Information Management System (IMS™) Version 8 is a licensed program that operates under Operating System/390 (OS/390®). IMS includes an enterprise database server that provides hierarchical database management services and a strategic enterprise transaction server that provides data communications and transaction management services.

The IMS Version 8 Database Manager (IMS DB) provides database management for transaction managers such as IMS Version 8 Transaction Manager and Customer Information Control System (CICS®). The IMS Version 8 Database Manager processes concurrent database calls for a wide variety of applications.

Application programs access databases through IMS DB and its data manipulation language, Data Language/I (DL/I).

The IMS Version 8 Transaction Manager (IMS TM) provides a database-independent, transaction processing environment for database managers such as IMS Version 8 Database Manager and DATABASE 2™ for z/OS™ (DB2® for z/OS, hereafter referred to as DB2).

The IMS Version 8 Transaction Manager:

- Manages an IMS TM terminal network
- Stores and shares IMS message queues among multiple IMS TM systems and routes messages between terminals and applications
- Provides connectivity to other IMS TM subsystems and non-IMS TM subsystems
- Provides connectivity and Web solutions by working with:
  - WebSphere® Application Server Enterprise Edition V4.0.1
  - WebSphere Studio Application Developer Integration Edition V4.1.1
- Schedules application programs to access IMS DB databases or DB2 databases (or both), and non-database files through the Generalized Sequential Access Method (GSAM)
- Provides system control facilities for system definition, restart, recovery, performance, and tuning
- Runs continuously through the year with no required shutdown for Daylight Saving Time
- Has the capability to test and execute IMS application programs that operate with dates beyond 1999

Highlights of New Function

The following sections describe the new major functions of IMS Version 8.

Information Integration Enhancements

This section describes the major IMS Version 8 enhancements to IMS DB and TM that affect information integration.

Java Enhancements: IMS' support of Java has been enhanced in the following areas:

Java Standards

IMS provides support for the new Java standards. JDBC 2.0 enhancements include support for Updatable ResultSet and limited reverse cursors. SQL enhancements to IMS DB data include support for aggregate functions (MIN, MAX, and so forth) and scalars.

JDBC Access

JDBC access to IMS DB data is provided for Java applications running in OS/390 WebSphere Application Server, CICS Transaction Server/390, and DB2 for OS/390 Java stored procedures applications. This access is in addition to the access available from IMS TM Java applications that run in the new Java dependent regions.

Java Dependent Regions

The Java dependent regions enhancement introduces two new dependent regions where message-driven and non-message-driven IMS Java applica-
tions can run. These new regions use the new IBM technology for Persistent Reusable Java Virtual Machines (JVM) to speed up the processing of Java applications and provide a serially reusable JVM that can be reset to a known state between transactions.

Java Tooling
IMS introduces a new utility called DLIModel, which automatically constructs the required IMS Java "metadata class" from PSB and DBD source. In IMS Version 7, the user was responsible for creating this class manually. The utility allows information on additional fields, long Java-style names, and datatypes to be supplied from user-coded control statements, and from XMI descriptions (or both) of COBOL copybook members. The utility can produce XMI descriptions of databases that conform to the Object Management Group’s Common Warehouse Metamodel 1.1.

Dynamic LE Runtime Parameters

Enhancement: Enables you to dynamically update Language Environment® (LE) runtime parameters for an IMS application. LE parameters can be changed without requiring CEEROPT and CEEUOPT to be changed, reassembled, and rebound.

Manageability Enhancements

This section describes the major IMS Version 8 enhancements to IMS DB and IMS TM that affect manageability.

IMSplex Enhancements: Prior to IMS Version 8, the IMS subsystems that were in sharing groups had to be managed individually. IMS Version 8 builds upon the idea of an IMS sysplex (known hereafter as an IMSplex) to help reduce the complexity of managing multiple IMS subsystems in a sysplex environment.

Definition: An IMSplex is one or more IMS address spaces (control, manager, or server) that work together as a unit. Typically (but not always), these address spaces:
- Share either databases or resources or message queues (or any combination)
- Run in a S/390® Sysplex environment
- Include an IMS Common Service Layer (CSL - new for IMS Version 8)

The address spaces that can participate in the IMSplex are:
- Control region address spaces
- IMS manager address spaces: Operations Manager (OM), Resource Manager (RM), Structured Call Interface (SCI)
- IMS server address spaces (CQS)

Examples: Examples of IMSplexes are:
- A set of IMS control regions at the V6 or V7 or V8 level without a CSL that are sharing data or sharing message queues
- A set of IMS control regions at the V8 level with a CSL that are sharing data or sharing message queues
- A single IMS control region at the V8 level with a CSL (for example, you might want the CSL for commands or the new DBRC function). This still qualifies as an IMSplex because it is a set of IMS address spaces (IMS control, OM, RM, SCI, CQS) working together.

To support IMSplexes, some existing IMS functions have been enhanced and some new functions have been added.
- A new component, the Common Service Layer (CSL), is introduced consisting of the following three subcomponents:
  - Operations Manager (OM).
  - Resource Manager (RM).
  - Structured Call Interface (SCI).
- A TSO-based single point of control (SPOC) application program is shipped with IMS Version 8.
- The IMS terminal management function of IMS TM has been enhanced.
- A new coordinated online change function (of the Resource Manager) has been added to coordinate global online change activities of all the IMS subsystems in the IMSplex.

The following sections briefly describe the enhancements that support the new IMSplexes.

Common Service Layer: The CSL’s components (the OM, RM, and SCI) provide the infrastructure
for an IMS Version 8 IMSplex. Each OM, RM, and SCI runs in a separate address space.

**Operations Manager:** The Operations Manager (OM) provides a single system image for system operations in an IMS Version 8 IMSplex. OM performs the following functions:

- Routes IMS commands to IMSplex members that are registered to process those commands
- Consolidates command responses from individual IMSplex members into a single response for presentation to the command originator
- Provides an application programming interface (API) for the automated control of commands to the IMSplex
- Provides user exits for command and response edit and command security reasons

**Resource Manager:** The Resource Manager (RM) helps manage resources that are shared by multiple IMS systems in an IMSplex. RM provides an infrastructure for managing global resources and coordinating processes across the IMSplex. RM maintains resource information using a resource structure on a coupling facility.

**Structured Call Interface:** The Structured Call Interface (SCI) is the part of the CSL that provides the communications infrastructure of the IMSplex. Using SCI, IMSplex components can communicate with each other within a single OS/390 image or from multiple OS/390 images. Individual IMSplex members do not need to know where the other members are running. SCI is responsible for routing requests and messages between the IMS control regions, OMs, RMs, CQSs, and other IMSplex members in the IMSplex.

**Coordinated Online Change:** One of the complexities of running multiple IMS systems in an IMSplex is managing online change processing for all of those IMS systems. Prior to IMS Version 8, you had to perform online change to each IMS in the IMSplex. An important part of managing an IMSplex from a single point of control is to be able to coordinate global online change processing among all the IMS systems in the IMSplex. This enhancement allows you to do just that.

