IBM
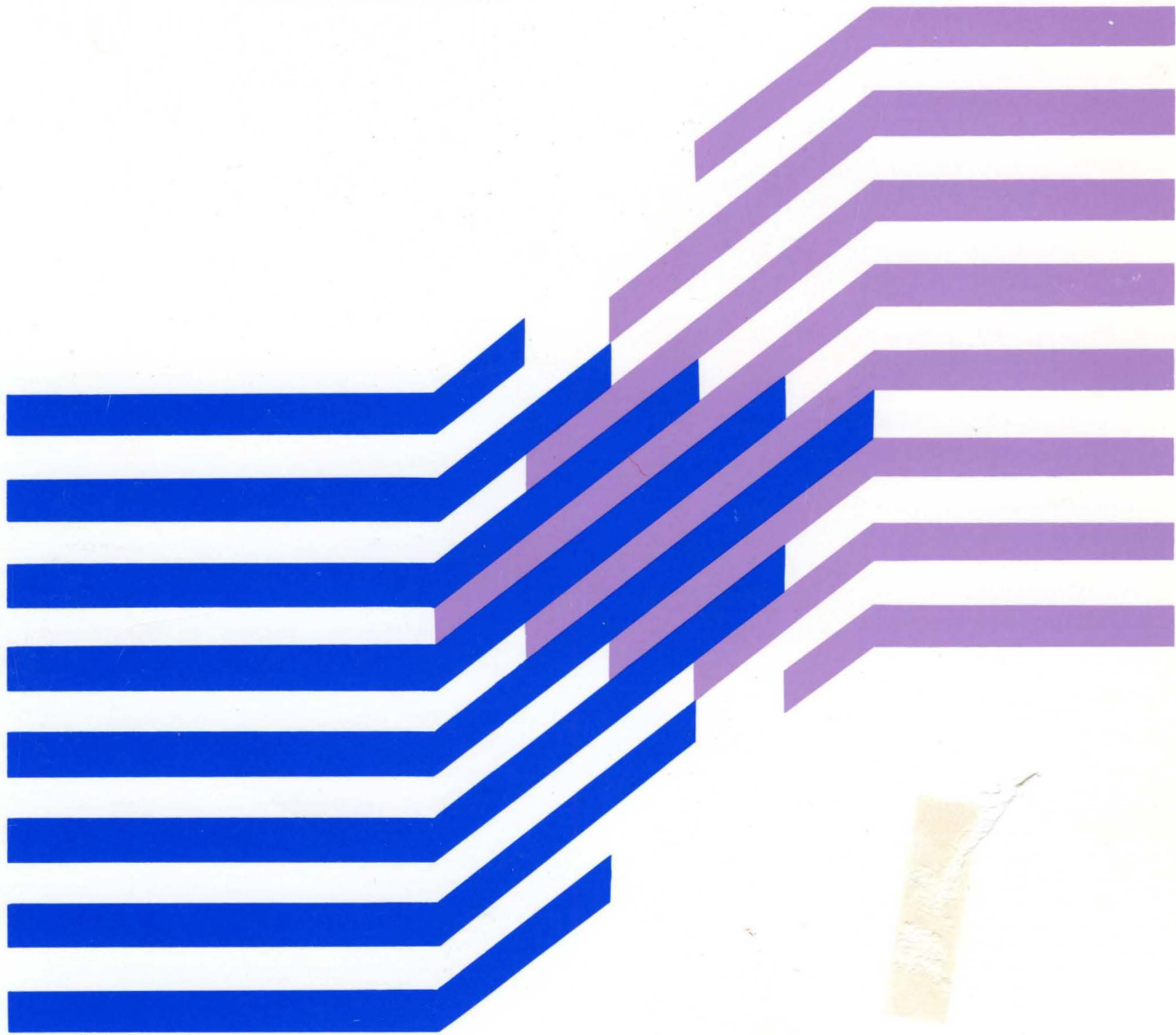
MVS/ESA
General Information
for System Product Version 3

MVS/System Product:
Version 3

IBM

MVS/ESA

General Information
for System Product Version 3

MVS/System Product:
Version 3

IBM

PROGRAMMING INTERFACES

This book does <u>NOT</u> contain any programming interface information.

Contents

About This Book

This book presents general overview and planning information for all the releases of:

- MVS/System Product-JES2 Version 3 (Program Number 5685-001), called MVS/SP 3-JES2
- MVS/System Product-JES3 Version 3 (Program Number 5685-002), called MVS/SP 3-JES3

Note: When any release of the MVS/System Product is used in the text, for example, MVS/SP 3.1, it refers to both JES2 and JES3 of MVS/SP for that release.

Who This Book is For

This book is intended for installation managers and system programmers who are considering installing a Version 3 release of MVS/System Product-JES2 or MVS/System Product-JES3.

Readers need a background in MVS.

Trademarks

The following are trademarks of International Business Machines Corporation.

- Enterprise Systems Architecture/370™
- ESA/370™
- Hiperbatch™
- Hiperspace™
- MVS/DFP™
- MVS/ESA™
- MVS/SP™
- MVS/XA™
- PR/SM™
- Processor Resource/System Manager™
- 3090™

How This Book is Organized

Chapter 1. Summary of MVS/SP Version 3 describes some of the individual enhancements provided in MVS/SP 3.

Chapter 2. Planning Information describes machine, programming, and storage requirements. Chapter 2 also highlights compatibility considerations for MVS/SP 3.

Related Information

Detailed information about the MVS/SP 3 library appears in the *MVS/ESA Library Guide for System Product Version 3*, GC28-1563.

This general information book contains general conversion and migration considerations for MVS/SP 3. The following books contain specific conversion and migration information:

- *MVS/ESA Conversion Notebook for System Product Version 3, Volume 1*, GC28-1567

- *MVS/ESA Conversion Notebook for System Product Version 3, Volume 2*, GC28-1568

Chapter 1. Summary of MVS/SP Version 3

MVS/System Product Version 3 (MVS/SP 3) provides new base control program function for MVS/ESA. MVS/ESA consists of MVS/SP 3 and MVS/Data Facility Product (DFP) Version 3 (MVS/DFP 3). MVS/ESA is the primary delivery vehicle for future MVS and DFP functional enhancements and constraint relief.

This book describes the content of MVS/SP 3 and follow-on related releases. These releases are:

- **MVS/SP 3.1.0**
- **MVS/SP 3.1.1-JES2**
- **MVS/SP 3.1.1-JES3**
- **MVS/SP 3.1.2-JES3**
- **MVS/SP 3.1.3**
- **MVS/SP 3.1.3-JES2**
- **MVS/SP 3.1.3-JES3**

MVS/SP 3 supports the Enterprise Systems Architecture/370, an architecture unique to the IBM 3090 Enhanced Models and the IBM 4381 Model Groups 90E, 91E, and 92E.

Enterprise Systems Architecture/370 (ESA/370) is designed to broaden an installation's choice of functions available for the development of new applications. ESA/370 also removes certain constraints in the 370-Extended Architecture that are limiting today's applications. New hardware addressing significantly extends addressability for system, subsystem, and application functions that use ESA/370.

New processor-managed *linkage stacks* simplify program linkage and offer improved performance because the processor, instead of software, manages stacks of saved linkage registers and status. Program linkages in existing programs do not require revision. New and changed applications can use the new linkages to simplify addressing across address spaces, currently available through cross memory services. These new processor-assisted linkages ease the process of programming for multiple address space communication.

MVS/System Product Version 3

MVS/SP 3 uses ESA/370 and provides a base for IBM subsystems, such as TSO/E, and user applications to take advantage of the architecture. While offering significantly extended addressability through access to multiple address spaces, MVS/SP 3 is fully compatible with existing 24-bit and 31-bit subsystems, user applications, and external interfaces.

MVS/SP 3 extends current addressing limits to meet installations' need for virtual storage beyond the current 2-gigabyte limit. This need for additional virtual storage comes from increasing the number of users accessing the system or from defining, for performance reasons, larger buffers or central storage data bases. The need for more virtual storage can also come from image processing, graphics processing, knowledge-based systems, or other applications that can use functions, such as data-in-virtual (introduced in MVS/SP 2.2), to map data into large areas of virtual storage.

MVS/SP 3 expands addressing capabilities, simplifies operations, provides constraint relief, and improves the RAS characteristics of MVS. Major enhancements to the function in the base control program include:

- Allowing data to be isolated from programs in *data spaces.* A data space is, like an address space, a map of virtual storage. Unlike an address space, however, a data space can hold only data or programs stored as data. New services allow programs to create and use data spaces.

- *Hiperspaces*, or high performance data spaces, provide high performance storage and retrieval of data, especially on systems that include expanded storage.

- *Data window services* extend some hiperspace benefits to FORTRAN, PL/I, COBOL, and Pascal programs, as well as assembler programs. Authorized and unauthorized programs can use virtual storage in data spaces to communicate between address spaces. In addition, authorized programs can use virtual storage in data spaces to share data among address spaces.

- Ability, through the *virtual lookaside facility (VLF),* to create and retrieve named data objects, such as members of partitioned data sets, in virtual storage. VLF, a new system function available to subsystems and user applications, can reduce the number of I/O operations to DASD and improve response time for applications with appropriate characteristics.

- Improved system management through *library lookaside (LLA)*, which now uses VLF and allows an installation to refresh selectively programs and libraries that LLA controls. It also manages and controls production libraries.

MVS/SP 3 also includes significant changes in the following areas:

- IPCS enhancements
- New and modified operator commands
- RAS enhancements
- Resource management enhancements
- System management enhancements
- Usability enhancements

Data Spaces

MVS/SP 3 allows the creation of data-only spaces called data spaces. Each data space can provide up to 2 gigabytes of virtual storage for data. While an address space contains system programs and data plus user programs and data, a data space contains only data (or programs stored as data). Therefore, within a data space, all addresses are available to the application. Because access to a data space is controlled by the hardware, data spaces enhance data isolation.

