

z/OS



# Introduction and Release Guide

*Version 1 Release 11*



z/OS



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*Version 1 Release 11*

**Note**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 145.

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## About this book

This book is an introduction to z/OS®, the next generation of the OS/390® operating system. It explains the enhancements that make z/OS the premier operating system, unmatched in the industry today. It also lists and describes the functional elements and features that together make up z/OS.

This book is also a release guide. That is, it will explain the new functional content of the release of z/OS.

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## Who should read this book

This book is for people who are interested in using an advanced-technology, enterprise-wide server operating system environment that is completely dedicated to supporting business goals. It helps anyone who needs a quick overview of the advances that z/OS offers.



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# Summary of changes

## **Summary of changes for GA22-7502-17 z/OS Version 1 Release 11**

This edition contains information previously presented in *z/OS Introduction and Release Guide*, GA22-7502-16, which supports z/OS Version 1 Release 10.

### **New Information**

This edition contains updated descriptions of new enhancements to the elements and features of z/OS for Version 1 Release 11 in Chapter 1.



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# Chapter 1. What's new in z/OS (z/OS V1R10 through z/OS V1R11)

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## Summary of what's new

This topic lists the major enhancements in z/OS that have been introduced in z/OS V1R10 through z/OS V1R11. Some enhancements require customization actions before you can use them. This topic refers you to the documents that describe the customization actions.

The following z/OS elements and features do not have exploitation information in this topic:

- Alternative Library for REXX
- BDT
- BDT File-to-File
- BDT SNA NJE
- BookManager® BUILD
- BookManager READ
- DCE Base Services
- EREP
- ESCON® Director Support
- FFST™
- GDDM®
- GDDM-PGF
- GDDM-REXX
- High Level Assembler (HLASM)
- High Level Assembler (HLASM) Toolkit
- IBM HTTP Server
- Metal C Runtime Library
- MICR/OCR
- OSA/SF
- TIOC
- 3270 PC File Transfer Program

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## z/OS system level enhancements to consider

This topic describes new z/OS system level enhancements.

### IBM z/OS Management Facility

**Description:** IBM z/OS Management Facility V1R11 (z/OSMF V1R11) provides a framework for managing various aspects of a z/OS system through a task oriented, Web browser interface. By streamlining some traditional tasks and automating others, z/OSMF can help to simplify some areas of system management and reduce the level of expertise needed for managing a system.

z/OSMF V1R11, the initial release of the product, allows you to perform the following functions:

- Configure TCP/IP policy-based networking functions on z/OS V1R11 systems
- Add links for external Web applications and Web sites to the z/OSMF navigation area
- Perform problem data management tasks through the Incident Log, which consolidates abend dump related problems and data and simplifies the process of sending the data for further diagnosis

- Manage user access to the z/OSMF product

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *IBM z/OS Management Facility User's Guide*

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## BCP new functions to consider

This topic describes new BCP functions in z/OS.

### Allocation enhancements in z/OS V1R11

**Description:** Allocation enhancements include:

- Tape Library Load Balancing  
A new option SYSTEM TAPELIB\_PREF(EQUALIBYDEVICES) in the ALLOCxx parmlib member is introduced to balance the workload across the eligible libraries based on the number of device exposures (i.e. device numbers) associated with libraries, all other things being equal.
- DISPLAY ALLOC and SETALLOC commands  
Two new commands are introduced in V1R11: DISPLAY ALLOC and SETALLOC. The DISPLAY ALLOC command enables operators to determine what ALLOCxx settings are currently active; the SETALLOC command is used to dynamically modify Device Allocation parameters and settings without re-ILPing.
- Enabling DFSMSHsm HDELETE processing from IEFBR14  
When deleting data sets with DFSMSHsm, users can now bypass unnecessary recall for PGM=IEFBR14 job steps by updating the ALLOCxx parmlib member to include a new statement SYSTEM IEFBR14\_DELMIGDS(NORECALL), or by using the new SETALLOC command to enable the behavior after IPL with the command SETALLOC SYSTEM,IEFBR14\_DELMIGDS(NORECALL).
- Demand tape library allocation  
Support is enhanced to direct allocation to a specific device or devices in an esoteric that are also found in a tape library. The support can be implemented by coding a new JCL keyword SMSHONOR or the corresponding Dynamic Allocation Text unit '0076'x along with a specific device name or an esoteric name on the UNIT parameter.
- Allocation and Scheduler support for EAV II  
In accordance with updates for extended address volume (EAV) II in V1R11, the Job Management components of Allocation and Scheduler are enhanced by introducing a new JCL keyword EATTR on DD statement (Scheduler) and the corresponding Dynamic Allocation text unit '8028'x (Allocation), thus enabling users or application programs to specify how the data set can be created on the DASD volume.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS System Commands*
- *z/OS MVS Programming: Authorized Assembler Services Guide*
- *z/OS MVS System Messages, Vol 8 (IEF-IGD)*
- *z/OS MVS Initialization and Tuning Reference*
- *z/OS MVS Planning: Operations*

- *z/OS MVS JCL User's Guide*
- *z/OS MVS JCL Reference*

## New BCPii function

**Description:** The Base Control Program Internal Interface (BCPii) function allows authorized applications to query, change, and perform basic operational procedures against the installed System z hardware base. As a base BCP component, the new BCPii address space allows authorized z/OS applications to access the local support element and other support elements in the HMC network to perform HMC-like functions.

A set of high-level application program interfaces (APIs) for data exchange and command requests are include:

- HWICMD Callable Service
- HWICONN Callable Service
- HWIDISC Callable Service
- HWIEVENT Callable Service
- HWILIST Callable Service
- HWIQUERY Callable Service
- HWIBeginEventDelivery Callable Service
- HWIEndEventDelivery Callable Service
- HWIManageEvents Callable Service
- HWIGetEvent Callable Service

**When change was introduced:** Integrated in z/OS V1R11 and available in z/OS V1R10 with APAR OA25426. A series of MCL hardware updates, and configuration updates on z/OS and various support elements enable the BCPii functionality.

### Reference information:

- *z/OS MVS Programming: Callable Services for High-Level Languages*
- *z/OS MVS Programming: Authorized Assembler Services Reference EDT-IXG*
- *z/OS MVS System Commands*
- *z/OS MVS Initialization and Tuning Reference*
- *z/OS MVS Diagnosis: Tools and Service Aids*
- *z/OS MVS System Codes*
- *z/OS MVS System Messages, Vol 6 (GOS-IEA)*

## BCPii function enhancements in z/OS V1R11

**Description:** The following enhancements are made to BCPii:

- New HWISET callable service is added to set various CPC and image (LPAR) attributes.
- BCPii applications can now query and modify all activation profile definitions on the support element. This includes reset, image and load activation profiles.
- A new IPL token attribute is introduced so that XCF can obtain knowledge about the status of another system, and upon the demise of the system, can potentially partition the sysplex out of the sysplex immediately and reset the demised system.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Programming: Callable Services for High-Level Languages*

**AMODE64 Pause/Release services**

**Description:** Every Pause/Release service IEAVxxx has an AMODE64 analog IEA4xxx, which supports the 64-bit addressing mode and allows storage above 2GB.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Programming: Authorized Assembler Services Reference EDT-IXG*
- *z/OS MVS Programming: Assembler Services Reference IAR-XCT*

**RMODE64 support for non-executable directed LOAD**

**Description:** When using the LOAD macro and providing a storage area into which the target module should be loaded, you have the option to provide storage above 2G and have the target module loaded into that area. This is to be used for non-executable modules only (though this is not validated). To get this RMODE64 support, instead of using the ADDR or ADRNAPF parameter, specify ADDR64 or ADRNAPF64.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Programming: Authorized Assembler Services Reference LLA-SDU*

**Choosing whether to run zAAP work on zIIP processors**

**Description:** You can specify the zAAPzIIP=YES/NO parameter on the IEASYSxx parmlib member to determine whether the system may run zAAP processor eligible work on zIIP processors when no zAAP processors are installed on the machine. The default in z/OS V1R11 is YES. This support is also provided at releases z/OS V1R9 and z/OS V1R10 via APAR OA27495 and the default for those releases is NO.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Initialization and Tuning Reference*

**System REXX enhancements in V1R11**

**Description:** System REXX, originally introduced in z/OS V1R9, has been enhanced to support the following functions:

- Data sets can now be concatenated to SYS1.SAXREXEC. This is established using the new REXXLIB statement in the AXRnn parmlib member.
- The TSO/E STORAGE function is supported in read-only mode.
- Parmlib members other than AXR00 can be specified using the new AXR= keyword in IEASYSxx.
- JES affinity is acquired for AXRnn address spaces when the primary JES subsystem starts. Every TSO=YES AXREXX invocation has a JES jobid and joblog associated with it. This enables additional capabilities related to the JES spool to be leveraged within a REXX exec running under System REXX,

including the ability to write JCL to an internal reader, retrieve output, and use the TSO/E TRANSMIT, RECEIVE and SEND commands.

- Support for z/OS UNIX callable services (syscalls) for TSO=YES AXREXX requests allows full use of available syscall commands.
- Two new built-in functions are provided: AXRINFO returns the name of the subsystem under which the exec is running (JES2, JES3, or MSTR), and AXRWAIT provides a wait function for use within a REXX exec.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS Programming: Authorized Assembler Services Reference ALE-DYN*
- *z/OS MVS Programming: Authorized Assembler Services Guide*
- *z/OS MVS System Commands*
- *z/OS MVS Initialization and Tuning Reference*
- *z/OS MVS Diagnosis: Tools and Service Aids*
- *z/OS MVS System Messages, Vol 3 (ASB-BPX)*
- *z/OS MVS System Codes*
- 

## RRS Global Panel Options

**Description:** RRS Global Panel Options (ATRFPPVAR) is available to indicate how the timestamp of RRS panels is displayed by selecting either GMT time or LOCAL time. The default setting is GMT.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Programming: Resource Recovery*

## Service aids enhancements in V1R11

**Description:**

- Message IEA045I is issued when SVC dump capture is started.
- SVC dump data capture uses a lower limit for stopping data capture with the new AUXMGMT=ON default. No new dumps are allowed when auxiliary storage usage reaches 50%. New dumps are allowed again only after the auxiliary storage usage drops below 35%. Current SDUMP data capture stops when auxiliary storage usage exceeds 68%, generating a partial dump.
- As an enhancement to the SDUMP timer DIE, you can issue the CHNGDUMP SET,SDUMP,MAXSNDSP= command to specify the maximum time interval that an SVC dump can keep a system non-dispatchable. For example, a system should not stay non-dispatchable long enough to result in being partitioned from the sysplex. The default interval is 15 seconds.
- As exploitation of stage 2 of extended access volume support (EAV2), the following data sets are in support of placement in cylinder-managed space:
  - Formatted print files including ABEND dumps, SNAP dumps, and the print files from AMBLIST, SPZAP, and AMATERSE.
  - Unformatted dump data sets.
  - Unformatted external traces from component trace and GTF trace.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS System Commands*
- *z/OS MVS Diagnosis: Tools and Service Aids*
- *z/OS MVS System Messages, Vol 6 (GOS-IEA)*
- *z/OS Migration*

## GRS: ENQ Contention Notification enhancements

**Description:** New ENF 51 contention signal filtering is introduced to provide improved monitoring and contention resolution capability. This signal-specific filtering capability can reduce ENF traffic and improve usability to ENF listeners.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Programming: Authorized Assembler Services Reference EDT-IXG*
- *z/OS MVS Programming: Authorized Assembler Services Guide*

## GRS: Exit enhancements

**Description:** GRS provides the following enhancements:

- A new ISGNQXITQUEUEUED2 exit is provided to allow users to know if any of the ENQs are in contention and, as the exit runs under the user's task, to be able to gather requester context information.
- ISGCNFXITSYSTEM and ISGCNFXITSYSplex exits are modified to provide more information about each request.
- RscTokens are externalized for global resources. RscTokens are provided in ISGQUERY, ISGNQXITQUEUEUED1, and the ISGCNFXITSYSTEM/SYSplex exits.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Installation Exits*

## GRS: Enhanced contention analysis for GRS latch

**Description:** The following enhancements have been made to provide some real time detection and greatly improved technical analysis for latches:

- New Enhanced Contention Analysis display commands for latches: D GRS,ANALYZE,LATCH
- New Latch Identity services: ISGLID and ISGLID64

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Planning: Global Resource Serialization*
- *z/OS MVS Programming: Authorized Assembler Services Reference EDT-IXG*
- *z/OS MVS Programming: Authorized Assembler Services Guide*
- *z/OS MVS System Commands*
- *z/OS MVS System Codes*
- *z/OS MVS System Messages, Vol 9 (IGF-IWM)*

## GQSCAN and ISGQUERY enhancements

**Description:** The following enhancements have been made to provide GRS STAR mode storage constraint relief for GQSCAN and ISGQUERY processing. All GRS Star Mode Query (GQSCAN and ISGQUERY) requests that required cross-system global ENQ gathering previously shared a single 2GB GRS dataspace. Now, 64-bit GRS private storage is used to store this data. This greatly increasing the amount of concurrent query requests that can be supported.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS System Codes*
- *z/OS MVS System Messages, Vol 6 (GOS-IEA)*

## IOS: Basic HyperSwap Support Enhancement

**Description:** The Basic HyperSwap support is enhanced in V1R11:

- The SETHS RESUMEIO command resumes normal I/O activity to all DASD devices that have been stopped by Basic HyperSwap because the STOP option was used.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS System Commands*
- *z/OS MVS System Messages, Vol 9 (IGF-IWM)*

## Message Flood Automation enhancement: Removing MFA use of customer exits

**Description:** In a z/OS R11 system or z/OS R9 or R10 system with APAR OA25602 installed, the use of IEAVMXIT and System Command Exit by Message Flood Automation is completely removed. Message Flood Automation processing is invoked directly within the message processing path. The advantages include:

- Eliminating the installation steps required to install Message Flood Automation
- Enabling Message Flood Automation to see and take action against all messages even if they are being sent through specific MPF exits

Because Message Flood Automation processing is invoked from directly within the message processing path, users must not have any obsolete version (pre-z/OS R11) of Message Flood Automation installed. To ensure that neither the IEAVMXIT message exit nor system command exit is installed, a new Consoles Health Check CNZ\_OBSOLETE\_MSGFLD\_AUTOMATION is also introduced.

