway Version 7.5

Notices

This information was developed for products and services offered in the US. This material might be available from IBM in other languages. However, you may be required to own a copy of the product or product version in that language in order to access it.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing IBM Corporation North Castle Drive, MD-NC119 Armonk, NY 10504-1785 US

For license inquiries regarding double-byte character set (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing Legal and Intellectual Property Law IBM Japan, Ltd. 19-21, Nihonbashi-Hakozakicho, Chuo-ku Tokyo 103-8510, Japan

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.

IBM may use or distribute any of the information you provide in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Director of Licensing IBM Corporation North Castle Drive, MD-NC119 Armonk, NY 10504-1785 US

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

The performance data and client examples cited are presented for illustrative purposes only. Actual performance results may vary depending on specific configurations and operating conditions.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and

cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to actual people or business enterprises is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

Each copy or any portion of these sample programs or any derivative work must include a copyright notice as follows: © (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corp. _enter the year or years_.

Trademarks

IBM, the IBM logo, and ibm.com® are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at "Copyright and trademark information" at http://www.ibm.com/legal/copytrade.shtml.

Adobe, the Adobe logo, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Terms and conditions for product documentation

Permissions for the use of these publications are granted subject to the following terms and conditions.

Applicability

These terms and conditions are in addition to any terms of use for the IBM website.

Personal use

You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative work of these publications, or any portion thereof, without the express consent of IBM.

Commercial use

You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of IBM.

Rights

Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any information, data, software or other intellectual property contained therein.

IBM reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by IBM, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

IBM MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

IBM Online Privacy Statement

IBM Software products, including software as a service solutions, (“Software Offerings”) may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user or for other purposes. In many cases no personally identifiable information is collected by the Software Offerings. Some of our Software Offerings can help enable you to collect personally identifiable information. If this Software Offering uses cookies to collect personally identifiable information, specific information about this offering’s use of cookies is set forth below.

This Software Offering does not use cookies or other technologies to collect personally identifiable information.

If the configurations deployed for this Software Offering provide you as customer the ability to collect personally identifiable information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for notice and consent.

To learn more, see IBM Privacy Statement.

Bibliography

This bibliography lists all of the publications in the IMS 15 library.

Title	Acronym	Order number
IMS Version 15 Application Programming	APG	SC27-6778
IMS Version 15 Application Programming APIs	APR	SC27-6779
IMS Version 15 Commands, Volume 1: IMS Commands A-M	CR1	SC27-6780
IMS Version 15 Commands, Volume 2: IMS Commands N-V	CR2	SC27-6781
IMS Version 15 Commands, Volume 3: IMS Component and z/OS Commands	CR3	SC27-6782
IMS Version 15 Communications and Connections	CCG	SC27-6783
IMS Version 15 Database Administration	DAG	SC27-6784
IMS Version 15 Database Utilities	DUR	SC27-6785
IMS Version 15 Diagnosis	DGR	GC27-6786
IMS Version 15 Exit Routines	ERR	SC27-6787SC19-4208
IMS Version 15 Installation	INS	SC27-6788
IMS Version 15 Licensed Program Specifications	LPS	GC27-6799
IMS Version 15 Messages and Codes, Volume 1: DFS Messages	MC1	GC27-6789
IMS Version 15 Messages and Codes, Volume 2: Non-DFS Messages	MC2	GC27-6790
IMS Version 15 Messages and Codes, Volume 3: IMS Abend Codes	MC3	GC27-6791
IMS Version 15 Messages and Codes, Volume 4: IMS Component Codes	MC4	GC27-6792
IMS Version 15 Operations and Automation	OAG	SC27-6793
IMS Version 15 Release Planning	RPG	GC27-6794
IMS Version 15 System Administration	SAG	SC27-6795
IMS Version 15 System Definition	SDG	GC27-6796
IMS Version 15 System Programming APIs	SPR	SC27-6797
IMS Version 15 System Utilities	SUR	SC27-6798

Index

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

W

X

Z

Product Number: 5635-A06
5655-DS5
5655-TM4

GC27-6794-00