Assembler application programs can use data spaces directly, and data-in-virtual processing is extended to allow users to map data-in-virtual objects into a data space, as well as into an address space. Subsystems and user applications can have simultaneous access to multiple address spaces, multiple data spaces, or a combination of both. Shared data spaces permit efficient and controlled sharing of data among multiple address spaces.

Application and system reliability can be improved by moving key data to its own data space, and limiting access to the information. This approach can minimize the number of storage overlays. Storage overlays are among the most difficult problems to diagnose.

Figure 1-1 shows how MVS/SP 3 expands the private area.
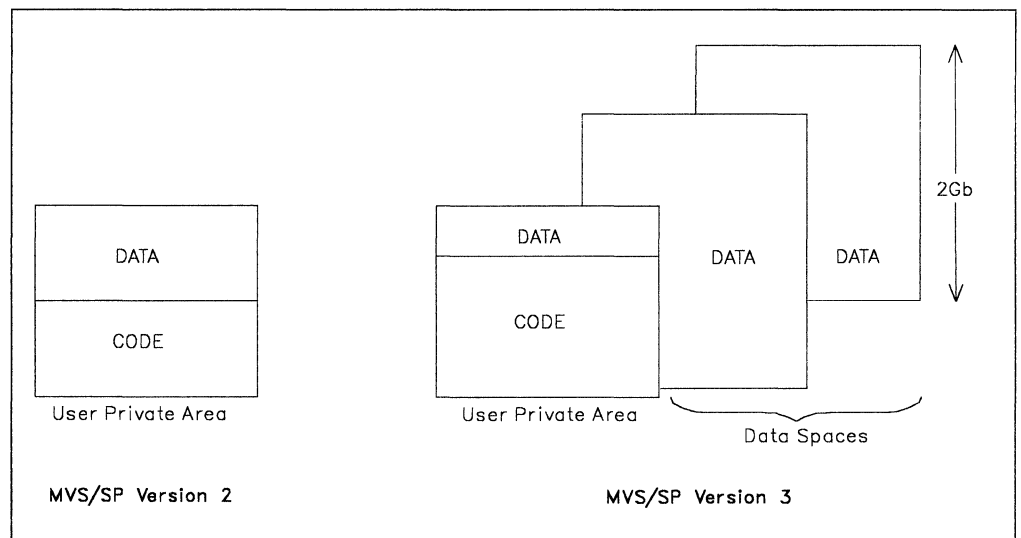
Figure 1-1. Data Spaces Expand the User's Private Area

A data space has the following characteristics:

- The entire data space addressing range is available to the user. The data space does not contain any system control blocks. In addition, the common areas (for example: PLPA, CSA) are not mapped in the data space.

- Virtual storage in a data space is directly byte addressable by a program and can reside anywhere in central storage, in expanded storage, or in auxiliary paging storage.

- A data space can be defined as accessible by only a single address space (private data space) or by multiple address spaces (shared data space). An unauthorized program can create only private data spaces. An authorized program can create both private and shared data spaces.

- Each data space can contain up to 2 gigabytes of data.

New system functions take advantage of data spaces, so users will see immediate benefit; user-written assembler language programs can use data spaces directly; and applications can use new system services to take advantage of a specific type of data space, called a hiperspace.

Hiperspaces

A high performance space, or hiperspace, is designed to provide high performance storage and retrieval of data. Special new services are used to transfer data between an address space, where it is backed by central storage, and a hiperspace, where it is not backed by central storage. This data is accessed and transferred in 4-kilobyte blocks on 4-kilobyte boundaries There are two types of hiperspaces.

The standard type of hiperspace is backed by expanded storage or, when expanded storage is not available, by auxiliary storage. Assembler language programs can use new services to access these hiperspaces, and programs written in high level languages can use new data window services to access such hiperspaces.

Another type of hiperspace can be used only by authorized programs and only on processors that have expanded storage. This hiperspace can be viewed as a high-speed storage device for temporary data or as a processor buffer for permanent data. While a data space can reside in processor storage or on auxiliary storage and is subject to normal storage contention and paging activity, this hiperspace resides only on expanded storage and is never backed by central storage or auxiliary storage.

The benefits of these system services are available to current applications with minimal system programming effort.

Data Window Services

Programs written in a high level language (HLL) can use data window services to benefit from extended addressing function. Data window services support calls from FORTRAN, PL/I, COBOL, and Pascal programs, as well as from assembler language programs. Applications can call these services in 24-bit or 31-bit addressing mode. Standard high level language or assembler statements are used to manipulate data in the window.

Window services are a set of system services that allow these applications to use hiperspaces and data-in-virtual objects. Data window services allow such applications to access and scroll through large permanent data objects and/or large temporary data objects. The application program sees this data through virtual storage windows. A window is a user-defined area (in the application) that maps portions of the data object.

A temporary object can span multiple hiperspaces. Data window services make these objects appear as a single seamless entity. A permanent object resides in a linear data set, which can hold up to four gigabytes of user data.

In addition to supporting all the capabilities of data-in-virtual, window services:

- Provides callable routines

- Supports large temporary objects

- Improves sequential access to data

- Enables updates to certain objects to be deferred until the application is finished with the object

Virtual Lookaside Facility (VLF)

VLF provides a set of services that allow authorized programs to store named data objects in data spaces managed by VLF and to retrieve these objects by name on behalf of users in multiple address spaces. The primary use of VLF is to provide a high-performance means of retrieving frequently used named objects from virtual storage as an alternative to repeated DASD retrieval.

VLF is a documented interface and can be used by other facilities. An application that uses VLF can sometimes obtain additional performance improvement by pre-processing the DASD objects and placing them in VLF storage in a ready-to-use format. Thus, repetitive processing normally done every time the object is used, would then need to be performed only once. TSO/E Version 2, for example, uses VLF for "pre-compiled" CLISTs.

For VLF objects that correspond to members of partitioned data sets, VLF automatically purges the objects from VLF storage, if they are updated on DASD within a single system.

Library Lookaside (LLA)

Library lookaside (LLA) can dynamically identify the system's most active LNKLST load modules and place them in a data space for subsequent retrieval. These in-storage directories can be selectively refreshed. Placing active load modules and their directory entries in virtual storage reduces the I/O load resulting from repeatedly fetching the module from DASD and eliminates the directory search I/O.

LLA uses VLF to retrieve the most active LNKLST modules from virtual storage rather than continually fetching the modules from DASD. This processing has the following advantages:

- Reduces the need for system tuning by reducing the I/O load for LNKLST program libraries

- Simplifies LNKLST maintenance by permitting selective LLA refreshes

- Increases the growth capacity of the LNKLST

- Increases system availability by reducing the number of IPLs required for LNKLST changes

LLA manages and controls both LNKLST libraries and production libraries outside the LNKLST. It also maintains and controls in-storage directories of LNKLST libraries and non-LNKLST production libraries. The installation can dynamically identify the set of production libraries that LLA manages.

LLA offers all of its function and performance benefits to load modules that reside on libraries outside the LNKLST. Installations can dynamically add and remove libraries from LLA's management and can selectively refresh members and

libraries managed by LLA. In addition, LLA dynamically identifies the system's most active production load modules and places them in virtual storage for subsequent retrieval. This reduces the I/O load resulting from repeatedly fetching active modules from DASD and eliminates directory search I/O for production library directories, thus reducing the need for I/O to heavily used partitioned data sets.

IPCS Enhancements

Interactive problem control system (IPCS), the primary dump viewing tool for MVS, is enhanced for MVS/SP 3. IPCS provides improved dump formatting and analysis, dialog improvements, and additional use of SYS1.PARMLIB to make it easier to customize IPCS. Print dump (PRDMP) services are no longer available with MVS/SP 3.1. In replacing print dump services, IPCS also assumes trace formatting for the generalized trace facility (GTF) and system traces along with the batch printing functions of PRDMP. The following panel shows the IPCS primary menu.

```
---------------------- IPCS PRIMARY OPTION MENU --------------------------
OPTION ===> _

                                                  ********************
   0 DEFAULTS    - Specify default dump and options   * USERID   - IPCSU1
   1 BROWSE      - Browse dump data set                * DATE     - 87/06/08
   2 ANALYSIS    - Analyze dump contents               * JULIAN   - 87.160
   3 SUBMIT      - Submit problem analysis job to batch * TIME     - 16:43
   4 COMMAND     - Enter IPCS subcommand or CLIST       * PREFIX   - IPCSU1
   5 UTILITY     - Perform utility functions            * TERMINAL - 3278
   6 DUMPS       - Manage dump inventory                * PF KEYS - 24
   T TUTORIAL    - Learn how to use the IPCS dialog    ********************
   X EXIT        - Terminate using log and list defaults
 Enter END command to terminate IPCS dialog.
```

Functions that make IPCS easier to customize and to use include:

• New and enhanced dialog options
• Migration support through SYS1.MIGLIB
• Easier customization through SYS1.PARMLIB members
• New and enhanced IPCS batch processing
• New and enhanced exit services
• Blocked dump data set support
• New print and GTF trace functions to replace PRDMP

New and Modified Operator Commands

MVS/SP 3 improves operator commands in several ways:

• The MODIFY LLA command now allows the operator to refresh the entire LLA directory as before, or to identify a set of modules and/or libraries to be selectively refreshed. This selective refresh allows updated LNKLST modules to be activated without disturbing other unrelated LNKLST modules.

The MODIFY LLA command allows the operator to selectively refresh a set of non-LNKLST modules and libraries, as well as dynamically add or remove libraries from the set that LLA manages.

• The START LLA command allows the optional specification of a set of libraries to be dynamically added or removed from LLA's management.

- The new PAGEDEL command allows the operator to delete or replace local page data sets or swap data sets dynamically. This enhancement allows the operator to reconfigure the paging environment without an IPL, thus improving system availability.

- The new SETIOS command allows the operator to specify missing interrupt handler (MIH) time intervals for individual devices or device classes. A new option (IOS, MIH) on the DISPLAY command allows the master console operator to display time intervals for particular devices.

- A new IOS option on the SET command allows the operator to select dynamically the IECIOSxx SYS1.PARMLIB member without an IPL, improving system availability and the function of the missing interrupt handler.