**When change was introduced:** Integrated z/OS V1R11 and available in z/OS V1R10 and z/OS V1R9 with APAR OA25602.

**Reference information:**

- *z/OS MVS Planning: Operations*
- *z/OS MVS System Commands*
- *z/OS MVS System Messages, Vol 4 (CBD-DMO)*
- *z/OS MVS System Messages, Vol 6 (GOS-IEA)*
- *z/OS MVS Dump Output Messages*

- *z/OS MVS System Codes*
- *z/OS MVS Diagnosis: Reference*
- *z/OS MVS Diagnosis: Tools and Service Aids*
- *z/OS MVS Initialization and Tuning Reference*

## Program Management: New Binder IEWPARMS

**Description:** The new IEWPARMS DD statement is supported as an alternate source for binder options, and can also improve trace handling for diagnostic purposes.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Program Management: User's Guide and Reference*
- *z/OS MVS Program Management: Advanced Facilities*
- *z/OS MVS System Messages, Vol 8 (IEF-IGD)*

## Predictive failure analysis

**Description:** Soft failures are abnormal yet allowable system behavior that can slowly lead to the degradation of the operating system. To help eliminate soft failures, z/OS has developed Predictive Failure Analysis (PFA) using remote checks from IBM Health Checker for z/OS to collect data about your installation. Using this data, PFA constructs a model of the expected (future) behavior of the z/OS images, compares the actual behavior with the expected behavior, and if the behavior is abnormal issues a health check exception. Beginning with z/OS V1R11, z/OS introduces the following Predictive Failure Analysis (PFA) checks:

### PFA\_COMMON\_STORAGE\_USAGE

The check is looking to see if there is a potential for storage in the common storage area (CSA) plus system queue area (SQA) or in the extended common storage area (ECSA) plus extended system queue area (ESQA) to be exhausted in the upcoming PFA model interval.

### PFA\_LOGREC\_ARRIVAL\_RATE

The check is looking at the arrival frequency of selected software logrec entries. By monitoring the counts of software LOGREC arrivals, PFA can detect when the number of errors occurring could indicate a damaged system or address space.

### PFA\_VIRTUAL\_STORAGE\_USAGE

This check is looking for a persistent job that is using an abnormal amount of virtual storage which might indicate that a job is leaking virtual storage.

### PFA\_MESSAGE\_ARRIVAL\_RATE

This check is looking at the arrival rate of messages normalized by CP utilization to detect when either a persistent job or the z/OS image is damaged and is generating an excessive number of messages.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Problem Management*

## SMF enhancements in V1R11

**Description:**

- When using the IFASMF DL program to dump SMF log stream data, you can specify the RELATIVEDATE parameter to filter the data recorded during a specific date range.
- The LSNAME parameter of the IFASMF DL program supports new OPTIONS keywords to delete data from the log stream:
  - ARCHIVE, which deletes data after dumping the log stream to a data set.
  - DELETE, which simply deletes the data from the log stream.
- You can specify the MAXDORM parameter in parmlib member SMFPRMxx for both data set recording and log stream recording.
- The following 8-byte fields are added to the Performance section of the SMF type 30 records: SMF30SRV\_L, SMF30CSU\_L, SMF30SRB\_L, SMF30IO\_L, SMF30MSO\_L, and SMF30ESU\_L. The contents of these fields are equivalent to their 4 byte counterparts: SMF30SRV, SMF30CSU, SMF30SRB, SMF30IO, SMF30MSO, and SMF30ESU, respectively; but the values in the new 8 byte fields continue to grow past X'FFFFFFFF'.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS System Management Facilities (SMF)*
- *z/OS MVS Initialization and Tuning Reference*

## System logger enhancements

**Description:** There are three system logger enhancements:

- System Logger changes reduce concurrent log stream connection time involving staging data set allocations. These changes are intended to help improve IPL and Logger restart times.
- A threshold mechanism is provided to limit logger callers from causing excessive concurrent asynchronous IXGWRITE requests to be outstanding. Invokers are notified when the condition clears and additional write requests can be honored.
- System Logger provides log stream name identification for related latches, and the improved GRS latch analysis commands and messages improved analysis for latch contention, a new DISPLAY GRS,ANALYZE command, similar to the one available for enqueues, and can help make it easier to identify deadlocks and to find the root cause of latch contention.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS System Messages, Vol 10 (IXC-IZP)*
- *z/OS MVS Programming: Authorized Assembler Services Reference EDT-IXG*
- *z/OS MVS Diagnosis: Reference*
- *z/OS MVS Programming: Assembler Services Guide*

## WLM: Enhanced routing recommendations

**Description:** The WLM IWM4SRSC and IWMSRSRS services are enhanced to return detailed results and finetune the recommendations for routing work between servers in a sysplex.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Programming: Workload Management Services*

**WLM supports classification of Tivoli Director Server work**

**Description:** With the new WLM subsystem type LDAP supported, Tivoli Directory Server can now classify its work and allow end users to set performance goals for different kinds of LDAP work.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Planning: Workload Management*
- *IBM Tivoli Directory Server Administration and Use for z/OS*

**WLM: Maximum number of instances per WLM server address space extended**

**Description:** The limit of server instances (the maximum number was 1000) per server address space is now removed.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Programming: Workload Management Services*

**WLM supports more detailed reporting**

**Description:** The number of report classes allowed in a WLM service definition is extended from 999 to 2047 which allows for more detailed reporting.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Planning: Workload Management*

**WLM: HiperDispatch mode improved for zIIPs**

**Description:** The HiperDispatch function now supports dispatching to multiple zIIP affinity nodes.

**When change was introduced:** z/OS V1R11.

**Reference information:** None.

**WLM: REQLPDAT callable from unauthorized users**

**Description:** The SYSEVENT REQLPDAT that provides system capacity data can now be invoked unauthorized thus improving the ease of use for the customer.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Programming: Authorized Assembler Services Reference SET-WTO*
- *z/OS MVS Programming: Authorized Assembler Services Reference EDT-IXG*
- *z/OS MVS System Codes*

## XCF/XES enhancements in V1R11

### Description:

- By using the BCPii interfaces to invoke z/Series Hardware APIs, XCF can detect the state of remote images in the sysplex and use the obtained information to enhance and expedite sysplex partitioning processing.
  - The partition monitoring system can detect changes in the target system status, initiate partitioning actions, and might be able to bypass certain delays built into the partitioning process.
  - The default status update missing action is to isolate that system immediately using the fencing services.
- XCF can automatically adjust the failure detection interval (FDI) to use for systems in the sysplex when needed. The effective failure detection interval is the longer one of two intervals resulting from the user-specified FDI and a value based on the system's excessive spin parameters.
- XCF is updated to not immediately load a wait state when the GDPS/PPRC controlling system loses sysplex time synchronization and switches to local timing mode. However, XCF limits the amount of time that the controlling system can remain in the sysplex without external time synchronization.
- XES design is enhanced to accommodate processing large number of coupling facility subchannels:
  - The subchannel information returned by DISPLAY command is reformatted to provide the results with fewer lines.
  - The algorithm for subchannel operation completion, recovery, and notification processing is optimized to process more subchannel operation results in less time and with fewer spin loop timeouts.
- The size of XES hash tables has been increased to improve performance of serialized connections (lock and serialized list structures) and reduce contention related to these data structures.

**When change was introduced:** z/OS V1R11.

### Reference information:

- *z/OS MVS Setting Up a Sysplex*
- *z/OS MVS Programming: Sysplex Services Guide*
- *z/OS MVS System Messages, Vol 10 (IXC-IZP)*
- *z/OS MVS System Commands*
- *z/OS MVS Initialization and Tuning Reference*
- *z/OS MVS Diagnosis: Reference*

## AutoIPL support

**Description:** AutoIPL support provides the capability to request that the system automatically IPL standalone dump, z/OS, or both, when a disabled wait state is requested by a system component. This function is designed to be under the control of new parmlib parameters and a new Wait State Action Table (WSAT); together, they specify the actions, if any, to be taken for various disabled wait states.

The use of Auto-IPL is not currently supported in multisystem-capable sysplex configurations where SFM is active. When Auto-IPL is enabled in multisystem-capable sysplex configurations where SFM is active, the automatic IPL actions will be ignored.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS System Commands*
- *z/OS MVS Initialization and Tuning Reference*
- *z/OS MVS Diagnosis: Tools and Service Aids*

## Displaying PDSE caching statistics

**Description:** z/OS V1R10 enhances the availability of PDSE caching statistics, providing a new command to display the caching statistics, including new details at the data set level. This improved access to the statistics makes it easier to determine if you need to change your current PDSE caching specifications.

Use the HSPSTATS parameter on the DISPLAY SMS,PDSE or DISPLAY SMS,PDSE1 commands to obtain information related to the use of member caching in a hiperspace, including the size of the hiperspace, the current LRUTIME value, the current LRUCYCLE value, data sets eligible for caching, and data sets which are in cache. These DISPLAY commands generate a scrollable list on the operator's console showing the current caching statistics.

PDSE member-level caching must be active before any caching statistics can be displayed. The PDSE\_HSP\_SIZE or PDSE1\_HSP\_SIZE parameter must be specified in the IGDSMSxx member of SYS1.PARMLIB.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS System Commands*
- *z/OS MVS Initialization and Tuning Reference*
- *z/OS MVS System Messages, Vol 9 (IGF-IWM)*

## SMF enhancement for z/OS V1R10 - Suppressing EXCP entries for SMF type record 30

**Description:** You can now suppress empty execute channel program (EXCP) entries in the SMF type 30 record using the EMPTYEXCPSEC parameter in the SMFPRMxx parmlib member.