**Local Online Change:** As a result of the System Management enhancements:

- When you perform a local online change and have IMS Version 8 running with a CSL (and a resource structure is defined), changes to resources will occur and be logged in RM and the local IMS.
- The new QUERY MEMBER command can show local online change status.

**Syntax Checker:** The Syntax Checker is a new IMS ISPF application that assists you in defining and maintaining the IMS DFSPBxxx PROCLIB members. It checks the validity of parameters and their values based on what version of IMS you run it on. In addition, it provides detailed help text at the parameter level, identifies new and obsolete parameters, and helps determine that parameter information is valid before either the initial IMS startup or an IMS restart.

**TSO Single Point of Control Application:** One of the new functions delivered with IMS Version 8 is the ability to manage a group of IMS subsystems (an IMSplex) from a single point of control (SPOC) application. With IMS Version 8, IBM is delivering a TSO SPOC application. Using the ISPF-based TSO SPOC application, you can:

- Issue commands to all the IMSplex components
- Display consolidated responses from those commands
- Send a message (using the /BROADCAST command) to an IMS terminal that is connected to any IMS in the IMSplex

**Control Center for IMS:** The Control Center for IMS provides another graphical interface for the new Operations Manager through IMS Connect, greatly easing IMS operations. The Control Center provides a single user interface from which you can control both IMS and DB2. The IMS Control Center capability is integrated with the DB2 Universal Database (UDB) administrative tools for Fixpack 1.

The administrative tools include a Control Center for navigating IMSplex systems, wizards for creating the new IMS Version 8 IMSplex commands, and a results window for sorting and filtering single-image command results. The tools also include a Command Center for typing and executing both IMSplex commands and the old operations commands. IMS Connect is being
enhanced (through the service process) to allow the Control Center for IMS to communicate with the IMS Version 8 Operations Manager.

**IVP Enhancements:** The enhancements to the IMS Version 8 Installation Verification Program (IVP) dialog are:

- SMP/E installation processing has been removed from the IVP dialog. The complete SMP/E installation information is contained in the *Program Directory for Information Management System Version 8*. This change was made as a result of the packaging and installation changes made to IMS Version 8.
- The IVP includes a new application that verifies the installation of the Common Service Layer and the installation of the TSO SPOC application. The O steps in the IVP provide a new Common Service Layer sample application. These steps verify and demonstrate:
  - Samples of the IMS.PROCLIB members for OM, RM, and SCI
  - Starting and stopping OM, RM, and SCI
  - Starting and using the TSO SPOC application
- The IVP provides a new sample application that demonstrates using the Syntax Checker. This new application is the IVP “E” step. This sample demonstrates using the Syntax Checker to migrate an IMS Version 7 DFSPBxxx PROCLIB member to IMS Version 8.
- The IVP includes a Fast Path option on sample applications. You can now include or exclude Fast Path in the IVP sample applications.

**Transaction Trace Enhancement:** This enhancement provides you with the ability to trace a transaction (an IMS TM unit of work) through multiple subsystems, which also helps with diagnosing problems. IMS Version 8 works with the transaction trace facility of the operating system to enable this function. This function requires OS/390 APAR number OW50696.

**IMS Version 8 DB Scalability Enhancements**

This section describes the major IMS Version 8 enhancements to IMS DB that affect scalability.

**Batch Remote Recovery Service Support:** Batch programs can now use the operating system’s Resource Recovery Services (RRS) to manage 2-phase commit processing. This support is extended to both IMS DB and DB2 batch programs.

As a result of this support, these batch programs can use the MQSeries product with coordinated commit processing. In addition, this support is being utilized by the IMS DataPropagator™ for asynchronous, near-real time, IMS-to-DB2 propagation.

**Related Reading:** For more information about IMS DataPropagator, see *IMS DataPropagator: An Introduction* (GC27-1211), or go to the following Web address: www.ibm.com/software/data/db2imstools/ and choose “IMS DataPropagator” from the IMS Tools dropdown menu.

**CSA/VS Relief:** In order to relieve common storage area (CSA) and virtual storage (VS) constraints, IMS Version 8 is using less private and common storage below the 16 MB line. The system PSTs (Partition Specification Tables) and other IMS blocks have been moved to private and common storage above the 16 MB line.

**Database Image Copy 2 Enhancements:** The Database Image Copy 2 (DFSUDMT0) utility has been enhanced to be able to:

- Image copy multiple DBDSs during a single running of the utility. The image copies are taken in parallel, decreasing the amount of time it takes to perform an image copy.
- Accept the specification of database group names.
- Create multiple image copies in the same output data set.
- Increase performance through the use of the new OPTIMIZE option.
- Issue an image copy complete notification by group or database name.
**DBRC Enhancements:** There are seven major DBRC enhancements for IMS Version 8:
- 16 megabyte recovery control (RECON) data set record size
- Automatic RECON loss notification
- DBRC command authorization support
- DBRC HALDB commands
- Elimination of several DBRC/IMS abends
- PRILOG compression enhancement
- Increase of the maximum number of members allowed in CA and DBDS groups

The following sections provide an overview of the enhancements in the previous list.

**16 MB RECON Record Size:** Prior to IMS Version 8, the record size for RECON data sets was limited by the type of DASD the RECONs were defined on and was limited to a maximum of approximately 800 kilobytes. As of IMS Version 8, DBRC sets the record size to 16 megabytes.

**Automatic RECON Loss Notification:** When an I/O error occurs on a RECON data set and a spare data set is available, the instance of DBRC that noticed the error copies the good RECON to the spare, activates the spare, and deallocates the original RECON data set.

As of IMS Version 8, the first DBRC automatically notifies other DBRCs about the reconfiguration and deallocates the discarded RECON. The RECON can then be deleted and redefined as the spare.

**DBRC Command Authorization Support:**

As of IMS Version 8, you can use RACF® (or an equivalent product), a user-written exit, or both to control who is authorized to manipulate (using DBRC commands) the data in the RECON. With this enhancement, DBRC verifies whether or not a user is authorized to issue the DBRC command by checking the user authorization of the command resource that is associated with the DBRC command.

**DBRC HALDB Commands:** Prior to this enhancement, the only way to change or delete High Availability Large Databases (HALDBs) was to use the HALDB Partition Database utility. Now you can perform the following tasks using DBRC commands:
- Change the attributes of a HALDB (CHANGE.DB).
- Change a partition's attributes (CHANGE.PART).
- Create a HALDB using high key values even when the DBD was generated with a partition selection exit module name.
- Delete a partition (DELETE.PART).
- Delete a HALDB (DELETE.DB).
- List additional information about a HALDB partition (LIST.RECON).