RAS Enhancements

MVS/SP 3 provides substantial benefits for reliability, availability, and serviceability (RAS), including more than 75 functional RAS enhancements that satisfy more than 25 user RAS requirements. The following are among the more significant improvements.

- Automated spin loop recovery provides recovery from excessive spin loop time-out conditions without operator intervention by initiating a series of pre-defined recovery actions. PARMLIB and SET command support allows the installation to modify dynamically both the spin loop time out interval and the system-defined sequence of recovery actions.

- Stand-alone dump is enhanced to block output records written to the dump tape. This enhancement increases dump data tape capacity and may reduce the elapsed time required to take a stand-alone dump.

- The duration of system non-dispatchability caused by SVC dump is substantially reduced, thus improving system availability.

  SVC dump provides additional recovery to ensure that an end-of-file record is written to the end of a dump data set when errors are experienced during the dump process, thus improving serviceability.

- A new component trace facility allows the operator to activate individual component traces dynamically and allows consistent diagnostic tracing and formatting of trace information for MVS components. This facility also allows for dynamic selection and modification of trace options. RSM, VLF, and LLA make use of this trace facility, thus enhancing system availability and serviceability.

- RSM has new diagnostic features that reduce the data collection effort associated with debugging RSM problems while providing substantial error analysis. These features include a new component trace exit and an IPCS exit.

- Error detection and environmental validation is enhanced for many components, thus improving the availability and serviceability of the system. The system checks for proper branch entry to many system services, such as WAIT, POST, STATUS, GETMAIN, and FREEMAIN services.

- System trace is enhanced to support many additional system events, including branch entry to many services and RTM recovery processing.

- Reason codes are added to many system abends.

- Many recovery routines are upgraded to conform to minimum RAS guidelines.

- Associated recovery routines (ARRs) for stacking PCs eliminate the overhead associated with establishing and cancelling recovery environments for subsystem programs that are entered using the Program Call (PC) instruction.

- Performance overhead associated with SLIP PER traps that do not specify ASID or JOBNAME filtering has been greatly reduced.

- Support is added for the scheduler work area (SWA) in extended virtual storage for jobs using checkpoint/restart. Scheduler restart is changed to permit checkpoint/restart to operate with the SWA above 16 megabytes.

Resource Management Enhancements

MVS/SP 3 enhances resource management, including:

- The maximum number of page slots per page data set and swap data set has been increased, thus enabling an installation to increase its available paging capacity.

- Improvements in virtual storage management (VSM) services include:

  - The new STORAGE macro instruction. Programs can use this macro (rather than the GETMAIN/FREEMAIN macros) to obtain virtual storage.

  - Disabled reference (DREF) subpools. New DREF subpools allow authorized programs running on systems with expanded storage to obtain storage that is not page-fixed but that can be referenced while running disabled. Thus, disabled programs do not have to fix pages; this change can reduce long-term usage of real storage.

  - Fetch-protected LSQA subpools. These new subpools allow authorized programs to obtain LSQA that can be referenced only by programs running in key 0.

  - Extended region requests less than 32 megabytes. Installation exit IEFUSI can now specify an extended region smaller than 32 megabytes.

- Through a new service involving the RESMGR macro, programs can dynamically establish task or address space resource managers.

- A set of new services can create and terminate address spaces, as well as extract information from address spaces.

- Temporary data support using virtual I/O (VIO) is enhanced to exploit expanded storage. Using expanded storage eliminates VIO paging, and results in improved application performance, improved response time for interactive applications, and improved batch processing time when enough expanded storage is available and VIO data sets are used. MVS/SP 3 provides system controls for VIO use of expanded storage and installation controls to direct use of expanded storage by applications.

System Management Facility (SMF) Enhancements

MVS/SP 3 enhancements to SMF include:

- Type 41 record now includes a jobname to ease accounting.
- A terminal symbolic name is added to type 30, 34, and 35 records for TSO/E.
- The SMF installation exit IEFUSI allows users to override IBM defaults for data spaces.
- The SMF dump utility includes names of the input and output data sets in the SYSPRINT data set.

Usability Enhancements

MVS/SP 3 enhances MVS usability. The improvements include:

- SYS1.SAMPLIB now provides remote workstation programs, previously provided in JES2 base code.

- SYS1.MIGLIB, a system data set that contains IPCS formatting data for all MVS components, is now created at system generation time.

- Improvement to volume attribute list (VATLST) processing through the addition of default attributes and generic volume serial numbers. Changes within the VATLSTxx member of SYS1.PARMLIB support the storage management subsystem as well as enable the installation to:

  - Specify generic VATLST statements
  - Define default USE attributes for volumes not defined in the VATLST.

  Generic volume serial numbers and generic device types allow the grouping of DASD volumes, as well as making it easier to maintain the VATLST. During VARY ONLINE processing, the USE attribute specified in the VATLST is applied to the volume on the unit being varied.

- Improvement to data-in-virtual to increase the shared use of data objects in multi-system and single-system configurations.

  Data-in-virtual is extended to allow multiple users to obtain a private local view of a shared data-in-virtual data object. Previously, only **single write or multiple read** serialization was permitted. New capacity for **multiple write** has increased the sharing that data-in-virtual supports. A new keyword on the DIV macro instruction invokes the new support, allowing applications to indicate access of data in 4-kilobyte blocks and maintain a consistent view of data-in-virtual data.

- New services allow dynamic programs and TSO/E users to dynamically specify output characteristics that match those on the JCL OUTPUT statement.

Other improvements to MVS/SP 3 are available with the ones listed. They are:

- **Central Storage Constraint Relief Below 16 Megabytes** — exploits expanded storage to relieve central storage constraint below 16 megabytes, particularly in large TSO/E environments.

- **Global resource serialization performance** — improves the performance of global resource serialization by reducing processing time for global serialization requests. This processing improvement also allows increased numbers of multi-system enqueues and dequeues.

MVS/System Product Version 3 Release 1.1

MVS/System Product Version 3 Release 1.1 (MVS/SP 3.1.1) enhances the JES components of MVS/SP 3.1. The base control program part of MVS/SP 3.1.1 is functionally equivalent to the base control program part of MVS/SP 3.1.

JES2 Component of MVS/SP 3.1.1-JES2

The JES2 component of MVS/SP 3.1.1-JES2 contains a number of enhancements that provide virtual storage constraint relief (VSCR) and continuous system operation support.

The JES2 component of MVS/SP 3.1.1 takes advantage of data spaces through new macro instructions.

Expanded Job Number Range

An installation can specify up to 32,767 job numbers and allow as many as 32,767 jobs to exist in a JES2 complex concurrently. Also, the number of entries in JES2 job output queues is increased to 99,999 from the previous limit of 30,000. The Type 6 SMF record is extended to allow it to reflect the increased length of the job number.

Virtual Storage Constraint Relief (VSCR)

This release provides VSCR in several areas of JES2 processing. These enhancements include: the restructuring of the JES2 subsystem support module (HASPSSSM), the ability to allow SWA control blocks to reside above 16 megabytes in virtual storage, and the movement of JES2 trace tables above 16 megabytes in virtual storage. All protected buffers used by internal readers reside in data spaces.

Restructure of the HASPSSSM Load Module: The HASPSSSM (HASP subsystem support modules) is restructured into nine functionally-specific smaller modules to simplify maintenance and modification. Subsystem support interface support routines run in 31-bit addressing mode, and most control blocks reside above 16 megabytes in virtual storage.

With the use of **directed load**, an installation can optionally move the subsystem support load module out of LPA and into the common service area (CSA). Directed load simplifies migration and testing. Installations can now also direct the loading of user load modules (installation exits) into private or common storage areas with the LOADMOD(jxxxxxxx) initialization statement. Also, if JES2 finds multiple copies of a load module, the installation can direct JES2 to use the copy found in LPA.

Scheduler Work Area Moved Above 16 Megabytes in Virtual Storage: JES2 no longer restricts the placement of the scheduler work area (SWA) for jobs, started tasks, and time sharing sessions under its control; therefore, all subsystem interface (SSI) routines can now execute in 31-bit addressing mode. The only exceptions to 31-bit addressing mode are those interfaces to MVS services that execute in 24-bit mode, such as the functional subsystem interface (FSI).

Moving, optionally, the SWA control blocks for all JES2-related data sets (SYSIN, SYSOUT, and process SYSOUT) above 16 megabytes in virtual storage also provides VSCR in the installation's private area.

Output Processing Constraint Relief for Long-Running Jobs: To support any long-running job that produces many spin data sets, JES2 now:

- Reuses a job's old spin input/output table entry as it allocates a new spin data set. Previously, JES2 did not purge the spool-resident control blocks associated with spin data sets until the job was purged.

- Supports 9,999,899 SYSIN and SYSOUT data sets for the life of the job, extending the previous limit of 32,667

- Only POSTs an external writer when output matching the requestor's selection criteria is added to the output queue.

$TRACE Facility Enhancements

Previously, when tracing JES2 events, the number of trace tables was limited to 10 to prevent total depletion of available CSA. An installation can now set the maximum amount of space that the $TRACE facility can use and the size of those tables.

If, when logging trace information, JES2 cannot accommodate the events to be logged, JES2 discards the most recent trace data, sends a message to the operator, and uses the next new trace record to record this activity. The operator can use this information to tune the system's trace table storage requirements.

Two new trace identifiers are available. Trace IDs 18 and 19 trace $SAVE and $RETURN calls in the user environment.

Improved Warm Start Processing Performance

Changes in warm start processing reduce the overall time it takes JES2 to perform a warm start. Previously, one PCE performed all SPOOL and checkpoint read/write processing. The job queue can now be processed by several (up to 1000) PCEs.

During JES2 warm start processing, JES2 verifies the output queues and requeues only those elements that are found to be in error. A new operator informational message, $HASP493, indicates warm start processing is in progress; message $HASP492 follows indicating that warm start processing is complete.