- Specify EMPTYEXCPSEC(SUPPRESS) to ensure that the system generates no empty EXCP sections for non-allocated candidate volumes in the SMS storage group.
- Specify or default to EMPTYEXCPSEC(NOSUPPRESS) to request that the system generate one EXCP section for each SMS candidate volume.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS Initialization and Tuning Reference*
- *z/OS MVS Setting Up a Sysplex*

## Console service distributed mode

**Description:** When running in a sysplex environment, you can operate z/OS console services in distributed mode. The advantages of distributed mode include:

- Potentially reducing the time that it takes to IPL a system

- Potentially reducing the time that it takes a system to join a sysplex
- Potentially reducing the scope of Console related hangs
- Reducing the possibility of Consoles related outages
- Allowing more MCS, SMCS and subsystem consoles to be configured

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS Planning: Operations*

## IBM Health Checker for z/OS V1R10 enhancements

**Description:**

- New HZSPREAD and HZSPWRIT interfaces let check routines read data from or write data to the HZSPDATA data set. The HZSPDATA data set allows you to save check data between restarts of the system or IBM Health Checker for z/OS. (You set up the HZSPDATA data set in the HZSALLCP job and specify it in the IBM Health Checker for z/OS startup procedure, *hzsproc*.) The system preserves two groups of data between restarts, the first and the most recent.
- The HZSPRINT utility has been enhanced to support limiting log stream data in SYSOUT to a particular time range, using the new TIMERANGE parameter.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *IBM Health Checker for z/OS: User's Guide*

## XCF/XES enhancements in z/OS V1R10

**Description:**

- CF duplexing is enhanced with a new CFCC option to support expedited duplexing completion. When you request this option, duplexed commands complete sooner than the duplexing architecture previously permitted by allowing the duplexed commands to complete following the exchange of the second duplexing signal (specifically, the ready-to-complete (RTC) signals). This support is associated with a new CFLEVEL (CFLEVEL16).
- Exploiters of shared message queue, such as MQ Shared Queues and IMS Shared Message Queue, can transparently reduce their scheduling overhead with the enhanced sublist notification mechanism: false schedule avoidance. This support is also associated with CFLEVEL16.
- In z/OS V1.10, XCF and XES plan to extend and enhance their existing health checks to provide new and improved checks to detect single points of failure for all types of couple data sets using the new IOSSPOF service, check for appropriate separation of different types of couple data sets, and check XCF signaling paths and structure sizes. Improved CF structure and duplexing checks help you avoid sysplex-related problems. New checks for Sysplex Failure Manager action specifications help you improve sysplex availability.
- New options on the VARY XCF operator command will allow you to request a SADMP, z/OS IPL, or both, after the indicated system has been removed from the sysplex. AutoIPL capability is intended to help you achieve faster failure data capture and recovery after system failures.
- Some locking operations and IXLSYNCH operations can support a queuing protocol when no subchannels are available, which is similar to the current handling of CF list and cache requests. This enhancement is made to eliminate

the costly CPU-synchronous spins, and thus reduce the significant CPU overhead when processors must wait for an active CF operation to complete so that its subchannel can be re-used to drive the next request.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *IBM Health Checker for z/OS: User's Guide*
- *z/OS MVS System Commands*
- *z/OS MVS Setting Up a Sysplex*
- *z/OS MVS Programming: Sysplex Services Guide*
- *z/OS MVS Diagnosis: Reference*
- *z/OS MVS System Messages, Vol 10 (IXC-IZP)*

## IOS: Allowing PPRC secondary devices in subchannel set one

**Description:** To enable you to grow your data, additional significant exploitation of the alternate subchannel set is in this release. This additional exploitation consists of two functions:

- Allowing definition of non-PAV-alias devices in the alternate subchannel set for backing up open systems data from the SAN.
- Allowing the definition of PPRC secondary devices in the alternate subchannel set.

The DISPLAY M=DEV(ddddd) command is updated to display information for special devices, whether HyperSwap is enabled for the device, and whether the device has been swapped. The VARY PATH command is updated to allow five-digit device numbers. The DDR SWAP command is updated to allow five-digit device numbers.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS System Commands*
- *z/OS MVS Initialization and Tuning Reference*
- *z/OS MVS System Messages, Vol 6 (GOS-IEA)*
- *z/OS MVS System Messages, Vol 7 (IEB-IEE)*
- *z/OS MVS System Messages, Vol 9 (IGF-IWM)*

## IOS: Basic HyperSwap support

**Description:** The HyperSwap function enables I/O to the primary logical devices in a synchronous Peer-to-Peer Remote Copy consistency group to be swapped, without human intervention, to the secondary logical devices in the Peer-to-Peer Remote Copy consistency group with minimal disruption to the applications that are using the logical devices.

You can use a new command **SETHS** to manage the basic HyperSwap function. The **DISPLAY** command has been updated to display information about the HyperSwap function and the status of device pairs in the PPRC configuration.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS System Commands*
- *z/OS MVS Initialization and Tuning Reference*

- *z/OS MVS System Codes*
- *z/OS MVS System Messages, Vol 9 (IGF-IWM)*

## GRS: ISGENQ/ISGQUERY support of USERDATA

**Description:** ISGENQ has been enhanced to enable you to specify user data (USERDATA) on ISGENQ REQUEST=OBTAIN, TEST=NO, and RESLIST. RESLIST=NO assigns the user data to the single resource. RESLIST=YES applies the user data to all the entries in the table. There is no way to provide separate user data for each table resource entry.

ISGQUERY has been enhanced, where a ANSDetail=FULL3 value indicates that the USERDATA is returned in the answer area.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS System Codes*
- *z/OS MVS Data Areas, Vol 2 (DCCB-ITZYRETC)*
- *z/OS MVS Programming: Assembler Services Guide*
- *z/OS MVS Programming: Assembler Services Reference IAR-XCT*
- *z/OS MVS Programming: Authorized Assembler Services Guide*
- *z/OS MVS Programming: Authorized Assembler Services Reference EDT-IXG*

## GRS: GRS ENQ measurement improvements

**Description:** There have been improvements to the GRS EQDQ monitor.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS Planning: Global Resource Serialization*
- *z/OS MVS System Messages, Vol 9 (IGF-IWM)*

## GRS: Improved IPCS filtering of GRS data

**Description:** A new GRS reporting panel is presented to GRSDATA invokers through the 2.6 IPCS panel. The new filter panel can invoke GRSDATA or GRSTRACE and can provide help information on the reports and their fields and options.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS Diagnosis: Reference*
- *z/OS MVS IPCS Commands*
- *z/OS MVS IPCS User's Guide*
- *z/OS MVS Dump Output Messages*

## Program management: AMBLIST enhancements

**Description:** The AMBLIST service aid provides additional information about program objects. It also has usability and readability enhancements.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS Program Management: User's Guide and Reference*

- *z/OS MVS Diagnosis: Tools and Service Aids*
- *z/OS UNIX System Services Command Reference*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*

## Program management: New RLD type

**Description:** Program management supports an RLD for use in long-displacement types of instructions, in which the displacement is held in discontinuous bytes (DL-DH).

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS Program Management: Advanced Facilities*
- *z/OS MVS Program Management: User's Guide and Reference*
- *z/OS MVS Diagnosis: Tools and Service Aids*
- *z/OS MVS System Messages, Vol 5 (EDG-GFS)*

## WLM: Better protecting z/OS against high consumers of fixed and auxiliary storage

**Description:** In order to avoid storage shortages, detection mechanisms have been added to identify a sudden growth in fixed and pageable storage. This allows to react early enough to avoid system outages. The enhancement:

- Identifies fixed and auxiliary storage shortages
- Identifies the address spaces which show the highest growth in the respective storage consumption
- Helps the system to recover

New messages and automation methods allow the system to terminate address spaces with an unacceptable consumption of high fixed or pageable storage. Before termination, address spaces get logically swapped and non-swappable address spaces will be set to non-dispatchable so that they will not allocate additional storage.

**When change was introduced:** z/OS V1R10.

**Reference information:** None.

## WLM: Supporting enhanced ARM transaction management

**Description:** The services `arm_start_transaction` and `arm_stop_transaction` indicate the beginning and the end of an ARM transaction. Beginning with z/OS V1R10, ARM services are enhanced to use enclaves so that managing individual transactions is possible.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS Programming: Workload Management Services*

## WLM: Managing selected components in service class SYSTEM

**Description:** To make sure that the system runs smoothly, the following address spaces are now managed in service class SYSTEM: XCFAS, GRS, SMSPDSE, SMSPDSE1, CONSOLE, IEFSCHAS, IXGLOGR, SMF, CATALOG. The \*MASTER\* and WLM address spaces are already managed in service class SYSTEM.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS Planning: Workload Management*

## WLM: New performance block delays

**Description:** To increase the integration of enclave exploitation and websphere, a new set of performance block states is introduced. These states can be named by each application, thus allowing for more flexibility in reporting application states.

**When change was introduced:** z/OS V1R10.

**Reference information:** None.

## WLM: Processing in HiperDispatch mode

**Description:** HiperDispatch mode manages the assignment of work to processors. This dispatching mode takes the book structure of the machine into account and re-dispatches a unit of work to the same processor repeatedly so that cached data continues to be available to the processor, improving performance.

**When change was introduced:** Integrated in z/OS V1R10 and available in z/OS V1R9 with APAR OA20418.

**Reference information:**

- *z/OS MVS Planning: Workload Management*

## z/OS capacity provisioning

**Description:** z/OS capacity provisioning assists you in managing the CP, zAAP and zIIP capacity of system z10 servers that are running one or more z/OS systems. Based on On/Off Capacity on Demand, temporary capacity may be activated and deactivated under control of a policy you define. z/OS Capacity Provisioning simplifies the monitoring of critical workloads, and its automation features can help to activate additional resources faster than manual operation. Thus, z/OS Capacity Provisioning can build on z/OS Workload Management functions and complement them.

**When change was introduced:** Integrated in z/OS V1R10 and available in z/OS V1R9 with APAR OA20824.

**Reference information:**

- *z/OS MVS Capacity Provisioning User's Guide*

## Service Aids enhancements in z/OS V1R10

**Description:** The following enhancements are made to MVS service aids to provide support to systems with larger amounts of real storage:

- Dumping and IPCS components add support for common storage above the bar, an acknowledgement that growth will strain the capacity of 24-bit and 31-bit common storage.
- Transaction dump adds the capability to cope with reaching capacity of one dynamically allocated data set, allocating overflow data sets as needed to capture the dump requested.

- Updates to IPCS COPYDUMP produce subset dumps to be sent to another site better, using job names when those names are a better means to ensure that the subsets contain the most important data. SADMP and SDUMP were updated to support the correlation of job names with ASIDs.

Each of these, in its way, contributes to ensuring that larger, more complex systems can be serviced when that is needed.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS MVS Diagnosis: Tools and Service Aids*
- *z/OS MVS IPCS Commands*

## Unicode support enhancements in z/OS V1R10

**Description:** Enhancements to z/OS support for Unicode include:

- UTF-32 is provided with Unicode character conversion services. This support is defined as CCSID 1232. With this support, customers can perform conversions between any existing CCSID to 1232 when using Unicode character conversion services.
- Case conversion service is enhanced with the implementation of the extended translation facility 3 (ETF3). With this hardware enhancement, Unicode can implement direct hardware conversions between 1200 and 1208 CCSIDs, improving performance.
- Conversion information service is added to provide information about CCSIDs programmatically.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Support for Unicode: Using Unicode Services*
- *z/OS MVS System Messages, Vol 4 (CBD-DMO)*

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## C/C++ without Debug Tool new functions to consider

This topic describes new XL C/C++ functions in z/OS.

### XL C/C++ compiler option MAKEDEP and the related options M and MF are introduced

**Description:** Before z/OS V1R11, the stand-alone makedepend utility was used to analyze source files and determine source dependencies. In z/OS V1R11, the XL C/C++ compiler option MAKEDEP and the related options M and MF are introduced and can be used to obtain similar information. The use of the compiler option MAKEDEP is recommended.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ User's Guide*
- *z/OS XL C/C++ Compiler and Run-Time Migration Guide for the Application Programmer*
- *z/OS UNIX System Services Command Reference*

## XL C/C++ compiler option RTCHECK is introduced

**Description:** The RTCHECK option is introduced to generate compare-and-trap instructions that perform certain types of runtime checking. The messages can be used to debug C and C++ programs.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ User's Guide*

## XL C++ compiler suboption NAMEMANGLING(zOSV1R11\_ANSI) and mangling-related compiler options and pragma directives are introduced

**Description:** By changing the name mangling rules, programmers have the capability to switch between linking to newly-compiled code or compiled legacy code. This capability may be necessary in the event that there are mangling-related mutual compatibility issues that affect the two pieces of compiled code.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ User's Guide*
- *z/OS XL C/C++ Language Reference*

## XL C/C++ compiler option SHOWMACROS is introduced

**Description:** The SHOWMACROS option is used to display macros definitions to preprocessed output. This option can help to determine the available functionality in XL C/C++ compiler. The macro listing may prove useful in debugging complex macro expansions.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ User's Guide*

## XL C/C++ compiler option SKIPSRC is introduced

**Description:** When a listing file is generated using the SOURCE option, SKIPSRC option can be used to determine whether the source statements skipped by the compiler are shown in the source section of the listing file.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ User's Guide*

## XL C/C++ compiler option REPORT is introduced to produce pseudo-C code

**Description:** When the LIST option is specified, the z/OS XL C/C++ compiler generates a listing file for each source file named on the command line. When used with the REPORT option, pseudo-C code listing files are produced to show how

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sections of code have been optimized in both compile and link phases. You can use this information to understand your application code and to tune your code for better performance.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ User's Guide*

## XL C/C++ compiler option PREFETCH is introduced

**Description:** The PREFETCH option is introduced to insert prefetch instructions automatically where there are opportunities to improve code performance.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ User's Guide*

## XL C/C++ compiler option INLINE might behave differently

**Description:** XL C/C++ compiler option INLINE might behave differently than in prior releases because of the implementation of a new inliner. The functions that get inlined might be different, and the inline report might look different.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ Compiler and Run-Time Migration Guide for the Application Programmer*

## Support for Unicode literals and character types

**Description:** As of z/OS V1R11, Unicode literals and character types are supported. In C mode, the Unicode literals are enabled under the extended language level and disabled under strictly-conforming language levels. In C++ mode, the Unicode literals and character types are enabled under the extended and extended0x language levels, and disabled under other language levels.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ User's Guide*
- *z/OS XL C/C++ Language Reference*