**Elimination of DBRC/IMS Abends:** There are three areas that previously caused abends that no longer do so:
- Deallocation processing
  DBRC will not abend during deallocation processing if the ALLOC record is not found or if the ALLOC record already has a deallocation time. Instead of the abend, error messages are issued, a dump is taken, and the status for the database area is set to “Prohibit further authorization.”
- Authorization processing
  DBRC will not abend if the SUBSYS record becomes larger than the RECON physical record size. With the support of RECON records up to 16 megabytes in size, the SUBSYS record is written as multiple RECON record segments.
- Database I/O error
  DBRC will not abend if recording an extended error queue element (EEQE) causes the database data set record to exceed the RECON physical record size due to record segmenting.

**PRILOG Compression Enhancement:** Compression will now be attempted more frequently than was the case prior to IMS Version 8. Compression will be attempted whenever an online log data set (OLDS) archive job is run. For Remote Site Recovery (RSR), this is when the tracking log data set is opened.

**Maximum Number of Members in CA and DBDS Groups:** The maximum number of members in a CA or DBDS group has increased from 2000 to 32767.
Fast Path Enhancements: Fast Path has been enhanced for IMS Version 8 as follows:

- Shared VSO has been enhanced to provide:
  - System-managed rebuild of a VSO structure.
  - Automatic altering of a VSO structure size.
  - System-managed duplexing of VSO structures.
- DEDBs can now have up to 2048 areas.
- DEDBs can now be defined as “non-recoverable” in DBRC.

HALDB Single Partition Processing Enhancement: This enhancement enables utilities and applications to process or access a single partition while not affecting any other partition in the HALDB. This controlled access is achieved by the use of a new data definition (DD) statement (with a ddname of DFSHALDB) in the JCL of the batch job, the Batch Message Processing (BMP) dependent region, or the Java Batch Message Processing (JBP) dependent region.

Parallel Database Processing Enhancement: Prior to IMS Version 8, IMS DB performed database authorization, allocation, and open and close processing in a serial manner. IMS DB now performs these tasks using multiple OS/390 threads.

This function is provided as part of the IMS DB base and is controlled by IMS.

Remote Site Recovery Enhancement: The IMS Remote Site Recovery (RSR) function has been enhanced to provide coordinated disaster recovery for IMS and DB2.

IMS TM Scalability Enhancements

This section describes the major IMS Version 8 enhancements to IMS TM that affect scalability.

APPC/IMS Enhancements: APPC/IMS has been enhanced in the following ways:

- A new parameter (CPUTIME) has been added to the TP Profile data set (which is maintained by the operating system) to specify the number of CPU seconds that a CPI-C program is allowed to run before being terminated. This limits the time that resources are locked up due to a possible error in the program that causes it to loop endlessly.
- The /START and /DELETE commands have been enhanced to allow you to define (or delete) LU 6.2 descriptors to IMS while it is running.
- The /CHANGE command has been enhanced to allow you to change the outbound logical unit (LU) using the new OUTBND keyword.

APPC/OTMA Enhancements: Prior to IMS Version 8, implicit APPC/OTMA messages could only use shared queues for synchronous messages if the transaction was processed by the front-end IMS.

For IMS Version 8, both asynchronous and synchronous transactions now can use shared queues and you now can input a message on any of the external interfaces and have that message distributed and executed on any IMS system within the sysplex.

Coupling Facility Duplexing Support: IMS is providing support for z/OS Coupling Facility (CF) Duplexing function for IMS Shared Message Queue structures and IMS Fast Path Expedited Message Handler (EMH) structures. When CF Duplexing is enabled, z/OS creates a duplex copy of the structure for failure recovery. If the IMS Shared Queues structure or the EMH structure fails or if a connection to the structure is lost, z/OS switches to the unaffected structure instance without the overhead of a structure rebuild.

CF Duplexing also enables System-Managed Rebuild. z/OS does the structure rebuild for a planned reconfiguration (that does the structure copy) even if no IMS Common Queue Server (CQS) is currently running. IMS CQS-managed rebuild is still needed to address Coupling Facility failure, structure failure, or loss of connectivity.

FICON CTC Support for IMS MSC: The IMS Multiple Systems Coupling (MSC) facility has been enhanced to support the Fiber Connection (FICON™) channel-to-channel (CTC) hardware support on z-Series processors. When multiple IMS subsystems are connected by the FICON CTC hardware, the volume of IMS messages that can flow between the IMS systems can increase significantly, as opposed to the volume that is possible on the Enterprise System Connection (ESCON®) hardware.
Sysplex Terminal Management
Enhancements: For IMS Version 8, IMS TM has been enhanced to use the new Resource Manager (RM) to maintain IMS resource information in a sysplex environment. By having the resource information available to other IMS subsystems in the sysplex, the following is achievable:

- Resume work for VTAM® terminals and users if their local IMS fails
- Eliminate VTAM Generic Resources terminal affiliations
- Provide resource type consistency
- Provide name uniqueness
- Provide global callable services for node, LTERM, and user resources

Highlights of Existing Function
The following sections cover the major existing functions of both IMS DB and IMS TM.

IMS Java Application Development
Java application development support enables IMS applications to be written in Java and executed in IMS dependent regions. VisualAge® workstation tools as well as host tools can be used for development and testing. IMS Java applications have access to IMS message queues and databases through the use of IMS Java classes. Additionally, the JDBC interface can be used to access both IMS databases and DB2 data. The IMS Java support enhances the ability of customers and business partners to provide integrated e-business application development for IMS.

Extended Markup Language (XML)
IMS supports XML through interoperation with the OS/390 XML Parser, Java Edition. The XML parser's application programming interfaces (APIs) can be used with the High Performance Java Compiler shipped as part of VisualAge for Java, Enterprise Edition for OS/390 to develop new IMS Java programs running in IMS. IMS V7 Java application programmers can thus invoke the APIs (DOM APIs and SAX APIs) of the OS/390 XML Parser, Java Edition, to convert an XML document from its stream form into a “parsed” form for reading, editing, or updating an XML document.

IMS Connect
IMS Connect, a separately priced facility for IMS, provides enhanced IMS TCP/IP support. IMS Connect requires the IMS TM feature. Much of the function in IMS Connect can be used with IMS V6 TM. Customers can then use IMS Connect before performing a full migration to IMS V7 or IMS V8. Future enhancements to IMS TCP/IP support will be provided only through IMS Connect for IMS V7 and later versions.

Open Transaction Manager Access (OTMA) Facility Callable Interface
This function improves IMS connectivity by providing a high-level interface for access to IMS applications from other OS/390 subsystems. It presents an API to application programs to enable access and execution of IMS transactions through IMS OTMA facilities. With this simple and easy-to-use interface, the invoker of the APIs can submit a transaction or command to IMS from within the OS/390 environment without the necessity of understanding the technical protocols of the MVS Cross Coupling Facility (XCF) or IMS OTMA.

High Availability Large Databases (HALDB)
The HALDB function delivers enhancements to capacity, availability, manageability, and usability by enabling partitioning for IMS Full Function databases. HALDB supports as many as 1,001 partitions (each partition having a maximum capacity of 40 gigabytes). This means customers can have over 40 terabytes of OSAM and VSAM data sets. A single HALDB partition has the capacity of an entire IMS Full Function database from some earlier releases of IMS.