Continuous System Operation Enhancements

A number of JES2 initialization statements, their parameters, and the commands used to change and display those parameters have been modified to provide either single, range, or generic specifications.

The new $ADD command allows the dynamic addition of destination IDs (DESTIDs), functional subsystem (FSS) address spaces, and application IDs (APPLIDs).

The maximum number of remote job entry workstations and network job entry nodes is increased to 9999.

Installation Exits

Nine new installation exits (Exit 27 - PCE Attach/Detach, and Exits 28 - 35 Subsystem Interface Data- and Job-Related Exits) allow additional installation customization and processing. Also, changes to Exit 8 and Exit 12 offer greater flexibility and scope of use.

JES3 Component of MVS/SP 3.1.1-JES3

The JES3 component of MVS/SP 3.1.1 represents a major effort toward improving processing algorithms in JES3. These changes, along with the ability to run more jobs in a complex, improve the processing capacity of JES3 and its management of large complexes.

Expanded Job Number Range

JES3 now allows up to 32,767 jobs to exist concurrently in a JES3 complex by allowing installations to specify a job number range of up to 32,767. This change allows additional growth for large complexes and for those that make extensive use of job networking.

Reduction in JES3 Resource Consumption

The following changes contribute to a dramatic reduction in the JES3 global's CPU requirement:

- **Changes to scheduling** - changes how JES3 schedules work to be processed on behalf of a job (the job segment scheduler).

- **Changes in queueing JES3 tasks** - changes how the JES3 multifunction monitor queues tasks that are ready to be dispatched within the JES3 address space.

- **Enhancements to JCT processing** - JES3 now keeps an updated copy of the JCT data set in a data space and can retrieve the most recently used JCT records directly from the data space rather than having to perform I/O.

- **Enhancements to RSQ processing** - changes processing of the resident job queue (RSQ) to make it more efficient.

- **Increased limits for USAM and JSAM I/O buffers** - increases the limits installations can specify for USAM (user spool access method) and JSAM (JES3 spool access method) data buffers from 256 pages and 1024 pages, respectively, to 16,383 or 32,767 (depending on the number of buffers in a page, as specified by the installation). Allowing more USAM buffers effectively increases the number of TSO users, functional subsystem (FSS) writers, and batch jobs that can be active in a complex. Allowing more JSAM buffers reduces the chances of JES3 waits or deadlocks occurring while waiting for buffers.

- **Reduction in the amount of I/O and instructions** - reduces the amount of I/O performed and the number of instructions executed in several areas of job processing, including loading and deleting modules, generalized main service processing, and output service processing.

- **Enhancements to External Writer Scheduling** - allows up to ten external writer requests to process simultaneously. If needed, installations can change the maximum number of requests.

Reduction in JES3 Restart Time

This release reduces the time required to warm start or hot start a JES3 global. Enhancements include:

- Reduced I/O activity required to reinitialize jobs

- Significant changes to job validation processing, including processing multiple jobs in parallel

- Reduced time required to write messages to the initialization output (JES3OUT) data set

- A new SNAP facility used to supply information about each spool control block related to a job and any errors detected in the control block.

Management of Multiple Printers in an FSS Address Space

The JES3 FSS services now support more than one printer in a FSS address space, which reduces the amount of real storage associated with printer support. As part of this change, failures related to a specific FSS-managed printer are isolated to that printer; they do not impact all printers running under control of the affected FSS. Also, messages related to the overall operation of the FSS are routed separately from those related to a specific FSS-managed printer.

Operator control of FSS-managed devices is also enhanced. For example, the operator can now change the checkpoint interval for an FSS-managed device or change the process mode (PRMODE) of the output for a specific job.

Output Processing Constraint Relief for Long-Running Applications

Changes to output processing for jobs with large volumes of output can improve overall JES3 performance and provide better capacity for end users in installations using long-running applications such as TSO/E or office support offerings. The savings are even more noticeable in installations that make extensive use of job networking.

Additional JES3 Enhancements

- **Add/Delete a Node Dynamically** - This release allows the operator to add a node to, or delete a node from, a job network by issuing a command. Previously, an installation had to change the JES3 initialization stream and perform a complex-wide IPL and a warm start to change the configuration of a job network.

- **Integration and Improvement of JES3 Monitoring Facility Functions** - The functions previously provided by the JES3 Monitoring Facility II (JMF II) program offering (5796-PLW) have been upgraded and integrated into the JES3 component of this release. As part of the improvements, JMF now:

  - Writes information to the SMF data sets
  - Executes on a JES3 local in addition to a global main
  - Tracks up to 4095 entries in the function control table (FCT) instead of 255.

- **JES3 Spool Maintenance Facility Replaced by Enhanced Command Function** - The functions previously provided by the JES3 spool maintenance (JSM) facility are enhanced and can now be run using standard output service commands. Operators can use output service commands to inquire about or modify data sets and can select data sets based on their age on any output service queue.

- **Enhanced Dump Job Facility** - Changes to the dump job facility allow operators to request that all jobs within a range of job numbers be dumped to tape or retrieved from tape. Previously, requests could be made for only one job at a time.

- **Additional IPCS Support** - This release adds seventeen control blocks to the group of JES3 control blocks users can view online using IPCS (interactive problem control system).

- **New and Changed Installation Exits**

  - **Installation Exit 14** - This new exit allows users to perform their own validation processing of user fields in key control blocks during job restart processing.

  - **Installation Exit 47** - This exit is replaced by IATUX48. (IATUX47 was called by JSM.)

- **Installation Exit 48** - This new exit allows the installation to override an operator command requesting that an output data set be modified or deleted.

- **Removal of JES3 Card-Based Utilities** - The following utilities have been removed due to their limited use:

  - Card-to-Card (CC)
  - Card-to-Tape (CT)
  - Card-to-Printer (CP)
  - Tape-to-Card (TC)

MVS/System Product-Version 3 Release 1.2

MVS/System Product-JES3 Version 3 Release 1.2 (MVS/SP-JES3 3.1.2) enhances the JES3 component of MVS/SP 3.1.1. The base control program part of MVS/SP 3.1.2 is functionally equivalent to the base control program part of MVS/SP 3.1 and MVS/SP 3.1.1.

JES3 Component of MVS/SP 3.1.2-JES3

The JES3 component of MVS/SP 3.1.2 supports MVS/Extended Architecture Data Facility Product (MVS/XA DFP) Version 3 Release 1, which includes the Storage Management Subsystem. The Storage Management Subsystem provides system-managed storage - a new way to define DASD storage that is managed by the system.

JES3 support includes the following:

- JES3 uses the services of the Storage Management Subsystem during converter/interpreter (C/I) and main device scheduling (MDS) processing to:

  - Make sure catalog locate processing occurs on a processor that has access to the required catalogs.

  - Make sure jobs requiring system-managed storage resources execute on processors on which the resources are accessible and available

- Allows JES3 C/I processing to process the JCL keywords introduced by the Storage Management Subsystem.

- Removes JES3 awareness of units and volumes managed by the Storage Management Subsystem.

- Provides data set integrity for requests managed by the Storage Management Subsystem.

This release also includes the following enhancements:

- Allows multitasking for catalog locate processing.

- Allows locate processing to be performed in a JES3 C/I functional subsystem (FSS) address space.

MVS/System Product-Version 3 Release 1.3

MVS/SP 3.1.3 provides a number of functions for enhancing system security. MVS/SP 3.1.3 is designed to be part of a Trusted Computer Base to be evaluated at the B1 level by the National Computer Security Center (NCSC) of the U.S. Department of Defense. Only a subset of available security-related functions must be activated for a system designed to meet B1 criteria; an installation can select individual functions to customize its security, depending upon installation security requirements.

MVS/SP 3.1.3 offers the following improvements:

- Reduction in I/O for batch job streams accessing the same VSAM and QSAM data sets
- Relief for virtual storage constraints to application growth
- Improved system management
- Enhancements for applications
- SVC dump enhancements

Operations Planning and Control/Advanced (OPC/A) improvements help MVS/SP 3.1.3 manage the batch work load.

The JES2 and JES3 components of MVS/SP 3.1.3 contain security enhancements. JES2 provides printer enhancements. JES3 provides performance and operational enhancements.

Security

To enhance the security in the operating system, MVS/SP 3.1.3 works with Resource Access Control Facility (RACF) Version 1 Release 9 (RACF 1.9), and JES2 Version 3 Release 1.3 or JES3 Version 3 Release 1.3. Specific security features follow.

Operator Identification and Authentication: An installation can identify system operators and their associated IDs, passwords, and security labels. This function is accomplished through the new LOGON/LOGOFF operator commands and a new LOGON keyword in the CONSOLxx member of SYS1.PARMLIB.

Operator Command Authorization and Auditing: An installation can selectively permit the use of commands by operator as well as by console and can audit command activity in a variety of ways. New and changed system management facility (SMF) records provide extensive auditing capability.

Device-Level Access Control: An installation can use checks by the MVS allocation component to determine if unit record devices, teleprocessing or communications devices, and graphic devices should be allocated. (Tape and direct access storage devices are protected at the data set level.)

Enhanced Auditing Capability: The use of new and changed SMF records can improve auditing. The SMF audit records contain additional information about previously audited events as well as information about events that were not audited before. Changes also prevent losing SMF auditing data.

I/O Reduction for Batch Jobs

MVS/SP 3.1.3 reduces I/O for batch jobs in two separate functions:

- Hiperbatch
- Batch local shared resources (LSR)

Hiperbatch: Hiperbatch, a new MVS/ESA function, can reduce the execution time of certain batch job streams that access the same VSAM and QSAM data sets. Hiperbatch is an extension to both VSAM and QSAM; it stores VSAM and QSAM data in hiperspaces for access by multiple jobs.

Once the data resides in a hiperspace, VSAM or QSAM application programs can access the data without actual I/O operations. This strategy can reduce the elapsed time for the application programs by reducing the number of I/O operations. In systems that are not constrained for expanded storage and with applications that use and can share the same VSAM or QSAM data sets, hiperbatch can reduce the time and complexity of running a large batch work load.