## Support for GCC statement expression constructs in XL C compiler

**Description:** A statement expression construct is a GCC extension that is not offered in ISO standard C. This feature enables a compound statement enclosed in parentheses to appear as an expression, which enables the use of loops, switches, and local variables within an expression.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ Language Reference*

## Support for zero-extent array members

**Description:** A zero-extent array is an array with no dimensions. Like a flexible array member, a zero-extent array can be used to access a variable-length object. Unlike a flexible array member, a zero-extent array is not a C99 feature, but is provided for GNU C compatibility.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ Language Reference*

## MVS version of dbgld command is introduced

**Description:** The CDADBGLD utility is the MVS batch equivalent of the dbgld command and can be used in batch mode instead of using z/OS UNIX System Services. The compiler creates a debug side file for each compilation unit if the DEBUG compiler option is specified. The path names or data set names of all the debug side files are then stored in the module, which is an executable file or a DLL. The CDADBGLD utility opens all of the debug side files associated with the module and store all of the functions, global variables, external types, and source files in a module map. The performance of the debugger, especially the start time, is designed for significant improvement if the CDADBGLD utility is executed before the execution of a debugger.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ User's Guide*
- *z/OS XL C/C++ Messages*

## Full support for MVS linkage conventions is enabled

**Description:** CICS Transaction Server for z/OS V4R1 adds full support for MVS Linkage conventions, which will relax the requirement for C/C++ users to use the FLOAT(AFP(VOLATILE)) option when compiling floating point code to be used in the CICS environment.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS XL C/C++ User's Guide*

## Standard C++ Library enhancements

**Description:** The Standard C++ Library Reference includes information on feature enhancements, which are based in part on the ISO document ISO/IEC TR 19768 -- Technical Report on C++ Library Extensions. The enhancements are extensive. Some contribute to existing headers and others take the form of new headers. You may want to take advantage of these improvements to the Standard C++ libraries.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *Standard C++ Library Reference*

### Mixed AMODE across calls

**Description:** The METAL compiler option enables the XL C compiler to support calling an external function with an addressing mode (AMODE) that is different from the default AMODE. This capability supports the creation of METAL C programs that require AMODE switching across functions.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS XL C/C++ User's Guide*
- *z/OS Metal C Programming Guide and Reference*

### Standard C++ Library enhancements

**Description:** The *Standard C++ Library Reference* includes information on feature enhancements, which are based in part on the ISO document ISO/IEC TR 19768 -- Technical Report on C++ Library Extensions. You may want to take advantage of these improvements to the Standard C++ libraries.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *Standard C++ Library Reference*

### dbgld utility – Create a module map for debugging

**Description:** The z/OS XL C/C++ compiler creates a .dbg file for each compilation unit if the DEBUG compiler option is specified. The path names of all the .dbg files are then stored in the module, which is an executable file or a DLL. The **dbgld** command opens all of the .dbg files associated with the module and stores all of the functions, global variables, external types, and source files in a single module map file with a .mdbg extension. In addition, the contents of all the .dbg files are packaged together into this same .mdbg file. Debuggers that support demand load can use the .mdbg file for faster access to debug information.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS XL C/C++ User's Guide*

### Saved option string

**Description:** The Saved Option String feature provides a compact representation of compiler options. The XL C/C++ compiler saves the options used to compile each source file and creates the saved option string in the executable for each compilation unit. In addition to the saved option string, the compiler will also record version information for all compiler components that were active during the compilation.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS XL C/C++ Programming Guide*

## SQL co-processor enhancements

**Description:** z/OS V1R10 XL C/C++ adds support for the following:

- DFP type host variable
- SQL\_VARBINARY\_INIT, SQL\_BLOB\_INIT, SQL\_CLOB\_INIT and SQL\_DBCLOB\_INIT function-like macros, which facilitate initialization of SQL structures

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS XL C/C++ User's Guide*

## Source listing enhancements

**Description:** The z/OS V1R10 XL C/C++ compiler adds the starting offset of each function to the listing when the OFFSET option is specified.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS XL C/C++ User's Guide*

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## Common Information Model (CIM) new functions to consider

This topic describes new Common Information Model (CIM) functions in z/OS.

### Tracing

**Description:** To facilitate the control of the CIM server, you can record tracing messages in a file, display them on the z/OS Comm system logger (syslog) daemon, or dump them to memory.

In addition, you can combine the tracing messages and the logging messages to a single message stream.

- With z/OS V1R11, the trace levels have been redefined. In addition to the former functionality, they now allow to
  - Set tracing on and off
  - Configure method enter and exit tracing messages
- The new property *traceFacility* allows to specify the destination of the tracing messages:
  - A fully qualified filename (in combination with the new property *traceFilePath*)
  - The logging facility (in combination with the property *logLevel*)
  - Memory (in combination with the new property *traceMemoryBufferKbytes*)
- The new trace component LogMessages routes the logging messages into the tracing message stream.
- The new default for *traceComponents* is ALL, which enables tracing for all components.
- The new default for *traceLevel* is 2, which means that basic flow trace messages are issued.

**When change was introduced:** z/OS V1R11.

**Reference information:**

## Common Information Model

- *z/OS Common Information Model User's Guide*

### IPv6 support

**Description:** CIM now supports IPv6.

**When change was introduced:** z/OS V1R11.

**Reference information:** None.

### New property

**Description:** The new z/OS specific property *sequentialReleaseNumber* returns the release number of the operating system as an ever increasing number.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Common Information Model User's Guide*

## Support of CIM Schema version 2.13

**Description:** The CIM server now supports CIM Schema version 2.13.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Common Information Model User's Guide*

## Running providers under a designated user context

**Description:** Until now, providers were always processed in the context of the user ID of a request. The provider ran under the identity of the requestor's user ID, and resource access authorization occurred against this user ID. So the requestor was required to be authorized for all resources that a provider was accessing when it processed a request.

Starting with z/OS V1R10, you can process a provider alternatively in the context of a designated user ID. The designated user ID specifies a separate security context which is used to process the provider.

The properties `UserContext` and `DesignatedUserContext` of CIM class `PG_ProviderModule` specify the provider's processing context.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Common Information Model User's Guide*

## Audit logging with SMF records

**Description:** The CIM server is using the application ID `CFZAPPL` for authentication. This applies when using `PassTickets` and authorization check of the `SAF APPL` class.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Common Information Model User's Guide*

## MODIFY console command

**Description:** Starting with z/OS V1R10 the CIM server configuration can be changed from the z/OS system console using the MODIFY command.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Common Information Model User's Guide*

## Application ID CFZAPPL for authentication

**Description:** The CIM server is using the application ID CFZRCUST for authentication. This applies in using PassTickets and authorization check of the SAF APPL class.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Common Information Model User's Guide*

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## Communications Server new functions to consider

This topic describes new Communications Server functions in z/OS.

### Application integration, data consolidation, and standards

**Description:** z/OS Communications Server improves application integration, data consolidation, and standards in the following areas:

- **New SMTP client for sending Internet mail** - A new mail-forwarding SMTP client application called Communications Server SMTP (CSSMTP) is introduced. CSSMTP processes spool files on the JES spool data set that contain mail messages and forwards the mail messages to target message transfer agents (MTAs) without resolving each recipient.
- **FTP access to UNIX named pipes** - FTP can transfer files to or from z/OS UNIX System Services named pipes.
- **FTP large-volume access** - FTP reports can display space statistics for volumes.
- **FTP passive mode enhancements** - The FTP client supports a new configuration option, PASSIVEIGNOREADDR. This option causes the z/OS FTP client to ignore the IP address in the PASV reply when it is establishing a data connection to the FTP server. Instead, the z/OS FTP client uses the IP address it used to log into the FTP server and the port number from the PASV reply to establish the data connection.
- **Customizable pre-logon banner for otelnetd** - The z/OS UNIX Telnet server (otelnetd) provides a new banner page that can be displayed prior to the login prompt when a user connects to the server.
- **Remote execution server enhancements** - The MVS remote execution server improves the availability of the MVS remote execution server by polling JES for the status of jobs that are flagged as residing on the spool when the internal job name table is almost full. Job names representing jobs that have been purged become available for reuse. The polling function is not related to the setting of the PURGE parameter.

- **TN3270 support of TSO logon reconnect** - In conjunction with TSO/E, z/OS Communication Server provides support for logon reconnect when the LOGONHERE parameter is correctly defined in SYS1.PARMLIB member IKJTSOxx. The logon reconnect will takeover the original TSO session even when the original TSO session is not disconnected.
- **IPv6 stateless address autoconfiguration enhancements** - A client application can use IPv6 temporary addresses that were automatically configured and that were generated from a random interface ID to address security and privacy concerns identified by RFC 4941, *Privacy Extensions for Stateless Address Autoconfiguration in IPv6*. The use of temporary addresses with random and changing interface IDs embedded in the address makes it more difficult for eavesdropping software to correlate independent transactions that use different IPv6 addresses that were automatically configured but that involve the same z/OS system.
- **New API to obtain IPv4 network interface MTU** - Applications can determine the MTU (maximum transmission unit) for a TCP/IP stack IPv4 interface using a new programming interface ioctl.
- **RFC 5095 deprecation of IPv6 type 0 route header** - TCP/IP is modified to deprecate support for IPv6 type 0 routing headers. The reason for this deprecation is described in RFC 5095.

**When change was introduced:** z/OS V1R11.

**Reference information:** See the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- New SMTP client for sending Internet mail
- FTP access to UNIX named pipes
- FTP large-volume access
- FTP passive mode enhancements
- Customizable pre-logon banner for otelnetd
- Remote execution server enhancements
- TN3270 support of TSO logon reconnect
- IPv6 stateless address autoconfiguration enhancements
- New API to obtain IPv4 network interface MTU
- RFC 5095 deprecation of IPv6 type 0 route header

## Availability and business resilience

**Description:** z/OS Communications Server improves availability and business resilience in the following areas:

- **Improved responsiveness to storage shortage conditions** - TCP/IP and OMPROUTE processing is improved to help relieve storage shortages.
- **Disable moving DVIPA as source IP address** - The TCPSTACKSOURCEVIPA function is enhanced to prevent the stack from using dynamic virtual IP addresses (DVIPAs) in MOVING state as source IP addresses.
- **Support for enhanced WLM routing algorithms** - Server-specific workload manager (WLM) recommendations are enhanced. The recommendations are used by the sysplex distributor to balance workload when DISTMETHOD SERVERWLM is configured on the VIPADISTRIBUTE statement.

**When change was introduced:** z/OS V1R11.

**Reference information:** See the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- Improved responsiveness to storage shortage conditions
- Disable moving DVIPA as source IP address
- Support for enhanced WLM routing algorithms

## Scalability, performance, constraint relief, and accelerators

**Description:** z/OS Communications Server improves scalability, performance, constraint relief, and accelerators in the following areas:

- **accept\_and\_receive API enhancements** - The accept\_and\_recv socket API includes significant enhancements.
- **TCP/IP support for system z10 hardware instrumentation** - TCP/IP uses the z/OS MVS CSVDYLP service to load its load modules.
- **TCP/IP pathlength improvements** - The TCP layer is updated to detect and react transparently to two common sockets programming errors. The two cases that Communications Server now guards transparently against are traffic stalls caused by Nagle algorithms and delayed TCP acknowledgements and deadlock caused by insufficient TCP receive buffer size.
- **TCP throughput improvements for high-latency networks** - Performance is improved for inbound streaming TCP connections over networks with large bandwidth and high latency by automatically tuning the ideal window size for such TCP connections.
- **Virtual storage constraint relief** - Some data areas that map socket connections from ECSA to storage that is above the 2-gigabyte threshold are moved to provide additional common storage (ECSA) constraint relief; the ECSA storage reduction is directly proportional to the number of open sockets.
- **NSS private key and certificate services for XML appliances** - Network security services (NSS) is enhanced to improve XML appliance security as a logical extension of z/OS security.
- **Enterprise Extender IPsec performance improvements** - IP processing optimizes the Enterprise Extender (EE) path length when EE is protected by IPsec, as well as makes better use of zIIP processors for systems that are configured to use zIIPs.
- **Resolver DNS cache** - The resolver can use system-wide caching of domain name server (DNS) responses. The system resolver cache can be used to eliminate redundant network flows to DNS servers, which can provide significant performance improvements for z/OS workloads that perform repetitive resolver queries.
- **Sysplex autonomics improvements for FRCA** - The accuracy of the server efficiency factor (SEF) for server applications using the Fast Response Cache Accelerator (FRCA) function with persistent HTTP connections is improved.
- **QDIO routing accelerator** - The QDIO routing accelerator function provides accelerated forwarding at the DLC layer when the packets are flowing over any inbound OSA-Express QDIO or HiperSockets and outbound OSA-Express QDIO or HiperSockets DLC combination.
- **Sysplex distributor connection routing accelerator** - The QDIO accelerator provides accelerated forwarding of packets that the sysplex distributor forwards to a target stack when the packets are flowing over one of the above inbound and outbound DLC combinations.
- **Sysplex distributor optimization for multi-tier z/OS workloads** - An optimization is provided so that if sysplex distributor is also being used as the

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load balancer for the tier 1 server applications, the tier 1 sysplex distributor can have visibility into both tiers of the z/OS server applications on a given system when making a load balancing decision on an incoming tier 1 connection request. When using WLM based recommendations, this optimization allows sysplex distributor to compute a composite WLM weight for each system that includes the capacity, performance, and health characteristics of both the tier 1 server applications and the tier 2 server applications.