HALDB support also allows a partition to be taken offline, have something done to it, and be independently brought back online. This means each partition can be individually unloaded and reloaded, and while offline, have a batch reorganization done to it. Or the entire database can be taken offline and each partition reorganized in parallel, speeding up the offline reorganization process. Thus, HALDB improves database availability because multiple partitions decrease the amount of data unavailable if a partition fails or is taken offline.
HALDB partitions can be processed in parallel, reducing the total time required for batch workload or utility processing. Reorganized HALDBs are immediately usable after image copies can be created because Prefix Resolution or Prefix Update utility processing is no longer required. A series of ISPF panels, with imbedded help screens, provide an interface for creating and migrating databases.

**Common Storage Area (CSA) Constraint Relief**

More below-the-line 16M Common Storage Area usage is made available by moving modules and control blocks above the 16M line.

**64-bit Real Support**

For IMS I/O operations, above-the-bar 64-bit real storage is used for IMS page-fixed storage, freeing up below-the-bar real storage for customer use.

**Online Recovery Service (ORS)**

ORS, a separately priced facility for IMS, provides database recovery processing in an online IMS environment. This facility enables a customer to recover multiple database data sets simultaneously. ORS reads image copies, logs, and Change Accumulation data sets in parallel. It reads each input only once, even when it is used in the recovery of multiple data sets. ORS applies the database changes to multiple data sets simultaneously. This speeds recoveries through the reduction of I/Os and the use of parallel processes.

ORS also enables you to recover databases to any point in time. This includes times at which the databases were being updated. It is not necessary to have previously created a recovery point by qui-escing or deallocating the databases. ORS applies only committed updates as part of this process. This capability means that databases might be more available because they do not have to be deallocated to create recovery points.

Online commands are used to initiate database recoveries. Change Accumulation can be used but is never required before a recovery. This is true even when data sharing is used. ORS can be used to recover full function database data sets or Fast Path DEDB areas.

**Deferred Access Control Block (ACB) Open**

This function provides the option of delaying the queuing of VTAM logon requests until IMS is ready to start accepting logons. Use of this function can reduce or prevent time outs.

**Specifying Checkpoint Log (CPLOG) as an IMS Execution Parameter**

This function improves system availability by allowing users to change the number of log records produced between system checkpoints without the requirement of a system generation. Users can specify the number of log records between system checkpoints using the CPLOG execution parameter. The CPLOG value can be changed by using the /CHANGE command.

**Rapid Network Reconnect (RNR)**

RNR utilizes the facilities of VTAM's Multinode Persistent Session Services to improve system availability by allowing IMS TM to automatically reconnect terminal sessions following any kind of IMS failure and subsequent restart. RNR reduces network reconnect time after an IMS, OS/390, or VTAM, or CPC failure in a sysplex environment.

**VTAM Generic Resource (VGR) Support**

The installation can choose to have VTAM, instead of IMS, manage the generic resource affinity. This means that when any session outage occurs, whether a CPC, OS/390, VTAM, or IMS failure, a new terminal session can be immediately established with any available IMS system.

**Resource Access Control Facility (RACF) PassTicket**

This function allows the terminal or system entering the /SIGN ON command with a PassTicket (instead of a password) to specify the application name used in the creation of the PassTicket.

**USERID Clarification**

The USERID clarification function provides a way for application programs and user exits to determine the content of a USERID field. The content could be a RACF USERID, an LTERM name, a PSB name, blanks, binary zeros, or some other value.
Displaying the IMS System Parameters

This function displays various parameters used in the initialization of an IMS control region to the system console and to the job log.

Installation Verification Program (IVP)

The IVP (Installation Verification Program) is an ISPF dialog that is used to initially verify (test) the installation of IMS using a sample IMS system.

IMS External Subsystem Attach Facility (ESAF)

ESAF allows other products to attach to IMS. It allows IMS application programs, running in IMS dependent regions, to access resources owned by the attached products, for example, DB2 resources and IMS resources.

Deadlock SNAP Trace Records

This function provides diagnostic information for identifying the source of an external subsystem-detected deadlock condition. Trace records are written after an event occurs, such as signon. To accommodate sysplex tracing, trace entry sizes are 16 words. New and modified trace records provide additional information to facilitate the diagnosis of ESAF problems.

Support for Data Facility Storage Management Facility (DFSMS) Constructs

This support makes installation easier for sites that use SMS-managed volumes. HALDB sample applications are also provided.

IMS Logger

While IMS is running, all information necessary to restart the system in the event of hardware or software failure is recorded on a system log data set.

IMS V7 provided a more dynamic ability to change system checkpoint frequency. This improved system management and availability by allowing users to change the number of log records produced between system checkpoints without requiring a system generation. Users can specify the number of log records between system checkpoints using the CPLOG execution parameter. The CPLOG value can be changed via the /CHANGE command.

Shared Message Queues and Shared EMH Queues

Using an OS/390 coupling facility, IMS can store and share IMS message queues among multiple IMS TM systems. Incoming messages from one IMS TM in a sysplex can be placed on the shared queue by IMS TM's Common Queue Server for processing by any other IMS TM that has access to the shared queue. Using shared queues enables automatic workload balancing across all IMS subsystems in the sysplex, thus providing increased capacity and availability for the IMS system. Shared queues also provide an alternative to using MSC to transfer messages across a sysplex.

Asynchronous OTMA/APPC input messages can run on any IMS system in the shared queues group that is available for processing.

Common Queue Server (CQS)

CQS manages shared queues in a sysplex for multiple IMS TM subsystems. CQS receives, maintains, and distributes data objects from a shared queue on behalf of these TM subsystems or clients.

Distributed Syncpoint

Distributed Syncpoint support allows advanced program-to-program communications (APPC) and DCE/RPC (distributed computing environment/remote procedure call) application programs and DCE/RPC remote application programs to participate with IMS in protected conversations with coordinated resource updates. The OS/390 Resource Recovery Services/MVS (RRS/MVS) manages the syncpoint process on behalf of the conversation participants: the application program and IMS acting as resource manager. Application programs can access and update resources of multiple participating resource managers with integrity.

Fast Path High Availability Databases

IMS Fast Path Data Entry Databases (DEDBs) are designed to provide continuous availability with high performance for large databases. IMS utilities can reorganize or image copy a DEDB without disrupting its availability to the end user.
You can add, change, and delete Fast Path DEDBs at the database or area level without shutting down and restarting IMS. The IFP or MPP regions that access the DEDBs need not be stopped during online-change processing. DEDB online change can be used in XRF, RSR, and sysplex environments.

Using the Fast DB Recovery function, you can also restore database resources from a failed subsystem in a sysplex data-sharing environment more quickly. This function monitors another IMS DBCTL or IMS TM/DB subsystem in the Sysplex and in the event of a problem, restores the databases locked by the failed system. Other IMS subsystems release the locks held by the failed system and allow processing to continue. This increases availability.