Hiperbatch can also relieve DASD constraints when many jobs read the same VSAM and QSAM data set. This constraint relief can benefit I/O tuning.

An installation does not need to rewrite its application programs or JCL to use hiperbatch.

Batch LSR: Batch LSR helps applications that randomly access VSAM data sets. An installation can switch an application from using VSAM non-shared resources (NSR) to using VSAM local shared resources (LSR). The switch is accomplished without changing the application or link editing it again; only JCL changes are required. Note that batch LSR allows programs written in high-level languages to use LSR without the need for coding assembler language subroutines.

Virtual Storage Constraint Relief

SMF Enhancements: SMF enhancements ease virtual storage constraints by using storage and allowing input above 16 megabytes.

Virtual Storage Constraint Relief: MVS/SP 3.1.3 relieves virtual storage constraints by allowing programs that use VSAM data sets to request that the VSAM control blocks be placed above 16 megabytes. These changes improve processing when many VSAM data sets are used by system or application programs, including the Customer Information Control System (CICS).

System Management Improvements

System Management Facility (SMF) Enhancements: SMF now allows an installation to change the control interval size for writing records to the SMF data set. Increasing the control interval size can improve the rate of throughput.

Other SMF changes help prevent loss of the system and job-related data that SMF collects. So that SMF data collection does not stop, the system notifies operators when SMF storage is becoming exhausted or SMF data sets are becoming full, and an installation can specify how the system should proceed.

For MVS/SP 3.1.3, SMF also includes a new interactive problem control system (IPCS) subcommand to obtain SMF data from a dump.

Large Job Improvements: MVS/SP 3.1.3 improves the management of large jobs by handling central storage more efficiently. With the improvement, the system provides more frames of central storage by trimming large jobs in stages. Trimming does not go below the storage isolation minimum value, if specified for an address space. The system performs physical swaps of large jobs only if trimming the swap sets for the jobs does not produce the needed frames.

The improved control of swapping reduces unnecessary complexity and unnecessary swapping. Batch jobs will be protected from swapping by using the same logical swap think time used by the Time Sharing Option (TSO); this protection should particularly help interactive graphics applications.

Library Lookaside (LLA) Enhancements: A new macro allows authorized programs to refresh the LLA directory. Subsystems that manage their own partitioned data set (PDS) directory entries can use this macro to update the LLA directory whenever the subsystem updates its directory. By keeping the directories equivalent, the subsystem can fetch modules quickly from the LLA VLF data space.

An enhancement to LLA exit processing allows an installation to turn the LLA exits on and off without stopping and restarting LLA.

Changes in the LLA staging algorithm result in a better selection of modules in the LLA virtual lookaside facility (VLF) data space. The changes also improve module selection in a Processor Resource/Systems Manager (PR/SM) environment.

Increased Commonly Addressable Storage: Common area data spaces enable MVS/SP 3.1.0 components and subsystems to exploit access registers and data spaces. Common area data spaces provide virtual storage in a common storage area. This virtual storage can be addressed from any address space and any work unit. Thus, common area data spaces provide essentially unlimited commonly addressable storage. Common area data spaces are called SCOPE = COMMON in MVS publications.

Enhancements for Applications

Time Requests: An application program can request the CPU time or Vector time used by a task. Previously, only the CPU time was available and only for authorized programs.

Virtual Storage Management: New callable service requests allow applications to manage virtual storage that the applications obtain in address spaces and data spaces. The applications use the services to divide the virtual storage into cell pools and to manage the cells.

SVC Dump Enhancements

Enhancements to the processing for SVC dumps allow:

- Specification of a symptom record to be used for dump suppression
- Specification of a dump identifier
- Exclusion of the normal default data areas from the dump, in order to make the SVC dump smaller
- Addition of areas to the summary dump

Batch Work Load Management by OPC/A

OPC/A, which is the MVS batch scheduling facility, works with MVS/SP 3.1.3 to manage the batch work load. OPC/A automates, plans, and controls the processing of production and test batch work loads. OPC/A automatically drives the work load but allows for manual intervention, as required.

In MVS/SP 3.1.3, the installation specifies to OPC/A the resources to be handled. OPC/A provides to the system the status of these resources and indicates how they are to be handled.

JES2 and JES3 Components of MVS/SP 3.1.3

This topic describes the enhancements common to both JES2 and JES3.

JES Support for B1 Level Security Validation: JES2 and JES3 are designed to meet the criteria currently defined by the NCSC as the B1 level. To meet this security level, the JES-to-Security Authorization Facility (SAF) interface and RACF 1.9 provide protection for consoles, printers, commands, and other JES-controlled resources.

System Security Enhancements: JES, working with RACF 1.9, offers increased security that includes access control for SYSIN and SYSOUT data sets and access control to printers.

SYSIN and SYSOUT data sets acquire the security classification of the job that creates them. Using RACF profiles, the job's owner may authorize access by other users with the same classification.

In addition, the location where a specific classification of data is printed may be audited. Sensitive data is printed only on authorized printers.

Enhanced Network Job Entry (NJE) Security: To provide increased security in an NJE environment, JES provides several security validation or auditing functions. They include:

- Enhanced auditing and restricting of resources on a JES node basis.

- Authorizing and auditing all work (jobs and SYSOUT) entering or leaving a node.

- Propagating the userid associated with jobs and data sets along with all other network job header information. This additional information is used to validate a job's or user's request for resources.

- Encrypting passwords for jobs sent through a network.

Adaptability of Security Processing: JES provides the following four new installation exits for modifying or enhancing SAF processing and using RACF:

- Two exits, one immediately before invoking a security product and one immediately following a security call. These exits may be used for bypassing RACF calls, providing a replacement for RACF, or for modifying RACF's decision.

- An exit for monitoring and authorizing the Time Sharing Option/Extended (TSO/E) user's receipt of incoming data. This exit can be used to modify JES actions when RACF indicates that access is not allowed.

- An exit for altering the disposition processing of NJE SYSOUT entering a node. This exit can be used to modify JES actions when RACF indicates that access is not allowed.

JES2 Component of MVS/SP 3.1.3-JES2

MVS/SP 3.1.3-JES2 provides the following printer enhancements.

Optional Setup Verification of Output Devices: An installation can optionally disable the device startup message issued following a device characteristics (forms, carriage control, print train, and so forth) change. If this message for local or remote devices is disabled, the operator does not need to issue a device start command.

Optional Deletion of Remote Console Messages: An installation can optionally discard remote console messages normally routed to remote printers under circumstances such as when no console is available or when the console is not logged on.

Forms Control Buffer (FCB) Enhancement: Previously, there was no way to specify a default FCB for a particular device. The default FCB was based on the last $T PRT(nnnn),FCB= command for the device. New support allows, optionally, an installation to provide a device default FCB. It is specified on local and remote printer initialization statements. The device will always use the device default unless overridden by an explicit FCB requirement on a JCL statement.

JES3 Component of MVS/SP 3.1.3-JES3

MVS/SP 3.1.3-JES3 provides the following performance and system management enhancements.

- **JES3 General Service Routines**: The processing for JES3 timer services, JES3 multifunction monitor, and JES3 trace routines has been changed to improve JES3's performance.

- **JES3 Setup Processing**: Improvements in JES3 have reduced the amount of spool input/output and CPU usage in JES3 setup processing.

Chapter 2. Planning Information

Planning information includes machine requirements, programming requirements, migration information, and compatibility considerations.

Machine Requirements

MVS/SP 3 requires an IBM Enterprise System/3090 (ES/3090) Processor Unit E, J, or S model that supports the IBM Enterprise Systems Architecture/370 or an IBM ES/4381 Model Group 90E, 91E, or 92E processor. Use of hiperbatch requires expanded storage and one of the following ES/3090 processors:

- ES/3090 Model 150JH, 170JH, 180J, 200J, 250JH, 280J, 300J, 380J, 400J, 500J, or 600J

- ES/3090 Model 180S, 200S, 280S, 300S, 380S, 400S, 500S, or 600S with installation of an engineering change scheduled to be available 12/89

MVS/SP 3.1.3 continues to support I/O devices supported on previous MVS/SP 3 systems.

Programming Requirements

MVS/SP 3.1 requires:

- MVS Release 3.8 (5752-VS2).

- Assembler H Version 2 (5668-962), with a PTF for system generation, maintenance, and use of the new architecture in MVS/SP 3.

- SMP/E Release 4 (5668-949) for installation and maintenance.

- IBM licensed program Interactive System Productivity Facility (ISPF) Version 2 Release 3 (5668-319) for use of the IPCS dialog programs.

- TSO/E Version 1 Release 4 (5665-285) or TSO/E Version 2 (5685-025) for interactive support. MVS/SP 3.1 continues to provide TSO batch support.

- Either MVS/XA Data Facility Product (DFP) Version 2.3 (5665-XA2) with a PTF or MVS/DFP Version 3.1 (5665-XA3) with PTFs.

JES3 3.1.2 requires MVS/DFP 3.1.

MVS/DFP 3.1, which includes the Storage Management Subsystem, has been designed for use in an operating environment that supports Enterprise Systems Architecture/370.

JES3 support for the Storage Management Subsystem functions of MVS/DFP 3 is provided with MVS/SP-JES3 Version 3 Release 1.2.

Resource Measurement Facility (RMF) Version 4 Release 1.1 supports MVS/SP 3.1. RMF Version 4 Release 1.1 with a PTF supports MVS/SP 3.1.3.

The base control program of MVS/SP 3.1 contains base control program functions of MVS/SP 2.2.0 without base TSO support.