- **Sysplex distributor support for DataPower** - Sysplex distributor is enhanced to provide workload balancing capabilities for IBM WebSphere DataPower appliances.
- **OSA-Express3 optimized latency mode** - An OSA-Express3 device can operate in optimized latency mode, which optimizes interrupt processing for both inbound and outbound data. When an OSA-Express3 device is operating in optimized latency mode, latency is decreased and throughput is increased, particularly for interactive, non-streaming workloads.

**When change was introduced:** z/OS V1R11.

**Reference information:** See the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- accept\_and\_receive API enhancements
- TCP/IP support for system z10 hardware instrumentation
- TCP/IP pathlength improvements
- TCP throughput improvements for high-latency networks
- Virtual storage constraint relief
- NSS private key and certificate services for XML appliances
- Enterprise Extender IPsec performance improvements
- Resolver DNS cache
- Sysplex autonomies improvements for FRCA
- QDIO routing accelerator
- Sysplex distributor connection routing accelerator
- Sysplex distributor optimization for multi-tier z/OS workloads
- Sysplex distributor support for DataPower
- OSA-Express3 optimized latency mode

## Security

**Description:** z/OS Communications Server improves security in the following areas:

- **IPSec enhancements** - The Internet Key Exchange (IKE) daemon's retransmission scheme better conforms to RFC 2408. Rather than using fixed intervals for IKE message retransmission, the daemon uses a geometrically increasing retransmission interval. Some fine-grained attributes are reported in the **ipsec** command reports as well as in the Network Management Interface (NMI) and System Monitoring Facility (SMF) records.
- **AT-TLS enhancements** - AT-TLS supports the System SSL functions that have been added since z/OS Communications Server V1R7.

**When change was introduced:** z/OS V1R11.

**Reference information:** See the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- IPsec enhancements
- AT-TLS enhancements

## Simplification and consumability

**Description:** z/OS Communications Server improves simplification and consumability in the following areas:

- **Configuration Assistant enhancements** - The following list identifies the new Configuration Assistant functions:
  - Configure the Policy Agent configuration file
  - Configure the Defense Manager Daemon (DMD)
  - Configure the base location
  - Customize EBCDIC codepage support
  - Set up Policy Agent tasks
  - Install an **all files** option
  - Notify the administrator when configuration data is changed
- **syslogd enhancements** - The internal structure of syslog daemon (syslogd) provides more efficient processing of log messages. The syslogd job name matches the name of the cataloged procedure, and a set of operator commands starts, stops, and controls the daemon. The syslog daemon also performs automatic archival of z/OS UNIX files, based on configurable options.
- **syslogd browser and search facilities** - An ISPF-based syslog daemon browser application is available. The browser supports browsing and searching active syslogd files (the files to which syslogd currently writes) and syslogd archive data sets that were created using the new syslogd archival function.
- **Policy infrastructure management enhancements** - The Policy Agent provides monitoring and automatic start and restart for the following set of related applications:
  - Defense manager daemon (DMD)
  - Internet key exchange daemon (IKED)
  - Network security services daemon (NSSD)
  - syslog daemon (syslogd)
  - Traffic regulation management daemon (TRMD)

A variety of EBCDIC code pages are supported for the configuration files and policy definition files for the following applications:

- Policy Agent
- syslogd
- IKED
- NSSD
- DMD
- **MVS console support for select TCP/IP commands** - Support is added for using selected z/OS UNIX shell commands from the MVS console, the TSO environment, and from NetView. The z/OS UNIX shell commands are supported by a new EZACMD command. The following z/OS UNIX shell commands are supported from the MVS console, TSO, and NetView: **trmdstat**, **ipsec**, **nssctl**, and **pasearch**. In addition, the z/OS UNIX **ping** command is supported from the MVS console and NetView.

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- **IBM Health Checker for z/OS DNS server check** - A new z/OS Health Checker for z/OS migration health check is provided to help determine if you are using the BIND9 DNS server on your system.

**When change was introduced:** z/OS V1R11.

**Reference information:** See the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- Configuration Assistant enhancements
- syslogd enhancements
- syslogd browser and search facilities
- Policy infrastructure management enhancements
- MVS console support for select TCP/IP commands
- IBM Health Checker for z/OS DNS server check

## SNA and Enterprise Extender

**Description:** z/OS Communications Server improves SNA and Enterprise Extender (EE) in the following areas:

- **Display potential model application name** - The DISPLAY MODELS command can identify which application model definition will be used to build a dynamic application definition. You can use the DISPLAY MODELS command to prevent dynamic application definitions from being built incorrectly.
- **Include data space VIT with INOP dump** - The VTAM INOP dump processing automatically captures the VTAM internal trace (VIT) data space (ISTITDS1) in the dump when the VIT data space is in use.
- **HPR performance enhancements** - High performance routing (HPR) performance is enhanced in the following ways:
  - A new progressive mode adaptive rate-based (ARB) pacing algorithm increases performance in virtualized or CPU-constrained environments.
  - Unproductive path switches are reduced or eliminated when an HPR endpoint is unresponsive.
  - ECSA and CSM storage utilization of HPR control blocks is reduced.
  - CPU usage may be reduced when packet loss occurs.
- **APPN topology database update enhancements** - APPN topology database update (TDU) processing is enhanced in the following ways:
  - TDUs might include unknown topology control vectors when they are sent to a partner network node that supports the receipt of unknown vectors. Unknown topology vectors are not sent to a partner network node that does not have this support. Previously, unknown topology control vectors were not included in TDUs sent to any partner network nodes if at least one partner network node did not support the receipt of unknown vectors. Any topology control vectors added since the original APPN architecture are considered to be unknown vectors.
  - Serviceability enhancements aid in the identification of the network nodes involved in a TDU war, which is the endless exchange of TDUs in contention over the same topology resource that results in continuous performance degradation of the APPN network.
- **Provide ACF/TAP as part of z/OS Communications Server** - z/OS V1R11 Communications Server includes Advanced Communications Function/Trace Analysis Program (ACF/TAP). ACF/TAP was previously included only as part of

the Advanced Communications Function/System Support Program (ACF/SSP) product. ACF/TAP provides a full set of functions to format trace information, including VTAM buffer traces, VTAM internal traces, and NCP traces.

**When change was introduced:** z/OS V1R11.

**Reference information:** See the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- Display potential model application name
- Include data space VIT with INOP dump
- HPR performance enhancements
- APPN topology database update enhancements
- Provide ACF/TAP as part of z/OS Communications Server

## System management and monitoring

**Description:** z/OS Communications Server improves system management and monitoring in the following areas:

- **IBM Health Checker for z/OS RFC 4301 compliance** - A new z/OS Health Checker for z/OS migration health check is provided. This migration health check helps you determine whether IPsec filter rules that are not in compliance with RFC 4301 are active on your current systems. The check also provides guidance on the migration procedures and options available to migrate such IPsec filter rules to become compliant with RFC 4301.
- **Network management enhancements** - z/OS V1R11 Communications Server enhances its network management functions to provide the following information:
  - **Stack configuration data** - TCP/IP stack profile information is provided in a new SMF 119 event record. The same information is also provided in response to a new GetProfile request for the TCP/IP Callable NMI.
  - **SNA network management interface enhancements for detailed CSM usage** - The SNA NMI in z/OS V1R11 Communications Server provides additional storage ownership statistics in response to the CSM statistics request. You can request all ownership statistics or a subset of statistics that is based on ASID values.
  - **OSA network traffic analyzer data** - The OSA-Express network traffic analyzer trace facility provides real time trace collection similar to the SYSTCPIP packet trace collection.
  - **Sysplex networking data** - The TCP/IP Callable NMI, EZBNMIFR provides sysplex networking data. It has new request types.
- **Verbose ping** - The Verbose/-v parameter causes the Ping command to display details of the echo reply packets that have been received, and summary statistics regarding the echo packets (number of requests sent, number of replies received, and number of packets lost), and the round-trip times (minimum, maximum, average, and standard deviation) based on the response times from the echo replies that were received.

**When change was introduced:** z/OS V1R11.

**Reference information:** See the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- IBM Health Checker for z/OS RFC 4301 compliance

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- Stack configuration data
- SNA network management interface enhancements for detailed CSM usage
- OSA network traffic analyzer data
- Sysplex networking data
- Verbose Ping

## Virtualization

**Description:** z/OS Communications Server enhances virtualization in the following areas:

- **QDIO enhancements for WorkLoad Manager IO priority** - A new WLMRIORITYQ parameter is provided on the GLOBALCONFIG profile statement. You can use this parameter to establish a mapping of Workload Manager (WLM) service class importance levels to outbound Queued Direct I/O (QDIO) priorities for data with the value 0 for an IPv4 type of service byte or for an IPv6 traffic class. This mapping is used to determine the QDIO write priority for outbound packets. This function automatically extends the preferential treatment of the most important workloads for a business through the QDIO device driver all the way to the LAN.
- **QDIO support for OSA interface isolation** - z/OS V1R11 Communications Server enables a stack that is using an OSA-Express feature to prevent packets from flowing directly between two stacks that are sharing the OSA device. This is called connection isolation and when it is in effect, the OSA-Express feature discards packets whose next-hop address was registered by a sharing stack.

**When change was introduced:** z/OS V1R11.

**Reference information:** See the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- QDIO enhancements for WLM IO priority
- QDIO support for OSA interface isolation

## IP Services: Performance improvements

**Description:** z/OS Communications Server improves performance in the following areas:

- **TCP/IP performance improvements** - The TCP/IP data path has improved pathlength and scalability, and it provides virtual storage constraint relief. In addition, the UDP layer is enhanced to enable more efficient processing of incoming datagrams when an application has multiple threads concurrently reading datagrams from the same datagram socket.
- **IPSec cryptography performance improvements** - IPSec processing provides reduced CPU use and latency.
- **TN3270E Telnet server ECSA reduction** - z/OS Communications Server reduces the CSA/ECSA storage requirements for TN3270E Telnet Server receive processing. This function is also available for SNA.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- TCP/IP performance improvements

- IPSec cryptography performance improvements
- TN3270E Telnet server ECSA reduction

## IP Services: Security

**Description:** z/OS Communications Server improves security in the following areas:

- **DataPower integration with NSS SAF access service** - IBM DataPower Service Oriented Architecture (SOA) appliances are network devices that simplify, help to secure, and accelerate your XML and Web services deployments while extending your SOA infrastructure. XML appliances also secure and accelerate the parsing and transformation of many message formats, including XML-based messages.

z/OS network security services (NSS) adds a new XMLAppliance discipline that provides the basic infrastructure for XML appliance security as it acts as a logical extension of z/OS security. The new discipline adds the XMLAppliance SAF access service to the NSS server and it provides the capability to invoke a selected set of SAF functions on behalf of its clients. Essentially, NSS becomes the conduit for making remote SAF calls. By connecting as an NSS client, IBM DataPower SOA appliances can access these SAF functions as part of their security offerings.

A network administrator can monitor the different types of NSS clients and the associated client connections using the new `nssctl` command. Each type of NSS client appears in the client listing, with pertinent information such as their NSS discipline, the services they are accessing, name, connection state, connection time, the time of the last message received, and the services they have selected and enabled.

- **Defensive filtering** - You can use an enhanced z/OS UNIX `ipsec` command to add and manage defensive filters on a local system.
- **Allow routed traffic in default filter policy** - You can permit local and routed traffic with the default filter policy.
- **IPSec RFC currency** - IPSec RFC currency implements the mandatory support that is required by RFCs 4301, 4302, 4303, 4304, 4305, 4308, and 4835 with the exception of the requirements that depend on Internet Key Exchange version 2 (IKEv2).

Enhancements to virtual private network (VPN) support for mobile users allow identification by Internet Key Exchange (IKE) identity rather than IP address. IP filtering controls and handling of packets in VPN tunnels are improved in accordance with the new standards. You can restrict VPN tunnel negotiation parameters to limit the data addresses that an IKE peer can protect.