The following enhancements to the Fast Path function were introduced in IMS V7:

- **DEDB I/O Tolerance** improved the handling of write errors when a Data Entry Database (DEDB) write fails. IMS maintains a copy of the data in memory so the data may continue to be accessed and updated by the system experiencing the write error.
- The **IMS Monitor** was enhanced to provide monitoring of Fast Path DEDBs, MSDBs, EMH Queues, BALGs, and IFP regions. The monitoring capabilities for Full Function and Fast Path databases were also enhanced to support new constraints so that limitations could be placed on what is monitored.
- **Sequential Dependent Segments (SDEPs)** Scan expands compressed data. This enhancement extended IMS’ compression capability to the Fast Path Scan utility so that compressed SDEP components can be processed in any environment.
- **Timestamp and version information** were provided in the Application Control Block for DEDBs, aiding system programmers in analyzing Fast Path database problems.
- **DEDB Multiple Area Data Sets (MADS)** I/O timing provided relief to the “long busy” state situation associated with internal recovery processing by RAMAC® disk drives and slow recovery of non-RAMAC disk drives.

### Fast Path Virtual Storage Option

The IMS Fast Path Virtual Storage Option (VSO) enabled portions of data entry databases (DEDBs) to be stored in an OS/390 data space, so that DEDBs can have performance similar to IMS Main Storage databases (MSDBs). DEDBs support segment-level locking and database field calls. MSDB applications can use DEDBs (especially VSO DEDBs) instead of MSDBs.

IMS provides a utility to migrate non-terminal-related MSDBs to DEDBs, regardless of whether you use VSO. Migrating MSDBs to VSO DEDBs improves data availability for MSDB applications.

### MVS Resource Management

IMS supports MVS Workload Management by allowing it to monitor IMS transactions or batch jobs while they are running. Workload Management determines if the active IMS transactions or batch jobs are meeting the response time and performance goals, and can adjust MVS resources that are assigned to help IMS achieve its goals. By using MVS Workload Management, operations and systems management personnel can make more informed decisions in controlling the workload mix and prioritization to meet their business objectives (for example, system performance goals).

IMS enables workload balancing for transaction processing work in a Parallel Sysplex™ with enhancements to certain Multiple Systems Coupling (MSC) exit routines. You can define all transactions as local for each system and use the exit routines to control routing between systems.

### MVS Automatic Restart Manager

In a Parallel Sysplex environment, IMS supports the MVS Automatic Restart Manager. This support improves the availability of IMS systems.

### MVS OpenEdition Enablement

IMS supports MVS OpenEdition and the support services it provides. These services, when used with other selected products, conform to approved standards or provide an implementation for appropriate draft standards. Using such services as the portable operating system interface for computer environments (POSIX) and DCE/RPC standards enables application portability for MVS and IMS.
IMS applications can use POSIX threads support on MVS. Using threads support makes it easier to write multitasking applications, such as server applications. Application programmers and system programmers can use callable services to utilize many of the POSIX-related services. These services make it easier to code certain tasks in assembler language.

POSIX.1 support provides a standard interface that is available on a wide range of IBM and non-IBM operating systems. Programs that conform to the POSIX.1 standard can be more easily ported to and from MVS. Programmers with UNIX™ and C language skills can develop programs for MVS and IMS TM using their current skills.

POSIX.2 shell and utilities provide a user interface that is familiar to UNIX programmers, improving their productivity when using MVS.

With a growing number of transmission control protocol/Internet protocol (TCP/IP), RPC, and POSIX-conforming applications available commercially, your application needs can often be met more quickly with off-the-shelf software that conforms to POSIX, reducing the cycle time from identification of a need to delivery of a solution. These solutions can complement and use existing IMS applications and data.

For Open Access to IBM and non-IBM Networks: Using MVS OpenEdition facilities, current data and logic can be made available to heterogeneous clients by using a single set of standardized interfaces. For example, you can use an RPC from a local area network (LAN) or workstation to access IMS TM applications. OpenEdition DCE and the OpenEdition DCE Application Server/IMS provide application access to IMS TM host applications from workstations and LANs. The Application Server is a bridge between the new, heterogeneous world of DCE to the more traditional world of MVS. It allows a new class of workstation products to access IMS using a standard method of heterogeneous interoperability.

Open Transaction Manager Access

IMS Open Transaction Manager Access (OTMA) is a client/server protocol for IMS transactions. In a client/server environment, the IMS Transaction Manager is the high-performance server, and with the OTMA feature you can attach many different MVS client subsystems. An OTMA client acts as a gateway between IMS TM and a heterogeneous network. TCP/IP, RPC, MQSeries, and IMS TM systems can be used across their appropriate platforms in conjunction with each other, taking advantage of existing applications, data, and programmer skills.

Full Function Database

IMS full function databases support complex data structures such as logical relationships and secondary indexes.

Database Control (DBCTL)

DBCTL is an IMS DB operating environment that consists of the IMS DB product connected to a transaction management subsystem other than the IMS Transaction Manager. With DBCTL, transaction management subsystems (such as CICS) can have online access to full function databases and Fast Path DEDBs.

Data Sharing

IMS DB can concurrently access and share databases with other IMS DB subsystems in database/data communications (DB/DC), DBCTL, or batch environments.

IMS data sharing is improved by using S/390 parallel processing technology. In a sysplex that includes a coupling facility and the IBM Internal Resource Lock Manager (IRLM) Version 2, IMS can share data at the block level among as many as 32 systems. In a sysplex, IMS is no longer limited by IRLM to two central processor complexes (CPCs) in its data sharing.

Lock management and serialization for multisystem data sharing is handled by IRLM Version 2 using a coupling facility.

IMS multisystem data sharing can be used whether you have IMS TM or CICS as your transaction manager.
Database Recovery Control (DBRC)

DBRC helps automate the recovery of databases by keeping track of the database image copies and logs that are needed for recovery. DBRC also helps ensure database integrity in a data-sharing or Remote Site Recovery environment.

Additionally, DBRC commands are provided to aid in database administration with the RECON data set for HALDBs. This is done by creating a master template in a single editable file that can be geographically propagated and tailored to different sites or systems and by creating the definitions that can be executed in batch to create and restore partitions should they be unavailable from the RECON.

Remote Site Recovery

The Remote Site Recovery (RSR) feature lets you recover quickly from an interruption of computer services at an active site. The RSR feature allows you to maintain a geographically remote secondary IMS site that tracks the activity of the primary site and that can take over the active workload in the event of an outage. Because RSR maintains copies of your active resources at the remote site, including shadow databases and remote logs, you significantly enhance your ability to protect your investment in applications and data.

Extended Terminal Option (ETO)

ETO is a separately priced feature of IMS TM. It is designed to provide a significant continuous availability enhancement by allowing changes to the IMS VTAM terminal network to be made online, without the need for a planned outage for IMS system generation. ETO is designed to provide improved network and system security by controlling system access and message delivery for each user ID (which can be shared by more than one user) rather than for each terminal.