MVS/SP 3 has dependencies on specific release/service levels of other IBM products. For this information, as well as for specific PTF numbers, consult the following:

- For MVS/SP 3: *MVS/SP 3.1 Program Directory*, GC28-1841 for JES2 and GC28-1840 for JES3

- For MVS/SP 3.1.1 and later releases: *MVS/ESA Program Directory: JES2*, GC28-1018, and *MVS/ESA Program Directory: JES3*, GC28-1840

JES Coexistence with MVS/SP 3.1

The following chart shows which levels of JES are compatible with MVS/SP 3.1:

Appropriate JES2	Appropriate JES3
JES2 1.3.6	JES3 1.3.4
JES2 2.1.5	JES3 2.1.5
JES2 2.2.0	JES3 2.1.5 with SNA/NJE
JES2 3.1.1	JES3 2.2.1
JES2 3.1.3	JES3 3.1.1
	JES3 3.1.2
	JES3 3.1.3

For information about specific JES planning, see the *MVS/ESA Conversion Notebook*.

JES2

The JES2 component shipped with MVS/SP 3 is functionally equivalent to that shipped with MVS/SP-JES2 2.2.0 (FMID: HJE2221). However, within a JES2 multi-access spool complex, all member systems must be MVS/SP-JES2 2.2.0, MVS/SP-JES2 3.1.1, or a combination of MVS/SP-JES2 2.1.5 and MVS/SP-JES2 1.3.6 systems.

For migration purposes, the following JES2 component levels will also be supported:

- JES2 component shipped with MVS/SP 1.3.6 (FMID: HJE1367)
- JES2 component shipped with MVS/SP 2.1.5 (FMID: HJE2215)

JES2 Component of MVS/SP 3.1.1-JES2: When using the JES2 component of MVS/SP 3.1.1-JES2 on any system in a JES2 multi-access spool complex, it must be installed on all systems in the complex.

JES2 Component of MVS/SP 3.1.3-JES2: When using the JES2 component of MVS/SP 3.1.3-JES2 on any system in a JES2 multi-access spool complex, it must be installed on all systems in the complex.

JES3

The JES3 component shipped with MVS/SP 3 is functionally equivalent to that shipped with MVS/SP-JES3 2.2.1 (FMID: HJS2220). Thus, MVS/SP 3.1 can coexist in the same loosely-coupled multiprocessing environments as MVS/SP-JES3 2.2.1.

For migration purposes, the following JES3 component levels (with or without the JES3 SNA/NJE Enhancement) are also supported:

- JES3 component shipped with MVS/SP 1.3.4 (FMID: HJS2329)
- JES3 component shipped with MVS/SP 2.1.5 (FMID: HJS2215)

JES3 Component of MVS/SP 3.1.1-JES3: When using the JES3 component of MVS/SP 3.1.1-JES3 on any system in a JES3 complex, it must be installed on all systems in the complex.

JES3 Component of MVS/SP 3.1.2-JES3: When using the JES3 component of MVS/SP 3.1.2-JES3 on any system in a JES3 complex, it must be installed on all systems in the complex.

JES3 Component of MVS/SP 3.1.3-JES3: When using the JES3 component of MVS/SP 3.1.3-JES3 on any system in a JES3 complex, it must be installed on all systems in the complex.

Migration Information

Use System Modification Program Extended (SMP/E) Release 4 (5668-949) to install MVS/SP 3.1. You cannot use SMP4 to install MVS/SP 3.1. Installing the new base control program allows SMP/E to reset all of the entries in the control data sets that relate to the base control program. Installing MVS/SP 3.1 removes obsolete modules, macros, and functions from the distribution libraries and the operating system.

It is not necessary to perform a full system generation to install MVS/SP 3.1. If a system generation is desired, use the following products:

- The linkage editor provided with DFP
- A PTF on Assembler H Version 2 (5668-962)

A new system library, SYS1.MIGLIB, can be used to process dumps with IPCS MVS/SP 3 on previous levels of MVS/XA (but not on MVS/370).

The MVS configuration program (MVSCP) available with MVS/SP 3 or subsequent releases will execute on MVS/370 or MVS/XA. The output of this program is required to IPL MVS/SP 3 or subsequent releases.

MVS/SP 3.1 requires the products listed under "Programming Requirements" on page 2-1. For MVS/SP 3.1, continue to use the 370/370-XA Input/Output Configuration Program (IOCP) used for MVS/XA releases. The SYSGEN, IOCP, and MVSCP initialization streams should require no changes for those installations running MVS/SP Version 2.2 (MVS/SP2.2.0) or higher level.

For detailed information on planning the migration, see *MVS Conversion Notebook* for your particular migration. The following chart shows which *MVS Conversion Notebook* is appropriate for various MVS migrations.

Type of MVS Conversion	Appropriate MVS Conversion Notebook
From MVS/SP 2.2 to MVS/SP 3.1.	**Volume 2** of *MVS/ESA Conversion Notebook for SP Version 3* , GC28-1568
From MVS/SP 2.1.7 to MVS/SP 3.1.	**Part 2 of Volume 1** of *MVS/ESA Conversion Notebook for SP Version 3* , GC28-1567 **Volume 2** of *MVS/ESA Conversion Notebook for SP Version 3* , GC28-1568
From MVS/SP 2.1.1 to MVS/SP 3.1.	**Part 1 and 2 of Volume 1** of *MVS/ESA Conversion Notebook for SP Version 3* , GC28-1567 **Volume 2** of *MVS/ESA Conversion Notebook for SP Version 3* , GC28-1568

Compatibility Considerations

MVS/SP 3.1 is upwardly compatible for most application programs. In most cases, the changes included in the base control program of MVS/SP 3.1 are transparent to problem programs that use published external interfaces described in current IBM publications.

For more explicit information about interfaces that may be affected by use of MVS/SP 3.1.3, see the books in the MVS library.

Incompatible Changes Introduced by MVS/SP 3.1 Base Control Program

The following incompatibilities were introduced in the MVS/SP 3.1 base control program:

- SDUMP changes are:

  - The parameter list validation process is changed.
  - The length of dump data set records accommodates IPCS.

- Stand-alone dump records are a different size.

- SYS1.MIGLIB is a required system data set.

- SVC 33 has moved to the nucleus.

- Global branch entry GETMAIN/FREEMAIN requests made by programs running enabled for I/O and external interrupts will be abnormally ended.

- SMF accommodates the inclusion of data space usage fields in the IEFUSI exit.

- TCTIOT structure is changed.

- The maximum number of Program Call (PC) routines per entry table has been reduced to 128 entries in ESA/370 from 256 entries in 370-XA.

- The AMDPRDMP (print dump) and AMDPRDMP EDIT functions are replaced with comparable functions within IPCS. User programs may need adjustment to accommodate resulting changes:

  - Hard-coded dependencies on the internals of AMDPRDMP require modifications.

  - A new dump record mapping changes the format of dump records.

  - Users who previously updated AMDPRECT or BLSCECT to define dump exits now should update SYS1.PARMLIB member BLSCUSER.

  - ISPF dialogs replace the DSPL3270 feature of IPCS.

  - New services are provided for storage map, find exit, and scan exit.

  - The select ASID symbol service is updated.

  - The BLSUGWDM exit is updated.

  - The post formatting exit is updated.

  - Changes to the GET symbol service might affect user-defined CLISTs.

  - Verb exits are updated or deleted; both CVTMAP and SUMMARY services are provided in other ways.

  - Four types of IHAABDPL, BLSCECT, and BLSABDPL exits are deleted.

  - Component format tables are changed.

- Certain real storage manager (RSM) modules, which provide measurement data, have longer parameter lists and user provided work areas

- TSO base code is not included with the base control program.

- The SPLEVEL macro accommodates the assembly of code intended to run on a prior system level.

Compatible Changes Introduced by MVS/SP 3.1 Base Control Program

The following compatible changes were introduced in the MVS/SP 3.1 base control program:

- The IECIOSxx SYS1.PARMLIB member must be updated for the missing interrupt handler (MIH).

- Module IEEMB881 contains a new field at the end of its parameter list.

- SMF record types are changed:

  - Type 41 record includes a jobname to ease accounting.
  - Types 30, 34, and 35 records include a terminal symbolic name for TSO/E.
  - Types 71, 72, and 79 are affected by new RMF measurements.

Incompatible Changes Introduced by MVS/SP 3.1.1-JES2

The following incompatibilities are introduced within the JES2 component of MVS/SP 3.1.1-JES2:

- Job numbers increased from 4 to 5 digits in JES2 messages and commands
- Scan installation exit changed to scan $SCANTAB prior to $COMTAB.
- New SCAN calls and generic lookups are added
- SMF type 6 records are changed to support increased job ID numbers
- Destination verification SSI routines are changed to require authorization
- The following executable and mapping macros are changed incompatibly:

    - $POST installation exit — R11 = keyword deleted

    - $DEST service — positional parameters changed to keywords

    - $EXIT service — SAVAREA = keyword deleted

    - $FRECEL service — CELL = keyword deleted

    - $FREEBUF service — positional parameter deleted

    - $GETCEL service — SJB =, TCB =, and NONE = keywords deleted

    - $MODCHK service — LOAD = keyword deleted

    - $MODULE service — default for $USERCBS changed

    - $RETSAVE service — dummy positional parameter deleted

    - $SCANTAB service — new operands added; keyword deleted

    - $TRACE service — BASE = and ENVIRON = keywords deleted

    - $VERIFY service — TYPE = keyword changed to accept only an address

    - $VERTAB service — TYPE = keyword changed to accept different input;
      ID = keyword deleted

- The following installation exits are changed incompatibly:

    - EXITs 0-7, 10, 13, 14-25 — have mapping macro changes

    - EXIT 8 — changed the scope of the exit to get control on all I/O, also
      changed $SVT to $HCCT

    - EXIT 9 — changed $SVT to $HCCT

    - EXIT 11 — changed $SVT to $HCCT

    - EXIT 12 — changed $SVT to $HCCT

    - EXIT 26 — changed $SVT to $HCCT

- The following initialization statements are changed incompatibly:

    - APPL APPLID = changed to APPL(avvvvvvv)

    - CONDEF MSGID = parameter deleted

    - DESTID NAME = changed to DESTID(jxxxxxxx)

    - FSSDEF FSSNAME = changed to FSSDEF(acccccccc)

    - LOAD = jxxxxxxx changed to LOADMOD(jxxxxxxx)