- **Enhanced port access control** - You can use the PORT profile statement to control application access to port numbers that are not reserved by a PORT or PORTRANGE statement.
- **Enhanced rpcbind application registration control** - You can define a SERVAUTH resource profile that controls which applications or users can register and unregister with rpcbind. In addition, rpcbind is supported in a multilevel secure (MLS) environment.
- **FTP security enhancements** - You can use enhanced FTP server logins.
- **TLS/SSL enablement for Load Balancing Advisor** - You can secure and control access to all communications with the Load Balancing Advisor using TLS/SSL technologies. You can authenticate external load balancers, z/OS Load Balancing Agents, and ADNR clients that are connecting to the Load Balancing Advisor using client certificates, and you can perform access control checks using SAF-compliant security product profiles. You can use the AT-TLS feature of

the Communications Server to obtain the TLS/SSL support for the Load Balancing Advisor, Agents, and the ADNR function.

- **Remove support of traffic regulation policy in Policy Agent** - z/OS Communications Server does not support the traffic regulation (TR) policy as part of the Quality of Service (QoS) policy type. The TR policy function is still available, but only as part of the Intrusion Detection Services (IDS) policy type. See IP Services: Migrate from QoS TR policy to IDS TR policy in *z/OS Migration* for migration information.
- **Security options for centralized policy server connections** - z/OS Communications Server enhances the Policy Agent to allow connections between the policy client and policy server to be established without using SSL or AT-TLS.
- **Autolog support for AT-TLS dependent application** - You can delay the start of a procedure until after AT-TLS services are available or until dynamic VIPA processing is completed, or both.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- DataPower integration with NSS SAF access service
- Defensive filtering
- Allow routed traffic in default filter policy
- IPsec RFC currency
- Enhanced port access control
- Enhanced rpcbind application registration control
- FTP security enhancements
- TLS/SSL enablement for Load Balancing Advisor
- Remove support of traffic regulation policy in Policy Agent
- Security options for centralized policy server connections
- Autolog support for AT-TLS dependent applications

The following documents also contain reference information:

- *z/OS Communications Server: IP Configuration Reference*
- *z/OS Communications Server: IP Configuration Guide*
- *z/OS Migration*
- *z/OS Communications Server: IP System Administrator's Commands*
- *z/OS Communications Server: IP Programmer's Guide and Reference*
- *z/OS Security Server RACF Command Language Reference*
- *z/OS Communications Server: IP User's Guide and Commands*
- IBM Configuration Assistant for z/OS Communications Server online helps
- *z/OS Security Server RACF Security Administrator's Guide*

## IP Services: Business resiliency

**Description:** z/OS Communications Server improves business resiliency in the following areas:

- **TN3270E Telnet server LU name coordination in a sysplex** - The TN3270E Telnet server provides shared LU name management among a group of servers that are running on the same system or in the same Telnet subplex in a sysplex. With this enhancement, one TN3270E Telnet server in the group acts as an LU

name server and allocates shared LU names to other TN3270E Telnet servers in the group. Load balancing across multiple TN3270E Telnet servers that have consistent configurations is possible.

- **Subplex support for Load Balancing Advisor** - z/OS Communications Server enhances the Load Balancing Advisor and Load Balancing Agent function so they can participate in a sysplex subplexing environment. You can configure Load Balancing Advisors and Agents for each subplex group in the sysplex.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- TN3270E Telnet server LU name coordination in a sysplex
- Subplex support for Load Balancing Advisor

The following documents also contain reference information:

- *z/OS Communications Server: IP Configuration Reference*
- *z/OS Communications Server: IP Configuration Guide*
- *z/OS Communications Server: IP System Administrator's Commands*
- *z/OS MVS Setting Up a Sysplex*

## IP Services: Hardware related enhancements

**Description:** z/OS Communications Server introduces hardware related enhancements in the following areas:

- **INTERFACE statement support for QDIO** - You can use the INTERFACE statement in the TCP/IP profile to configure IPv4 definitions for OSA-Express QDIO rather than using DEVICE/LINK/HOME.
- **Multiple VLAN support** - You can configure multiple VLANs from the same TCP/IP stack for a single OSA-Express feature.
- **HiperSockets multiple write facility** - A HiperSockets interface can move multiple buffers of data using a single write operation. CPU usage is reduced and there is a performance improvement for outbound (from z/OS) streaming-type workloads, such as FTP transfers, where bulk data is transferred at high rates.
- **OSA-Express3 multi-port support** - z/OS Communications Server introduces support for the OSA-Express3 features available with an IBM® System z9® Enterprise Class (z10 EC).

This support includes the following:

- Multiple port support per Channel path ID (CHPID); you can use all the QDIO ports available on an OSA-Express3 CHPID.
- Transparent error handling enhancements, which provide more direct and efficient I/O processing.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- INTERFACE statement support for QDIO
- Multiple VLAN support
- HiperSockets multiple write
- OSA-Express3 multi-port support

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The following documents also contain reference information:

- *z/OS Communications Server: IP Configuration Reference*
- *z/OS Communications Server: IP System Administrator's Commands*
- *z/OS Communications Server: SNA Resource Definition Reference*
- *z/OS Communications Server: SNA Operation*
- *z/OS MVS Planning: Workload Management*
- *z/OS RMF Report Analysis*
- *z/OS MVS System Management Facilities (SMF)*
- *z/OS MVS Initialization and Tuning Reference*

## IP Services: Consumability in z/OS V1R10

**Description:** z/OS Communications Server enhances consumability in the following areas:

- **Configuration Assistant: Import of policy configuration data** - In z/OS Communications Server, the Policy Agent provides configuration file import services for the IBM Configuration Assistant for z/OS Communications Server. The Configuration Assistant uses the Policy Agent to read and validate one or more configuration files. The Configuration Assistant imports the resulting policies into a new or existing configuration. You can use the imported policies in the Configuration Assistant and you can save the new configuration for the Policy Agent.
- **Configuration Assistant: IP address groups** - You can collect IP addresses, subnets, and IP address ranges into named address groups. You can also specify IP address groups, subnets, or ranges as security endpoints on IPsec key exchange policies.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- Configuration Assistant: Import of policy configuration data
- Configuration Assistant: IP address groups

The following documents also contain reference information:

- *z/OS Communications Server: IP Configuration Reference*
- *z/OS Communications Server: IP Configuration Guide*
- Configuration Assistant Help System
- The Policy Data Import tutorial that the Configuration Assistant provides

## IP Services: Middleware enablement

**Description:** z/OS Communications Server provides middleware enablement in the following areas:

- **Network management interface (NMI) enhancements** - z/OS Communications Server provides new SMF119 records for IP security. It also enhances the EZBNMIFR NMI so that it collects timestamps for messages that are in queues. FTP application data is available to NMI application programs through the EZBNMIFR programming interface.
- **FRCA cache enhancements for WebSphere Application Server** - The FRCA function for high-speed web serving is enhanced to support a shared cache. The FRCA function has also been extended to support web traffic being carried on an IPv6 network (FRCA in previous releases was limited to IPv4 traffic).

- **SNMP enhancements** - The SNMP support for IPv6 management data is upgraded from the IETF internet draft version of the MIB modules to the RFC version. Interface state change notification changes and Agent z/OS UNIX connection changes are also provided.
- **Socket API timeout support** - Applications can use two new socket API options to indicate the amount of time that receive- and send-type socket API calls wait for their operations to complete.
- **Optimize asynchronous socket receive use of 64-bit shared memory** - Applications using the optimized Asynchronous Socket I/O option of z/OS UNIX System Services (designated by the AioCommBuff bit in the AIOCB) can use 64-bit shared memory objects. Applications are no longer constrained by 31-bit addressability because they can use buffers residing in 64-bit shared memory objects on the BPX4AIO callable service for receive processing, but still retain the performance benefits that the AioCommBuff option provides.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using this function:

- Network management interface enhancements
- FRCA cache enhancements for WebSphere Application Server
- SNMP enhancements
- Socket API timeout support
- Optimize asynchronous socket receive use of 64-bit shared memory

The following documents also contain reference information:

- *z/OS Communications Server: IP Configuration Reference*
- *z/OS Communications Server: IP Configuration Guide*
- *z/OS Communications Server: IP Programmer's Guide and Reference*
- *z/OS Communications Server: IP System Administrator's Commands*
- *z/OS Communications Server: IP Sockets Application Programming Interface Guide and Reference*
- *z/OS Communications Server: IP CICS Sockets Guide*
- *z/OS Communications Server: IP IMS Sockets Guide*
- *z/OS XL C/C++ Run-Time Library Reference*
- *z/OS UNIX System Services Programming: Assembler Callable Services Reference*

## IP Services: RAS and customer satisfaction

**Description:** z/OS V1R10 Communications Server provides reliability, availability, serviceability (RAS) and other customer enhancements in the following areas:

- **Path MTU discovery for Enterprise Extender** - Path MTU discovery for Enterprise Extender (EE) enables VTAM to dynamically determine any MTU size changes that are associated with IPv4 and IPv6 EE connections in the IP network. VTAM can segment the HPR data to avoid IP packet fragmentation.
- **IBM Health Checker for z/OS enhancements** - z/OS Communications Server TCP/IP provides one additional IBM Health Checker for z/OS check. In a Common INET (CINET) environment, the new check determines whether the port range specified by the INADDRANYPORT and INADDRANYCOUNT parameters in the BPXPRMxx parmlib member are reserved for OMVS on the TCP/IP stack.
- **NETSTAT enhancements** - z/OS Communications Server provides several enhancements to the DISPLAY TCPIP,,NETSTAT command.

- **OMPROUTE enhancements** - OMPROUTE is enhanced to process INCLUDE statements in the OMPROUTE configuration file. It is also enhanced to detect and avoid futile neighbor state loops with designated routers that are not responding based on interfaces used to reach those routers.
- **Diagnostic enhancements for TCP/IP host name configuration problems** - A new message, EZZ0162I, is issued when TCP/IP is started. It contains the host name of the associated stack.
- **IPCS formatter enhancements** - z/OS Communications Server introduces a serviceability enhancement to the TCP/IP dump formatter, TCPIPCS, so that you can format additional summaries and reports, including in-flight recorders.
- **Data trace enhancements** - z/OS Communications Server enhances socket data tracing (DATTRACE) to allow filtering by port number. A new PORTNUM parameter is supported on the VARY TCPIP,,DATTRACE command that you can use to trace only packets that have a source or destination port that matches a specific port number.
- **Packet trace enhancements** - The TCP/IP stack's packet trace function can record inbound packets that are discarded by the stack. You can filter packet trace collection and formatting by discard reason codes. The TCP/IP intrusion detection services trace can also capture and format discarded packets, and allow filtering by discard reason code. In addition, you can format SNA packets received through any of the TCP/IP services traces. You can format any SNA traffic collected by the OSA-Express Network Traffic Analyzer, packet trace, data trace, or Intrusion Detection Services trace.
- **TCP/IP SMF record enhancements** - z/OS Communications Server provides new storage statistics for the several management interfaces. This improves monitoring and tuning of TCPIP storage usage.
- **Allow DNS BIND 9 server to run with BPX.SUPERUSER authorization** - z/OS Communications Server permits the DNS BIND 9 name server application to be started with a nonzero UID if the user ID associated with the BIND 9 name server is permitted access to the BPX.SUPERUSER class profile.
- **ASID reuse for TCP/IP, TN3270E, and resolver** - You can start the TCP/IP and Telnet address spaces as reusable ASIDs by specifying REUSASID=YES on the START command.
- **Resolver support for EDNS0** - Using Extension Mechanisms for DNS (EDNS0) protocols, the z/OS resolver accepts DNS response messages in UDP packets that are up to 3072 bytes in length, compared to the previous maximum of 512 bytes.
- **FTP enhancements** - One FTP enhancement is related to security; you can use enhanced FTP server logins. Other FTP enhancements include the following:
  - FTP application data enhancements
  - FTP client API for Java
  - FTP JES enhancements
  - FTP batch pipe subsystem enhancements
  - FTP and MVS data set contention enhancements
  - FTP keepalive enhancements

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using the functions:

- Path MTU discovery for Enterprise Extender

- IBM Health Checker for z/OS enhancements
- Netstat enhancements
- OMPROUTE enhancements
- Diagnostic enhancements for TCP/IP host name configuration problems
- IPCS formatter enhancements
- Data trace enhancements
- Packet trace enhancements
- TCP/IP SMF record enhancements
- Allow DNS BIND 9 server to run with BPX.SUPERUSER authorization
- ASID reuse for TCP/IP, TN3270E, and resolver
- Resolver support for EDNS0
- FTP application data enhancements
- FTP client API for Java
- FTP JES enhancements
- FTP batch pipe subsystem enhancements
- FTP and MVS data set contention enhancements
- FTP keepalive enhancements

The following documents also contain reference information:

- *z/OS Communications Server: IP Configuration Reference*
- *z/OS Communications Server: IP Configuration Guide*
- *z/OS Communications Server: IP Programmer's Guide and Reference*
- *z/OS Communications Server: IP System Administrator's Commands*
- *z/OS Communications Server: SNA Resource Definition Reference*
- *z/OS Communications Server: SNA Operation*
- *IBM Health Checker for z/OS: User's Guide*
- *z/OS Communications Server: IP Messages Volume 4 (EZZ, SNM)*
- *z/OS Communications Server: IP Diagnosis Guide*
- *z/OS MVS IPCS Commands*
- *z/OS UNIX System Services Planning*
- *z/OS MVS Initialization and Tuning Reference*
- *z/OS MVS System Commands*
- *z/OS Communications Server: IP User's Guide and Commands*
- *z/OS Communications Server: IP and SNA Codes*
- *SmartBatch BatchPipeWorks Reference*
- *SmartBatch BatchPipeWorks User's Guide*

## SNA Services: Path MTU discovery for Enterprise Extender

**Description:** Path MTU discovery for Enterprise Extender (EE) enables VTAM to dynamically learn any MTU size changes that are associated with IPv4 and IPv6 EE connections in the IP network. VTAM can segment the HPR data to avoid IP packet fragmentation.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to Path MTU discovery for Enterprise Extender (for SNA) in *z/OS Communications Server: New Function Summary* for a detailed description, restrictions, dependencies, and steps on using this function.