Advanced Program-to-Program Communications for IMS (APPC/IMS)

APPC/IMS provides the ability to develop distributed and cooperative (client/server) IMS TM applications to communicate with programmable workstations and other systems using APPC/MVS and the LU 6.2 protocol. IMS TM allows you to use the Common Programming Interface for Communications (CPIC) or the IMS DL/I programming interface to communicate with LU 6.2 systems.

IMS TM supports network-qualified names for APPC/IMS environments. IMS MSC supports transactions from APPC/IMS subsystems. You can include IMS MFS message formats with APPC/IMS transactions.

Data Communications Control (DCCTL)

DCCTL is an IMS TM operating environment that can connect to a database management subsystem other than the IMS Database Manager. With DCCTL, database management subsystems such as DB2 can have access to IMS transaction management without a prerequisite for the IMS DB. So, DCCTL can provide a database-independent, transaction processing environment for DB2.

Multiple Systems Coupling (MSC)

MSC permits message and transaction routing between two or more IMS TM subsystems in one or more OS/390 systems or processors. Whether a transaction is processed on a local IMS TM subsystem or on a remote one is transparent to the user entering the transaction. So, MSC provides a single-system image to the end user. MSC supports transactions (messages), responses, program-to-program switches, and fixed-length conversational scratch pad areas on two or more IMS systems.

Intersystem Communication (ISC)

ISC enables communication between IMS TM and another subsystem (such as CICS), a user-written subsystem, or another IMS TM subsystem using the LU 6.1 protocol.

Front-End Switching

IMS TM can be a front-end network manager connected to a back-end application processing subsystem, which can be another IMS TM subsystem or a non-IMS TM subsystem. ISC (LU 6.1), LU 0, and LU 2 communications protocols are supported between the front and back-end subsystems.
Extended Recovery Facility (XRF)

XRF provides a local alternate IMS subsystem that monitors the status of an active IMS subsystem so that the alternate subsystem can take over the active subsystem’s workload in the event of an outage. XRF can be used to minimize the impact to end users of planned and unplanned IMS subsystem or OS/390 system outages.

Online Change

Online change improves the availability of an online IMS subsystem by allowing non-disruptive changes to the IMS subsystem. Resources such as database definitions, transaction definitions, application definitions, MFS formats, and security definitions can be added, deleted, or changed without bringing down the IMS subsystem.

Subsystem Logging

In an online environment, log records are stored on DASD, instead of being written to tape. Logging to DASD simplifies recovery of the IMS subsystem, reduces operator involvement, and improves system availability.

Fast Path Expedited Message Handler (EMH)

Fast Path EMH supports applications requiring fast response times.

IMS Message Format Service (MFS)

MFS allows application programs to handle logical messages, so they do not need to handle device-specific characteristics of input or output messages. MFS distributed presentation management (DPM) supports ISC and secondary logical units type P (SLU P) for a user-written program in a SLU P controller or in another subsystem connected with ISC. MFS DPM enables device-independent data streams to be transmitted between IMS and a remote program. MFS DPM also enables the application program to use a single data structure, regardless of the data source or destination.

Data Compression

IMS DB supports Enterprise System/9000® data compression hardware. This support provides storage (DASD) savings and improved transaction response time because hardware data compression uses fewer processor resources than software data compression and because I/O operations are reduced for compressed data.

Application Programming Interface

Application programmers can write IMS application programs in Java, COBOL, PL/I, the C language, Pascal, ADA, REXX, or IBM High Level Assembler (HLASM) language. IMS also provides an interface to the IBM Language Environment for MVS and VM.

The IMS application programming interface (xxxTDLI) has no direct dependency on language compiler release levels. Older IMS application programs that have not been modified (for example, by linking them with Language Environment routines) will continue to run as expected, regardless of current language compiler support.

Discontinuance of Support for CICS Local DL/I

IMS does not support the CICS local DL/I environment. You must convert your existing local DL/I applications to use IMS DBCTL. IMS/ESA® Version 4 was the last IMS release to support local DL/I.

Discontinuance of Support for the IMS LU 6.1 Adapter

IMS does not support the IMS LU 6.1 adapter for LU 6.2 applications. You must convert existing applications to use APPC/IMS. IMS/ESA Version 4 was the last IMS release to support the adapter.

Discontinuance of Support for IMS Client Server Object Manager

IMS does not support IMS Client Server Object Manager (CSObject). You must migrate to IMS Connect.

IMS/ESA Version 5 was the last IMS release to support CSObject.
Other Support Discontinuances

IMS does not support the following:

- Assembler H
  You should migrate to the High Level Assembler (HLASM) product.
- The following basic telecommunications access method (BTAM) devices:
  - LINEGRP UNITYPE=1050, 2260, 2265, 2770, 2980, 3741, 7770, TWX, 3614, 3767, 3770, and 3790
  - MSPLINK TYPE=BSC
  - TYPE UNITYPE=SLUTYPE4
- The RECOVCTL parameter for the IMS Database Recovery Control (DBRC) CHANGE.RECON and INIT.RECON commands.

IMS requires VTAM for service changes. IMS Version 5 is the last release for which VTAM is optional for IMS TM.

Softcopy Publications

All IMS Version 8 publications are available in softcopy format (PDF and BookManager®) on the IMS Licensed Product Kit CD (LK3T-7092) and on the Internet (at www.ibm.com/ims).

The PDF books can be read online using the Adobe® Acrobat Reader. The BookManager books can be read online using BookManager READ on MVS, VM, OS/2®, DOS, Microsoft® Windows®, or AIX®.

Specified Operating Environment

Hardware Requirements

IMS Version 8 executes on all IBM processors that are capable of running OS/390 System Product (OS/390) Version 2 Release 10 or later.

The processors must have sufficient real storage to satisfy the combined requirements of IMS, the operating system, IMS batch requirements, and other customer-required applications.

The configuration must include sufficient I/O devices to support the requirements for system output, system residence, and system data sets.

Sufficient direct access storage must be available to satisfy information storage requirements and can consist of any direct access facility supported by the system configuration and the programming system.

System Console: The console requirements of OS/390 Version 2 Release 10, or later, apply.

Tape Units: At least one IBM 3420, 3480, or 3490 tape unit is required for installation and maintenance.

Direct Access Devices: During the binding of the IMS control blocks load modules, both the Binder work data set SYSUT1 and IMS.SDFSRESL must reside on a device that supports a record size of 18KB or greater. For all other system libraries and working storage space, any device supported by the operating systems is allowed.

For IMS database storage, any device 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 Database Image Copy 2 enhancements require concurrent-copy capable DASD controllers.

Non-Sysplex Data Sharing Requirements: The hardware requirements for single-LPAR interprocessor block-level data sharing between IMS Version 6 (with IRLM Version 2.1), IMS Version 7 (with IRLM Version 2.1), and IMS Version 8 (with IRLM Version 2.1) are the same requirements as for the base IMS Version 8.