    - NODE(nnnn) SNA | BSC operand ignored

    - PRT(nnnn) DSPLSNGL | DSPLTCEL replaced by TRKCELL = YES | NO

    - RMT(nnnn) (SNA) 'terminal type' replaced by DEVTYPE = parameter

- RMT(nnnn) (BSC) 'terminal type' replaced by DEVTYPE= parameter

- SPOOLDEF RECINCR= parameter deleted

- TRACE(n) and TRACEDEF statements replace TRACE statement

Compatible Changes Introduced by MVS/SP 3.1.1-JES2

- $BLDMSG service — new keywords added

- $BUFCK service — new keyword added

- $CALL service — support for $CADDR, $UCADDR, $UPADDR added

- $DEST service — new keyword added

- $ERROR service — support for callers in user environment added

- $FRECEL service — new keywords added

- $FREEBUF service — new keywords added

- $FREMAIN service — new keyword added

- $GETBUF service — new keywords added

- $GETCEL service — new keywords added

- $GETMAIN service — new keyword added; new value for the TCB= keyword added

- $QJIX service — new keywords added

- $RESTORE service — support for calls in any environment added

- $RETSAVE service — new keyword added; support for calls in any user environment added

- $RETURN service — support for calls in any user environment added

- $SAVE service — new keyword added; support for calls in any user environment added

- $SCAN service — new keyword added; new values for WARNMSK= keyword added

- $SCANTAB service — new operands added

- $STORE service — support for calls in any environment added

- $TRACE service — new keywords added

- $XMPOST service — new keywords added

Incompatible Changes Introduced by MVS/SP 3.1.1-JES3

The JES3 component of MVS/SP 3.1.1 introduces the following incompatible changes:

- The length of the job number fields in messages is increased from 4 to 8 characters and uses a new format, job id.

- The following control blocks are changed to accommodate changes in the format of the job number field:

IATYRSQ	IATYISD	IATYAWA
IATYIDD	IATYOSE	IATYNFD
IATYLRS	IATYWTR	IATYNOD

- The input to installation exits IATUX20, IATUX23, and IATUX45 now contains an 8-character job id. Installations using these exits to create or update job header or trailer pages should modify the exit routines to accommodate these changes.

- The AJOBNUM macro now returns the job number in binary format in register 0. Installations requiring the job number in EBCDIC format must use the new IATXJOB macro to convert the number.

- SMF records type 6, 26, and 57 have changed to accommodate the new job number format.

- The job segment scheduler (JSS) queue is restructured, and there is a new macro, IATXJSS, used to add or delete a job queue element (JQE) from the JSS structure.

- The method used to dispatch some JES3 tasks that are ready to execute has changed, and there is a new macro, IATXRDQ, to handle this work.

- JES3 trace entry 48 is deleted.

- Installations that access or update the job data set (JDS) may need to use the new IATXJDS macro in addition to the existing JDS macros.

- Job validation processing during initialization is restructured.

- A new installation exit, IATUX14, called during the job validation/restart phase of initialization processing, can replace existing user modifications.

- The default destination for FSS-related messages is changed from LOG to JES.

- The JMF II program offering is not updated to support this release.

- The default destination for JMF output is changed; JES3 now generates SMF records rather than writing reports.

- JMF output is changed to accommodate new and changed control blocks for this release.

- The JES3 spool maintenance (JSM) facility, as used previously, is deleted from JES3.

- JES3 formatting information that was formerly in IPCS modules is now in IATIPCSP. Installations using IPCS to access JES3 dump information online will have to add IATIPCSP to SYS1.PARMLIB.

- Installation exit IATUX47 is replaced by installation exit IATUX48.

- The JES3 card-based utility programs are removed due to their limited use:

  - Card-to-card (CC)
  - Card-to-printer (CP)
  - Card-to-tape (CT)
  - Tape-to card (TC)

- The JES3 formatted dump has changed to accommodate new and changed control blocks.

- JES3 no longer supports the System/3 1130 Remote Terminal Processor (RTP) programs, nor does it support the 1130 loader program for multi-leaving remote work stations.

The *MVS/ESA JES3 Conversion Notebook* for MVS/SP 3.1.1 will contain additional information about incompatibilities introduced by the JES3 component of MVS/SP 3.1.1.

Compatible Changes Introduced by MVS/SP 3.1.1-JES3

The JES3 component of MVS/SP 3.1.1-JES3 introduces the following compatible changes.

- The MVS START command used to start an FSS contains a new positional parameter.

- The parameter list used by the FSS and FSA CONNECT functions has changed.

- The parameter list used by the FSA START function has changed.

Incompatible Changes Introduced by MVS/SP 3.1.2-JES3

The JES3 component of MVS/SP 3.1.2 introduces the following incompatible changes:

- Installations must use a new interface, the JES3 spool access facility, when accessing spool data sets while running under a JES3 subtask.

- The input parameters for installation exits IATUX11, IATUX46, IATUX49, and IATUX61 are either changed or have different meanings.

- Changes to the return conventions for installation exit IATUX07.

- Changes to the output to the *I SETUP command.

- Installations must not use the following ddnames in JCL: J3SCINFO, J3JBINFO, JS3CATLG.

- Changes to the texts for messages IAT3719, IAT4405, IAT5210, IAT7866, and IAT8674.

- Changes to the following spool resident control blocks: IJS (intermediate job summary table), LVS (locate request table), and IDD (C/I data CSECT).

- Changes to the JES3 formatted dump to accommodate control block changes.

- Changes to C/I and main device scheduling (MDS) processing.

Compatible Changes Introduced by MVS/SP 3.1.2-JES3

Installations using the new functions in the JES3 component of MVS/SP 3.1.2 can expect to see some of the following changes. Other changes in the list are compatible changes that will occur whether or not the new functions are used.

- Changes in commands that address data sets, volumes and devices.

- Changes in commands that address locate and setup processing and jobs in locate and setup processing.

- Additional guidelines on how to set up catalogs.

- Changes in how to code JCL statements and parameters for catalogs and data sets.

- Changes in how to code the //*MAIN JES3 control statement.

- Changes in how to name JES3 mains.

- Changes in guidelines for choosing MDS options.

- Changes in guidelines for determining on which processors to run C/I FSSs for locate processing and Storage Management Subsystems.

- Changes in guidelines for using Resource Access Control Facility (RACF) and Hierarchical Storage Management (HSM) program products.

- Changes in how eligible mains are chosen for processing a job.

- A new use of the subsystem interface.

- New messages and information added to existing messages.

- The input to IATUX08.

- Changes in where installation exits IATUX07, IATUX11, and IATUX61 can be called from.

- Changes to the MDSVLM and RQTAPUT macros.

- New and changed MDS trace records.

- New JES3 failsoft codes and information added to the existing failsoft and system abend codes.

- Additional control block changes.

The *MVS/ESA JES3 Conversion Notebook* for MVS/SP 3.1.2 contains additional information about incompatibilities introduced by the JES3 component of MVS/SP 3.1.2.

Incompatible Changes Introduced by MVS/SP 3.1.3 Base Control Program

The following incompatibilities are to be introduced in the MVS/SP 3.1.3 base control program:

- The macro library is restructured into two libraries: SYS1.MACLIB and SYS1.MODGEN.

  This change requires reassembly of the AMDSADMP macros used to generate stand-alone dump programs.

- Command authorization is now based on information passed with each command rather than on information associated with the console on which the command is issued.

- The following are incompatible changes in SMF:

  — Message IEF986E replaces message IEE978E to help prevent SMF data loss.

  — SMF record types are changed:

    - Type 6 record contains additional field information for printout auditing.
    - Type 90 record now contains the new parameters in the SMFPRMxx member of SYS1.PARMLIB.

- The following control blocks are changed:

  — Communications vector table (CVT)
  — Optimizer user control block (OUCB)
  — Program properties table (PPT)

- Changes to the parameter list for the CSVLLIX2 installation exit require recompilation of all CSVLLIX2 installation exit routines.

- The /*SIGNON statement for remote job stream processing with JES2 and JES3 contains a new password in columns 35 through 42.

- Beginning with RACF 1.9, the RACROUTE macro is the only way to obtain RACF functions.

Compatible Changes Introduced by MVS/SP 3.1.3 Base Control Program

The following compatible changes are to be introduced in the MVS/SP 3.1.3 base control program:

- The following macros are changed compatibly:

  - ALESERV: This macro now adds and deletes entries from the access list for SCOPE = COMMON data spaces. The return and reason codes contain minor changes to support the data lookaside facility.

  - DSPSERV: This macro contains a new parameter, SCOPE = COMMON, to create data spaces that are commonly addressable.

  - MGCR: This macro contains a new field in its parameter list.

  - SMFEWTM: This macro contains a new parameter, MODE = XMEM.

  - TIMEUSED: This macro contains new parameters and can now be used by any program.

  - SDUMP and SDUMPX: These macros allow a new SDATA option of NODEFAULTS. This option excludes the normal default options of ALLPSA, SQA, SUMDUMP, and IO from the dump.

- The following are compatible changes in SMF:

  - When the IEFACTRT, IEFU83, or IEFU84 exit routine is in 24-bit addressing mode, SMF passes the buffer in 24-bit addressing mode.

  - A new installation exit, IEFU85, is added.

  - The SMFEWTM and SMFWTM macros accept 31-bit address input.

  - The installation can set the SMF data set control interval size.

  - The SMFPRMxx member of SYS1.PARMLIB contains new parameters.

  - The D0D wait state code contains reason codes for SMF.

- The MODIFY LLA command can now change the CSVLLIX1 and CSVLLIX2 installation exits for LLA processing.

- The following are compatible changes to JCL:

  - JOB statement: New SECLABEL parameter

  - OUTPUT JCL statement: New DPAGELBL and SYSAREA parameters

  - DD statement with *, DATA, or SYSOUT parameter: Can now contain a DSNAME parameter to specify a data set name for an in-stream or sysout data set

  - DD statement: New DSNTYPE parameter to support partitioned data sets extended (PDSE), if MVS/DFP 3.2 is installed

Incompatible Changes Introduced by MVS/SP 3.1.3-JES2

The following incompatible changes are introduced within the JES2 component of MVS/SP 3.1.3-JES2:

- Execution Batch Monitoring (XBM) Facility — the majority of the previous benefits of using the execution batch scheduling facility no longer exist.