The following documents also contain reference information:

- *z/OS Communications Server: IP Configuration Reference*

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- *z/OS Communications Server: SNA Resource Definition Reference*
- *z/OS Communications Server: SNA Operation*

### SNA Services: TN3270E Telnet server ECSA reduction

**Description:** z/OS Communications Server reduces the CSA/ECSA storage requirements for TN3270E Telnet Server receive processing.

**When change was introduced:** z/OS V1R10.

**Reference information:** None.

### SNA Services: Extended border node searching enhancement

**Description:** APPN extended border node (EBN) support is enhanced so that you can restrict the searching capability of adjacent non-native nodes without coding a directory services management exit.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to Extended border node searching enhancement in *z/OS Communications Server: New Function Summary* for a detailed description and steps on using this function.

The following documents also contain reference information:

- *z/OS Communications Server: SNA Resource Definition Reference*
- *z/OS Communications Server: SNA Operation*

### SNA Services: TGN parameter for EE model PUs

**Description:** This function adds a transmission group number parameter (the TGN parameter) to the DYNTYPE=EE PU definition statement in the model major node. This helps manage the Enterprise Extender (EE) network and helps diagnose EE connectivity issues.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to TGN parameter for EE model PUs in *z/OS Communications Server: New Function Summary* for a detailed description and steps on using this function.

The following documents also contain reference information:

- *z/OS Communications Server: SNA Resource Definition Reference*
- *z/OS Communications Server: SNA Operation*

### SNA Services: High Performance Routing enhancements

**Description:** High Performance Routing (HPR) is enhanced in the following areas:

- **Stalled HPR pipe termination** - z/OS Communications Server introduces a new modifiable VTAM start option (HPRSTALL) that enables you to limit the length of time that an RTP pipe can remain continuously stalled. If that limit is exceeded, VTAM automatically terminates the RTP pipe and issues a new unsolicited VTAM message (IST2253I) that indicates a timeout occurred.
- **RTP pipe session limit control** - z/OS Communications Server introduces a new High Performance Routing start option (HPRSESLM) that limits the number of sessions that are placed on each Rapid Transport Protocol (RTP) pipe.

Limiting the number of sessions on a single RTP pipe can result in significant performance improvement by allowing concurrent traffic on multiple RTP pipes.

- **Display RTP enhancements** - z/OS Communications Server enhances the DISPLAY RTPS command to help you identify the RTP pipes that have low performance.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the following topics in *z/OS Communications Server: New Function Summary* for detailed descriptions that include any applicable restrictions, dependencies, and steps on using the functions:

- Stalled HPR pipe termination
- RTP pipe session limit control
- Display RTP enhancements

The following documents also contain reference information:

- *z/OS Communications Server: SNA Resource Definition Reference*
- *z/OS Communications Server: SNA Operation*

## SNA Services: MAXLOCAT enhancement

**Description:** The MAXLOCAT start option is enhanced to prevent excessive storage growth when search replies are sent.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the MAXLOCAT enhancement topic in *z/OS Communications Server: New Function Summary* for a detailed description and steps on using the function.

The following documents also contain reference information:

- *z/OS Communications Server: SNA Resource Definition Reference*
- *z/OS Communications Server: SNA Operation*
- *z/OS Communications Server: SNA Network Implementation Guide*

## SNA Services: Start option for CSDUMP triggers

**Description:** A new CSDUMP start option specifies a VTAM message or sense code that triggers a dump of the VTAM address space and current address space, the VTAM Internal Trace dataspace, and optionally a TCP/IP address space. This start option improves serviceability by performing the same function as the existing MODIFY CSDUMP command, but the triggers are effective at VTAM initialization; you do not have to manually issue a command.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the Start option for CSDUMP triggers topic in *z/OS Communications Server: New Function Summary* for a detailed description and steps on using the function.

The following document also contains reference information:

- *z/OS Communications Server: SNA Resource Definition Reference*
- *z/OS Communications Server: SNA Operation*

### SNA Services: TCP/IP performance improvements

**Description:** The SNA data link control support for the TCP/IP data path has improved pathlength and scalability. The PCID and SIGA VTAM Internal Trace (VIT) entries are changed from CIO option entries to CIA option entries. This change provides you with a means of reducing the pathlength of the OSA Express QDIO or HiperSockets data path through VTAM.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the TCP/IP performance improvements topic in *z/OS Communications Server: New Function Summary* for a detailed description and steps on using the function.

The following document also contains reference information:

- *z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT*

### SNA Services: IPCS support of VTAM display commands

**Description:** z/OS V1R10 Communications Server introduces a new TSO operator DNET command that you can use to issue VTAM display commands against a dump and to examine the resulting output directly from the TSO session. This provides information about a dumped system during post-failure problem analysis.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to the IPCS support of VTAM display commands topic in *z/OS Communications Server: New Function Summary* for a detailed description, restrictions, dependencies, and steps on using the function.

The following document also contains reference information:

- *z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures*

### SNA Services: OSA-Express3 multi-port support

**Description:** z/OS V1R10 Communications Server introduces support for the OSA-Express3 features available with an IBM System z10 Enterprise Class (z10 EC).

This support includes the following:

- Multiple port support per channel path ID (CHPID), which enables you to use all the QDIO ports that are available on an OSA-Express3 CHPID.
- Transparent error handling enhancements to provide more direct and efficient I/O processing.

**When change was introduced:** z/OS V1R10.

**Reference information:** Refer to OSA-Express3 multi-port support in *z/OS Communications Server: New Function Summary* for detailed description, dependencies, and steps on using this function.

The following documents also contain reference information:

- *z/OS Communications Server: SNA Resource Definition Reference*
- *z/OS Communications Server: SNA Network Implementation Guide*
- *z/OS Communications Server: SNA Operation*
- *z/OS Communications Server: SNA Messages*

- *System z10, System z9 and zSeries OSA-Express Customer's Guide and Reference*

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## Cryptographic Services new functions to consider

This topic describes new Cryptographic Services functions in z/OS.

### ICSF: Secure key AES support

**Description:** The Advanced Encryption Standard (AES) is a National Institute of Standards and Technology specification for the encryption of electronic data. It is expected to become the accepted means of encrypting digital information, including financial, telecommunications, and government data. AES is the symmetric algorithm of choice, instead of Data Encryption Standard (DES) or Triple-DES, for the encryption and decryption of data. The AES encryption algorithm will be supported with secure (encrypted) keys of 128, 192, and 256 bits.

The secure key approach, similar to what is supported today for DES and TDES, offers the ability to keep the encryption keys protected at all times, including the ability to import and export AES keys, using RSA public key technology.

Support for AES encryption algorithm includes the master key management functions required to load or generate AES master keys, update those keys, and re-encipher key tokens under a new master key.

**When change was introduced:** Cryptographic Support for z/OS V1R8-V1R10 and z/OS.e V1R8 Web deliverable.

**Reference information:**

- *z/OS Cryptographic Services ICSF Overview*
- *z/OS Cryptographic Services ICSF System Programmer's Guide*
- *z/OS Cryptographic Services ICSF Administrator's Guide*
- *z/OS Cryptographic Services ICSF Application Programmer's Guide*

### ICSF: Support for 13-Digit through 19-Digit PAN data

**Description:** Credit card companies sometimes perform card security code computations based on Personal Account Number (PAN) data. Currently, ICSF callable services CSNBCSV (VISA(TM) CVV Service Verify) and CSNB CSG (VISA CVV Service Generate) are used to verify and to generate a VISA Card Verification Value (CVV) or a MasterCard Card Verification Code (CVC). The ICSF callable services currently support 13, 16, and 19-digit PAN data. To provide additional flexibility, new keywords PAN-14, PAN-15, PAN-17, and PAN-18 are implemented in the rule array for both CSNB CSG and CSNB CSV to indicate that the PAN data is comprised of 14, 15, 17, or 18 PAN digits, respectively.

**When change was introduced:** Cryptographic Support for z/OS V1R8-V1R10 and z/OS.e V1R8 Web deliverable.

**Reference information:**

- *z/OS Cryptographic Services ICSF Application Programmer's Guide*

### ICSF: New Crypto Query Service

**Description:** The ICSF Web deliverable includes a new callable service, ICSF Query Algorithms, which retrieves information about the cryptographic and hash algorithms that are available based on hardware options and software installed on System z.

**When change was introduced:** Cryptographic Support for z/OS V1R8-V1R10 and z/OS.e V1R8 Web deliverable.

**Reference information:**

- *z/OS Cryptographic Services ICSF Application Programmer's Guide*

### ICSF: Enhanced SAF Checking

**Description:** The ICSF Web deliverable introduces Key Token Policies to augment the existing security controls of symmetric and asymmetric keys stored in the CKDS and PKDS. The Key Token Policy provides a set control points for the management of keys stored in an ICSF key data set. The policy control points are designed to:

- Enable Key Token Checking
- Enable Default Key Label Checking
- Identify and prevent duplicate keys tokens from being stored in the ICSF key data sets.

As part of the Key Token Policy support, ICSF is replacing the PKDS cache with an in-storage copy of the PKDS similar to the in-storage copies of the CKDS and the TKDS. In addition, the in-storage copies are designed to be kept current in a sysplex environment where the PKDS is shared through the use of sysplex messaging.

**When change was introduced:** Cryptographic Support for z/OS V1R8-V1R10 and z/OS.e V1R8 Web deliverable.

**Reference information:**

- *z/OS Cryptographic Services ICSF Administrator's Guide*

### System SSL: Transport Layer Security (TLS) support

**Description:** System SSL design has been updated to support the Transport Layer Security (TLS) V1.1 protocol as defined in RFC4346. This support is intended to allow System SSL applications to exploit the protocol as well as ensuring continued interoperability with other SSL implementations that support the TLS V1.1 protocol.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS Cryptographic Services System SSL Programming*

### System SSL: Transport Layer Security (TLS) extensions

**Description:** System SSL is updated with support for TLS Extensions (RFC4366). TLS Extensions are designed to be used to provide additional functionality for the Transport Layer Security (TLS) protocols by allowing TLS clients and servers to exchange supplementary information during the SSL Handshake. Support is provided for the Server Name Indication, Maximum Fragment length Negotiation, and Truncated HMAC extensions.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS Cryptographic Services System SSL Programming*

## **System SSL: Support for X.509 v3 certificates and X.509 v2 Certificate Revocation Lists (CRLs)**

**Description:** System SSL is updated to support X.509 v3 certificates and X.509 v2 Certificate Revocation Lists (CRLs) at the RFC3280 level. Currently z/OS System SSL is coded to create and validate X.509 certificates according to RFC2459, Internet X.509 Public Key Infrastructure Certificate and CRL Profile. This support will allow System SSL applications to create and utilize certificates based on RFC3280 while retaining backward compatibility with existing applications of z/OS System SSL which may be using X.509 certificates created according to RFC2459.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS Cryptographic Services System SSL Programming*

## **System SSL: New operational mode designed to meet NIST FIPS 140-2 Level 1 criteria**

**Description:** National Institute of Standards and Technology (NIST) is the U.S. federal technology agency that works with industry to develop and apply technology, measurements, and standards. One of the standards published by NIST is the Federal Information Processing Standard Security Requirements for Cryptographic Modules referred to as FIPS 140-2. In z/OS V1R11, System SSL provides a mode of operation designed to meet the NIST FIPS 140-2 Level 1 criteria. This mode restricts a System SSL application to using FIPS approved algorithms, key sizes, and SSL protocols.