Sysplex Data Sharing: For data sharing in a sysplex environment (using IRLM Version 2.1), the following is required:

- A Coupling Facility level 9 or higher
- One of the following with its related hardware
  - A 9037 Sysplex Timer®
  - IBM S/390 9674
  - IBM S/390 9672 Transaction Server
  - IBM ES/9000® 9021 711 model processor
**Shared Message Queues and Shared EMH Queues:** For sharing message queues and sharing EMH queues in a sysplex environment, one of the following is required with related hardware:

- An IBM S/390 9674 with coupling facility control code level 9
- IBM S/390 9672 Transaction Server
- IBM ES/9000 9021 711-base model processor or IBM ES/9000 511-base model processor
- The related hardware for all of the preceding items in this list.

**DFSMS Concurrent Copy Support:** Databases and area data sets that are to be copied using the Database Image Copy 2 utility must reside on hardware that supports the DFSMS concurrent copy feature (such as a 3990 Storage Control Model 3, extended function with licensed internal code, or an equivalent device).

**Remote Site Recovery Features:** Remote Site Recovery requires:

- A Sysplex Timer (if data sharing or if the workload is spread across multiple CPUs)
- A 3172 highband control unit
- At least one tape unit (3420, 3480, 3490) at the tracking site

Coordinated Disaster Recovery support for IMS and DB2 requires that the DB2 logs reside on devices supporting eXtended Remote Copy.

**Multiple Systems Coupling Requirements:** When the physical link is channel-to-channel and it is dedicated to IMS, the System/370™ channel-to-channel adapter or a logical channel on the IBM 3088 or ESCON is required.

MSC fiber channel connection (FICON) channel-to-channel (CTC) support requires that at least one side of the MCS link be an IBM G6 processor or IBM zSeries™ with the FICON channel and FICON CTC microcode. The other side (IMS) can be any processor with a FICON channel.

**Shared VSO Coupling Facility Enhancements:** The Shared VSO Coupling Facility enhancements exploit Coupling Facility System-Managed Rebuild, Auto Alter, and System-Managed Duplexing functions that are available only on processors supporting these Coupling Facility functions and capabilities. A Coupling Facility level 9 is required for the Auto Alter function and a Coupling Facility level 10 is required for the System-Managed Duplexing.

**Supported Terminals:** See the *IMS Version 8 Release Planning Guide* (GC27-1305) for a list of the communications devices supported by IMS Version 8.

**Software Requirements**

This section describes the software requirements for IMS Version 8 and the major enhancements for IMS Version 8.

**Operating Systems:** IMS Version 8 operates under OS/390 Version 2 Release 10 configurations or subsequent versions, releases, and modification levels, unless otherwise stated, and requires the following minimum version, release, or modification levels:

- OS/390 Version 2 Release 10 (5647-AQ1).
- DFSMS/MVS® 1.5*, a base element of OS/390 V2R10
- IBM High-Level Assembler Toolkit (5696-234), a separately orderable feature of OS/390 V2R10
- RACF or equivalent, if security is used
- ISPF Version 4 Release 2 (5655-042)
- SMP/E*
- e-Network Communications Server for OS/390 V2R10, if IMS Transaction Manager is used
- JES2*
- JES3*
- TSO/E*

* - These items are OS/390 Version 2 Release 10 base elements that cannot be ordered separately.

- IRLM 2.1 (5655-DB2), if data sharing is used.
- Coupling Facility (logical partition). In general, IMS Version 8 requires a Coupling Facility level 9, or later. if you are using multi-mode persistent session Rapid Network Reconnect, MADS I/O Timing, shared message queues,
IRLM structures, cache structures, list structures, or log structures.

IMS Version 8 also operates in a virtual machine (VM) under control of OS/390 Version 2 Release 10. This environment is intended for use in a program development, testing, and non-XRF production environment.

**Restriction:** In a VM environment, be aware that:

- If you use BTAM binary synchronous terminals, expect communication line timeouts. Terminal timeouts are not limited to VM, but, when they occur, they affect communication line recovery because polling is inconsistent when BTAM operates under VM.
- The Log Analysis utilities might yield inaccurate time-stamp oriented results.
- If you operate the IMS Version 8 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.

If you are going to run IMS Version 8 on z/OS Version 1 Release 1 or higher, you need to apply APAR OW51598 to the operating system.

z/OS Version 1 Release 2 is needed for the following:

- IMS MSC FICON CTC support.
- Shared Queues/EMH Coupling Facility duplexing support.
- All systems involved in using APPC/OTMA Synchronous Shared Queues support for the Multi-System Cascaded Transactions support. Resource Recovery Services must also be active on all of these systems.
- The System-Managed Duplexing of VSO structures (part of the Shared VSO Coupling Facility enhancements). The duplexing also requires a minimum Coupling Facility (CF) of 11, or later, and bidirectional CF to CF links.

z/OS V1R2 Coupling Facility duplexing is recommended, though not required for the IMS Version 8 Resource Manager and Coordinated Online Change enhancements.

**Data Sharing:** For block-level sharing, the IRLM 2.1 is required. The IRLM is an independent component shipped with IMS Version 8. The IRLM must be defined as an OS/390 subsystem. Block-level data sharing of full-function databases is supported between all in-service levels of IMS.

**DBRC:** IMS Version 8 DBRC requires that the Migration/Coexistence SPE be applied to the DBRC on the pre-IMS Version 8 DBRC.

**IMS Java:** IMS Java application support (Java dependent regions) requires the IBM Developer Kit for OS/390, Java 2 Technology Edition (5655-D35), with a special enhancement referred to as the Persistent Reusable Java Virtual Machine (JVM).

**Note:** IMS Version 7 was the last release of IMS to support the High Performance Java (HPJ) compiler. Customers using HPJ-compiled applications should migrate to the new Persistent Reusable JVM support.

JDBC access to IMS DB for DB2 Stored Procedures requires DB2 UDB for z/OS and OS/390, Version 7 (5675-DB2).

JDBC access to IMS DB for CICS applications requires CICS Transaction Server for z/OS Version 2 (5697-E93).

JDBC access to IMS DB for WebSphere applications requires WebSphere Application Server z/OS Version 5.0 and additional WebSphere Application Server z/OS Connection Management support.
**Control Center for IMS**
- DB2 UDB Fixpack 1
- IMS Connect Version 1.2 (support delivered through the service process)
- IMS Version 8

**Small Programming Enhancements (SPEs)**
- DBRC SPEs are required on IMS Version 6 and IMS Version 7 in order for them to coexist with IMS Version 8.
- The Shared Queues OTMA/APPC Migration/Coexistence SPE is needed on IMS Version 6 only.

**Sysplex Data Sharing:** IMS sysplex data sharing (including data caching, shared SDEPs, and shared VSO DEDB areas) requires IRLM Version 2.1.