- Recovery after abend — in the SUBTASK environment, JES2 now frees all save areas associated with the abending subtask.

- Installation exits:

  - Exit 32 — byte 1 of parameter list passed in register 1 is now 'reserved'

- Initialization statements:

  - INTRDR — default for AUTH= changed
  - JOBCLASS XBATCH= deleted, replaced by XBM=
  - JOBDEF XBATCH= deleted
  - RDR(nn) — default for AUTH= changed

Compatible Changes Introduced by MVS/SP 3.1.3-JES2

The following compatible changes are introduced within the JES2 component of MVS/SP 3.1.3-JES2:

- Executable macros:

  - $#GET service — new keyword added
  - $CALL service — new keyword added
  - $CBIO service — support for calls in subtask environment added
  - $EXIT service — new keyword added
  - $GETMAIN service — support for calls in subtask environment added
  - $MODULE service — new mapping macros can be specified
  - $PCETAB service — new keyword added
  - $PURGE service — new keyword added
  - $WAIT service — uses $CALL services

- Installation exits:

  - Exit 6 — new word added to parameter list passed in register 1
  - Exits 0-35 (inclusive) — updated control blocks

- Initialization statements:

  - NODE(nnnn) PENCRYPT= added
  - PCEDEF STACNUM= added
  - PRT(nnnn) DEVFCB=, PRESELCT=, and SETUP= added
  - PUN(nn) SETUP= added
  - R(nnnn).PR(m) DEVFCB= and SETUP= added
  - R(nnnn).PU(m) SETUP= added
  - RECVOPTS(type) — new type (GENERAL) added
  - RMT(nnnn) - (BSC and SNA) MSGPRT= added

Incompatible Changes Introduced by MVS/SP 3.1.3-JES3

The JES3 component of MVS/SP 3.1.3 introduces the following incompatible changes:

- The following commands are changed incompatibly:

  - *F E — No longer controls the generation of path trace table entries

  - *X DJ — New keyword parameters (LABEL= and SLCHECK=) control whether output tapes have OS standard labels.

- The following macros are changed incompatibly:

  - IATYFCD — a new parameter (PREV=) is added to specify the name of the previous FCT

  - INTERCOM — a new keyword (TOKEN=) is added to pass the security token associated with the originator of the command.

- ATIME — now allows processing to commence after a time interval has elapsed or at a specified time of day.

- The following trace entry changes are incompatible:
  - All 16 registers are now traced in return trace area (29).
  - The active DSP name will be traced in the return and call (28) trace entries.

- The following initialization changes are incompatible:
  - 3540 is no longer a valid option on the HOLD= keyword of the SYSOUT initialization statement as a result of DSID removal.
  - The default buffer size has been increased.
  - The defaults for the PAGES= keyword on the BUFFER statement have been increased.
  - The default for the USRPAGE= keyword on the MAINPROC statement has been increased.
  - The default for the PRTPAGE= keyword on the MAINPROC statement has been increased.
  - The default for the GRPSZ= keyword on the SPART statement has been increased.

- The following JCL change is incompatible:
  - DSID= is no longer a valid parameter on the DD JCL statement because IBM no longer supports 3540 devices.

Compatible Changes Introduced by MVS/SP 3.1.3-JES3

The JES3 component of MVS/SP 3.1.3 introduces the following compatible changes:

- The following installation exits are changed compatibly:
  - EXIT 03 — allows adding DSNAME messages
  - EXIT 18 — allows additional security decisions by using installation exits 58 and 59
  - EXIT 21 — prints the full data set name on the data set header
  - EXIT 56 — provides a user security token for JES3 command authorization.

- The following macros are changed compatibly:
  - FAILDSP — has a reason code that can be associated with the failure
  - JDSGET — allows the data set name to be specified using DDNAME= or DSNAME= keywords
  - JESTAE — adds a symptom exit to record symptom strings in the variable recording area (VRA)
  - IATYDIF — adds the BYPASS option to the change parameter.

- The following commands are changed compatibly:
  - *I NJE — PENCRYPT is added to display the password encryption option
  - *F NJE — PENCRYPT is added to control sending encrypted passwords to specified nodes
  - *X JESNEWS — changes regarding security levels when RACF JESSPOOL class is active

- *F U — new options DSN = and SL = for modifying output data set character-
    istics

- *I U — new options DSN = and SL = for modifying output data set character-
    istics

- *F U Q = HOLD — DSID = option no longer supported on the MODIFY
    command

- *I U Q = HOLD — DSID = option no longer supported on the INQUIRY
    command.

• The following JCL change is compatible:

- The value of a new parameter (DSNAME) on the SYSIN/SYSOUT DD JCL
    statement will be used as the fifth qualifier in the new five part data set
    name generated.

• The following change in job entry control language is compatible:

- In order to use the PROCESS statement to invoke the JESNEWS DSP, a job
    must be running with the lowest possible security level if the security
    product is being used to protect spool data sets.

• The following initialization changes are compatible:

- A new initialization option (PRJESMSG =) controls fetch and allocation mes-
    sages appearing in the JESMSGLG data set.

- A new keyword (PWCNTL =) is added to the NJERMT initialization statement
    to control passing encrypted passwords.

- The number of printers defined to run under the control of a single func-
    tional subsystem is no longer limited by the size of JES3 buffers.

- The TYPE = keyword parameter on the DEVICE initialization statement can
    be used to define a 3480 tape subsystem with compaction.

• The following message changes are compatible:

- JES3 will generate a new standard 44-character name for SYSIN/SYSOUT
    data sets.

- Messages concerning DSID have been deleted.

• The following process sysout facility changes are compatible:

- New fields have been added to the SSSO (SSSOWTRN and SSSOUSER) to
    indicate that it is an external writer request or request by userid.

• The following change to formatted dumps is compatible:

- MPC = will appear instead of FCT = in staging area traces.

Chapter 3. Publications/Microfiche Ordering Information

The structure and content of the MVS/SP 3 library are described in the *MVS/ESA Library Guide for System Product Version 3*. The library guide lists the books by task and provides ordering information. The "Summary of Changes" in the library guide shows the changes for each release, including the changes from MVS/SP 2 to MVS/SP 3.

Index

resource
  consumption
    reduction in JES3 system 1-12
  management
    enhancement 1-8
RSM (real storage manager)
  enhancements 1-7

S
scheduler work area
  See SWA
security
  auditing capability 1-15
  device-level access control 1-15
  operator authentication 1-15
  operator command auditing 1-15
  operator command authorization 1-15
  operator identification 1-15
  to meet B1 criteria 1-15
SET operator command
  IOS option 1-7
SETIOS operator command
  description 1-7
SMF (system management facility)
  enhancements 1-8, 1-16
SMP/E (System Modification Program/Extended)
  requirement for MVS/SP 3 2-1
spin loop recovery
  new feature 1-7
stand-alone dump
  enhancements 1-7
START LLA operator command
  enhancement 1-6
STORAGE macro
  description 1-8
SVC dump
  enhancements 1-7, 1-17
SWA (scheduler work area)
  placement 1-10
SYSPRINT data set
  use by SMF dump utility 1-8
system generation
  for MVS/SP 3.1 installation 2-3
system management facility
  See SMF
System Modification Program/Extended
  See SMP/E
SYS1.MIGLIB library
  description 1-9

T
time
  CPU use by task 1-17
  Vector use by task 1-17
Time Sharing Option
  See TSO

TSO (Time Sharing Option)
  requirement for MVS/SP 3 2-1

U
usability
  enhancement 1-9

V
VATLST (volume attribute list)
  improvements 1-9
VIO (virtual I/O)
  use of expanded storage 1-8
virtual I/O
  See VIO
virtual lookaside facility
  See VLF
VLF (virtual lookaside facility)
  object 1-5
  services 1-5
volume attribute list
  See VATLST

W
warm start
  improvements 1-11
  reduction in time for JES3 1-12
window service
  description 1-4

Special Characters
$TRACE facility
  enhancements 1-11

MVS/ESA
General Information
for System Product
Version 3

READER'S
COMMENT
FORM

GC28-1359-2

This manual is part of a library that serves as a reference source for systems analysts, programmers, and operators of IBM systems. You may use this form to communicate your comments about this publication, its organization, or subject matter, with the understanding that IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

Note: *Copies of IBM publications are not stocked at the location to which this form is addressed. Please direct any requests for copies of publications, or for assistance in using your IBM system, to your IBM representative or to the IBM branch office serving your locality.*

Possible topics for comment are:

Clarity   Accuracy   Completeness   Organization   Coding   Retrieval   Legibility

If you wish a reply, give your name, company, mailing address, and date:

_____

_____

_____

_____

What is your occupation? _____

How do you use this publication? _____

Number of latest Newsletter associated with this publication: _____

Thank you for your cooperation. No postage stamp necessary if mailed in the U.S.A. (Elsewhere, an IBM office or representative will be happy to forward your comments or you may mail directly to the address in the Edition Notice on the back of the title page.)

c
u
t

a
l
o
n
g

t
h
i
s

l
i
n
e

Reader's Comment Form

Fold and Tape   Please Do Not Staple   Fold and Tape

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 40 ARMONK, N.Y.

POSTAGE WILL BE PAID BY ADDRESSEE

International Business Machines Corporation
Department D58, Building 921-2
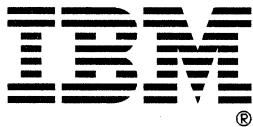PO Box 950
Poughkeepsie, New York 12602-9935

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES
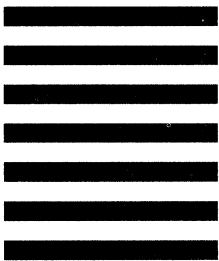
Fold and Tape   Please Do Not Staple   Fold and Tape

Printed in U.S.A.

IBM ®

GC28-1359-2