**Transaction Trace:** The Transaction Trace function of IMS Version 8 requires OS/390 APAR number OW50696.

**Fast Database Recovery:** Fast database recovery support requires:
- IRLM Version 2.1
- Sysplex environment with cross-system coupling facility (XCF)
- IMS DB/DC or DBCTL subsystem
- A shared-database resource (full-function database or DEDB)

**OSAM Database Coupling Facility Caching:**
The OSAM Database Coupling Facility Caching function requires the same hardware and software requirements as for Sysplex data sharing.

**CICS Subsystems Supported:** IMS DB Version 8, using the Database Resource Adapter (DRA), can be connected to any of the following:
- CICS Transaction Server for z/OS Version 2 (5697-E93)
- CICS Transaction Server for OS/390 Version 1 (5655-147)
- CICS/ESA® Version 4 (5655-018)
- User-written software

**IMS TM Version 8**, using the appropriate TM interface, can be connected to any of the following:
- CICS Transaction Server for z/OS Version 2 (5697-E93)
- CICS Transaction Server for OS/390 Version 1 (5655-147)
- CICS/ESA Version 4 (5655-018)

**DB2 Subsystems Supported:** IMS TM Version 8 can be connected to any of the following DB2 subsystems:
- DB2 Version 6 (5645-DB2)
- DB2 Version 7 (5675-DB2)

**Intersystem Communications Subsystems Supported:** IMS TM Version 8, using ISC, can be connected to any of the following:
- IMS Version 8 (5655-C56)
- IMS Version 7 (5655-B01)
- IMS Version 6 (5655-158)
- CICS Transaction Server for z/OS Version 2 (5697-E93)
- CICS Transaction Server for OS/390 Version 1 (5644-147)
- CICS/ESA Version 4 (5655-018)
- User-written software

**Multiple Systems Coupling:** IMS TM Version 8, using MSC, can be connected to the following IMS subsystems:
- IMS Version 8 (5655-C56)
- IMS Version 7 (5655-B01)
- IMS Version 6 (5655-158)

**Remote Site Recovery (RSR) Features:** The RSR features, recovery-level tracking (RLT) and database-level tracking (DLT), each require one of the following subsystems:
- IMS Version 8 Database Manager
- IMS Version 8 Database/Transaction Manager

**Extended Terminal Option (ETO) Feature:** The ETO feature requires one of the following subsystems:
- IMS Version 8 Transaction Manager
- IMS Version 8 Database/Transaction Manager
### Programming Languages Supported:
Application programmers can write IMS application programs in the following languages:
- ADA
- Visual Age (VA) for Java Version 2 for OS/390
- COBOL for OS/390 & VM
- VS COBOL II
- VS Pascal
- PL/I for OS/390 & VM
- PL/I
- C
- C and C++ for OS/390 and VM
- TSO/E REXX
- S/370 Assembler
- High Level Assembler Release 2

### Requirement:
The following languages require the IBM Language Environment for OS/390 and VM:
- Visual Age (VA) for Java Version 2 for OS/390
- COBOL for OS/390 & VM
- C and C++ for OS/390 and VM
- PL/I for OS/390 & VM

### Application Programs Supported:
All application programs supported under IMS Version 6 and IMS Version 7 are still supported under IMS Version 8.

### Requirement:
IMS Version 7 is the last version to support HPJ-compiled application programs. If you use HPJ-compiled applications, you must migrate to the new JVM support. For more information about migrating Java applications to the new JVM support, see IMS Version 8 Release Planning Guide.

### Compatibility
Customer applications written for currently supported versions of are upwardly compatible with IMS Version 8, allowing existing applications and data to be used without change. Migration, coexistence, and maintenance support is provided for IMS V6 and V7 with V8.

IMS V7 introduced a new combined MSC exit (DFSMSCE0). IMS V7 is the last release to support the old MSC exits: Terminal Routing (DFSCTMR0), Input Message Routing (DFSINPRT0), Link Receive Routing ((DFSMLR0/DFSMLR1), or Program Routing (DFSCMPR0).

For previous versions of IMS to be compatible with the OTMA function in IMS V8, IMS V6 customers must apply APAR PQ58630 and IMS V7 customers must apply APAR PQ58631.

IMS Web was provided as an early tool for Internet use by customers preparing for and providing access to IMS applications across the Internet. IMS Web is no longer available. IBM now provides a common connector strategy for consistent easier access to existing applications and data. Replacement solutions for accessing IMS from the Web are provided through:
- IMS Connect Version 1, Release 2 (5655-E51)
- IBM Developer Kit for OS/390, Java 2 Technology Edition (5655-D35)
- WebSphere Application Server Enterprise Edition V5.0
- WebSphere Studio Application Developer Integration Edition V5.0

Service for the IMS TCP/IP OTMA Connection (IMS TOC), which provided early IMS TCP/IP access, has been discontinued. IMS Connect provides enhanced IMS TCP/IP support and requires the IMS TM feature. Much of the function in IMS Connect can be used with IMS V6 TM. So, IMS V6 customers can use IMS Connect before fully migrating to IMS V7 or IMS V8.

Future enhancements to IMS TCP/IP support will be provided only through IMS Connect. For customers who use IMS TOC, IBM recommends migrating to IMS Connect.

IMS V7 was the last release to support the High Performance Java Compiler. Customers using HPJ-compiled applications should migrate to the new Persistent Reusable JVM support.

IMS V8 is the last release to support the IMS V5 SDEP CI format.

IMS V8 is the last release to support the Security Maintenance Utility (SMU). Customers using SMU should migrate to the Resource Access Control Facility (RACF) or an equivalent product.

IMS V8 is the last release to support Basic Telecommunications Access Method (BTAM). Customers using BTAM are encouraged to migrate to Virtual Telecommunications Access Method (VTAM) or Transmission Control Protocol/Internet...
Protocol (TCP/IP). User code or tools dependent on BTAM should migrate to VTAM or TCP/IP.

**Licensed Program Materials Availability**

This licensed program is available with source licensed program materials for some modules designated as “RESTRICTED MATERIALS OF IBM.” In addition, some modules are available without source licensed program materials. The modules are available in object code. The remaining modules are available with source licensed program materials.

The source licensed program materials are available as optional materials. They are written in Assembler and PL/I.

**Supplemental Terms**

**Designated Machine Identification**

Designated Machine Identification Required: Yes.

**Testing Period**

- Basic License: 2 months
- DSLO License: None

**Installation/Location License**

- Not applicable. A separate license is required for each machine on which the licensed program will be used.

**Usage Restriction**

- Not applicable

**Type/Duration of Program Services**

Central Service will be provided until discontinued by IBM with a minimum of six months written notice.

Local Service will be provided only through the testing period. After the testing period, Local Service can be obtained under the Agreement for Local Licensed Program Support for IBM Licensed Programs.

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- MVS
- OpenEdition
- OS/2
- OS/390
- Parallel Sysplex
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