**When change was introduced:** z/OS V1R11

**Reference information:**

- *z/OS Cryptographic Services System SSL Programming*

## **PKI Services: Support for SHA-256 with RSA encryption**

**Description:** PKI Services now supports SHA-256 with RSA encryption as a signature algorithm.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Cryptographic Services PKI Services Guide and Reference*

## **PKI Services: Key generation and archiving**

**Description:** PKI Services now allows a certificate requestor to request that PKI Services generate the public and private keys for a certificate. PKI Services uses the PKCS #11 APIs provided by ICSF to generate the key pair and store the keys and certificate in the token data set (TKDS). It packages the certificate and private key in a PKCS #12 package, and sends the requestor a link via e-mail to retrieve

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the package. PKI Services also provides functions to recover the certificate package if the requestor loses the original package.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Cryptographic Services PKI Services Guide and Reference*

### PKI Services: Support for Java server pages (JSPs)

**Description:** PKI Services now allows you to create and customize the PKI Services Web application using Java server pages (JSPs) as an alternative to REXX CGI execs. The JSPs use an XML template to define certificates instead of the text template used with the REXX CGI execs. A new utility validates the syntax of the XML template.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Cryptographic Services PKI Services Guide and Reference*

### ICSF: 4096-RSA key support

**Description:** ICSF will exploit hardware support for the 4096-bit RSA key generation, symmetric key management, remote key loading, signature generation and verification support, and PKDS support available on System z9 and System z10 processors with feature 0863 installed with the latest Crypto Express2 Coprocessor.

**When change was introduced:** Cryptographic Support for z/OS V1R7-R9 and z/OS.e V1R7-R8 Web deliverable.

**Reference information:**

- *z/OS Cryptographic Services ICSF Administrator's Guide*
- *z/OS Cryptographic Services ICSF Application Programmer's Guide*
- *z/OS Cryptographic Services ICSF Messages*
- *z/OS Cryptographic Services ICSF Overview*
- *z/OS Cryptographic Services ICSF System Programmer's Guide*

### ICSF: ISO-3 PIN support

**Description:** ISO Format-3 PIN Block support meets the ISO 9564-1 Banking standard. This is supported on System z9 and System z10 processors with the latest Crypto Express2 Coprocessor.

**When change was introduced:** Cryptographic Support for z/OS V1R7-R9 and z/OS.e V1R7-R8 Web deliverable.

**Reference information:**

- *z/OS Cryptographic Services ICSF Administrator's Guide*
- *z/OS Cryptographic Services ICSF Application Programmer's Guide*
- *z/OS Cryptographic Services ICSF System Programmer's Guide*

## ICSF: Long random number support

**Description:** Long random number callable service can create random numbers that are up to 8192 bytes. This is supported on System z9 and System z10 processors with the latest Crypto Express2 Coprocessor.

**When change was introduced:** Cryptographic Support for z/OS V1R7-R9 and z/OS.e V1R7-R8 Web deliverable.

**Reference information:**

- *z/OS Cryptographic Services ICSF Administrator's Guide*
- *z/OS Cryptographic Services ICSF Application Programmer's Guide*
- *z/OS Cryptographic Services ICSF System Programmer's Guide*
- *z/OS Cryptographic Services ICSF Messages*
- *z/OS Cryptographic Services ICSF Overview*
- *z/OS Cryptographic Services ICSF System Programmer's Guide*

## ICSF: CPACF support

**Description:** The System z10 EC server will provide high speed hardware processing for additional AES and SHA algorithms through an enhanced CP Assist for Cryptographic Function (CPACF). Support for AES-192 and AES-256 along with SHA-224, SHA-384 and SHA-512 hashing is being added

**When change was introduced:** Cryptographic Support for z/OS V1R7-R9 and z/OS.e V1R7-R8 Web deliverable.

**Reference information:**

- *z/OS Cryptographic Services ICSF Administrator's Guide*
- *z/OS Cryptographic Services ICSF Application Programmer's Guide*
- *z/OS Cryptographic Services ICSF Messages*
- *z/OS Cryptographic Services ICSF Overview*
- *z/OS Cryptographic Services ICSF System Programmer's Guide*

## PKI Services: Support for two-byte UTF8 characters that map to code page 1047

**Description:** PKI services now allows a certificate that contains UTF8 characters to be used as its certificate authority (CA) or registration authority (RA) certificate if the UTF8 characters can be mapped to code page 1047. It also allows the creation and administration of certificates containing UTF8 characters that map to code page 1047.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Cryptographic Services PKI Services Guide and Reference*

## PKI Services: Removal of requirement for OCSF

**Description:** Before z/OS V1R10, PKI Services required that OCSF be installed. Beginning with z/OS V1R10, the dependency on OCSF is removed, except for the PKI Services Trust Policy (PKITP).

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Cryptographic Services PKI Services Guide and Reference*

### PKI Services: Support for additional distinguished name attribute types

**Description:** PKI Services introduces support for the following distinguished name attribute types:

- Distinguished Name Qualifier
- Domain Component
- User ID

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Cryptographic Services PKI Services Guide and Reference*

### PKI Services: Improved interface for picking up certificates

**Description:** When a user requests a certificate, the certificate ready notification e-mail contains a link for the user to use to pick up the certificate, and a transaction ID. Before z/OS V1R10 the user had to copy and paste the transaction ID into an input field, which could result in errors. Beginning in z/OS V1R10, the link includes the transaction ID, and the user no longer needs to provide it.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Cryptographic Services PKI Services Guide and Reference*

### PKI Services: Secure connection with LDAP

**Description:** You can optionally set up a secure connection between PKI Services and the LDAP server to prevent the bind password from flowing in the clear. The secure connection uses the Secure Sockets Layer (SSL) and Transport Layer Security (TLS) protocols to maintain an encrypted communications path between PKI Services and the LDAP server.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Cryptographic Services PKI Services Guide and Reference*

### PKI Services: Support for IP version 6 addresses

**Description:** PKI Services supports the specification of IP version 6 addresses in addition to IP version 4 addresses in a subject alternative name extension.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Cryptographic Services PKI Services Guide and Reference*

### PKI Services: Support for 4096-bit RSA keys

**Description:** PKI Services supports RSA keys up to 4096 bits in certificate authority (CA) or registration authority (RA) certificates.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Cryptographic Services PKI Services Guide and Reference*

## System SSL: gskkyman enhancements

**Description:** gskkyman command line support is enhanced to support displaying certificates within a key database file or PKCS#11 token and to display information about key database file expiration.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Cryptographic Services System SSL Programming*

## System SSL: SHA-2 algorithm enhancements

**Description:** System SSL is enhanced to support the SHA-2 hash algorithms SHA-224, SHA-256, SHA-384 and SHA-512. This support allows you to create and store SHA-2 hash based certificates in key database files for use during the SSL/TLS handshake. The Certificate Management APIs is also updated to allow SHA-2 hash algorithms to be used.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Cryptographic Services System SSL Programming*

## 4096-bit RSA hardware exploitation

**Description:** System SSL will exploit 4096-bit RSA hardware digital signature generation and verification and encrypt and decrypt when executing on a System z9 or System z10 processor with feature 0863 installed with the latest Crypto Express2 Coprocessor.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Cryptographic Services System SSL Programming*

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## DFSMS new functions to consider

This topic describes new DFSMS functions in z/OS.

### Open/Close/End of Volume enhancements

**Description:** DFSMS's Open/Close/EOV component provides the following enhancements:

- Displaying the fact that a data set has an expiration date set to never expire, in message IEC507D
- The system no longer reprocesses the same volume when duplicate volume serial numbers are detected during multi-volume tape processing (automatic recovery for message IEC708I)
- Providing improved mapping for SMF type 14 and 15 records, with the option to provide DSECTs for the individual segments of the records.
- Providing an installation-wide abend option for multi-volume tape conditions that generate messages IEC709I, IEC710I, IEC711I, and IEC712I. New parameter bits and a new return code are added for the label anomaly exit, to allow abending of jobs for these conditions.

**When changes were introduced:** z/OS V1R11.

**Reference information:**

- *z/OS DFSMS Using the New Functions*

**Data set separation by volume**

**Description:** z/OS now supports separating data sets at the volume level as well as the physical control unit (PCU) level. Data set separation allows you to designate groups of data sets in which all SMS-managed data sets within a group are kept separate from all the other data sets in the same group.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS DFSMSdfp Storage Administration*

**Enhanced striping volume selection**

**Description:** Several restrictions have been removed and new support added, including the use of volume selection preference attributes, so that striping volume selection now functions much more like conventional volume selection. Striping volume selection is used for SMS allocation or recall of a striped data set, that is, an extended format data set that occupies multiple volumes.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS DFSMSdfp Storage Administration*

**EAV enhancements in z/OS V1R11**

**Description:** z/OS V1R10 introduced extended address volumes (EAVs) which allowed DASD storage volumes to be larger than 65,520 cylinders. The space above the first 65,520 cylinders is referred to as cylinder-managed space and is extended addressing space (EAS). Data written in cylinder-managed space uses EAS access techniques. Data sets that are able to use cylinder-managed space are referred to as being EAS-eligible. The following table shows enhancements to the EAV function for z/OS R11:

*Table 1. EAV enhancements for z/OS V1R11*

| z/OS V1R10 EAV                                                                                                                                                                                                                                       | z/OS V1R11 EAV enhancement                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Only VSAM data sets are EAS-eligible.                                                                                                                                                                                                                | Extended format sequential data sets are now EAS-eligible.                                                                                                                                              |
| Control whether VSAM data sets can reside in cylinder-managed space by including or excluding EAVs in particular storage groups. For non-SMS managed data sets, control the allocation to a volume by specifying a specific VOLSER or esoteric name. | Controlling whether the allocation of EAS-eligible data sets can reside in cylinder-managed space using both the methods supported in z/OS V1R10 and by using the new EATTR data set attribute keyword. |

**When change was introduced:** z/OS V1R11.

**Reference information:**

- Using extended address volumes enhancements for R11 in *z/OS DFSMS Using the New Functions*
- *Device Support Facilities (ICKDSF) User's Guide and Reference*
- *z/OS DFSMS Access Method Services for Catalogs*

## Health Check to identify catalogs with IMBED and REPLICATE Attributes

**Description:** z/OS no longer supports the IMBED and REPLICATE attributes for user catalogs and master catalogs. These attributes have become obsolete, and they can have adverse effects on catalogs that were originally defined with them. In z/OS R11, z/OS provides a new IBM Health Checker for z/OS check that you can use to identify catalogs which have these attributes defined. IBM recommends that you re-define all catalogs that currently have the IMBED or REPLICATE attributes, to remove them.

**When changes were introduced:** z/OS V1R11.

**Reference information:** See the section on deleting obsolete catalog attributes in:

- *z/OS DFSMS Managing Catalogs*

## DFSMSHsm enhancements

**Description:** DFSMSHsm is enhanced with a new data set backup retention period, improvements to fast replication data set recovery, and enhanced support for migration level 1 (ML1) volumes.

- DFSMSHsm's data set backup support is expanded to let users specify the minimum number of days to retain a specific backup copy of a data set, using the new RETAINDAYS keyword. The RETAINDAYS keyword is also added to the ARCHBACK macro and the ARCINBAK program. The (H)RECOVER command and ARCHRCOV macro have new TIME keywords added, to allow recovery by time as well as by date. In addition, the (H)BDELETE command and ARCHBDEL macro have a new ALL parameter which must be specified to delete all backup versions of the data set.
- DFSMSHsm removes a restriction on the recovery of pre-allocated cataloged data sets, which previously could only be recovered if they resided on the same volume or volumes where they resided at the time of the backup. DFSMSHsm removes this restriction by adding a new SMS copy pool definition field, enabling the capture of the catalog information for a data set at the time of backup, and then using that information to recover the data set if it has been moved or deleted since the last backup. Additional enhancements include moving ALLOWPPRC command parameters to the copy pool definition, un-allocating catalogs prior to a copy pool recovery, automatically re-initializing a volume if its VTOC was in a flash copy relationship when the relationship was withdrawn, and improvements to the ARC1803I message.
- Beginning in z/OS V1R11, DFSMSHsm enables ML1 overflow volumes to be selected for migration processing, in addition to their current use for data set backup processing. DFSMSHsm enables these ML1 overflow volumes to be selected for migration or backup of large data sets, with the determining size values specified by a new parameter of the SETSYS command. Use the new ML1OVERFLOW parameter with the subparameter of DATASETSIZE(dssize) to specify the minimum size that a data set must be in order for DFSMSHsm to prefer ML1 overflow volume selection for migration or backup copies. In addition, DFSMSHsm removes the previous ML1 volume restriction against migrating or backing up a data set whose expected size after compaction (if

active and used) is greater than 65536 tracks. The new limit for backed up or migrated copies is equal to the maximum size limit for the largest volume available.

**When changes were introduced:** z/OS V1R11.

**Reference information:**

- *z/OS DFSMS Using the New Functions*
- *z/OS DFSMS Shsm Storage Administration*

## DFSMS OAM Enhancements

**Description:** OAM has the following enhancements for z/OS V1R11:

- OAM 2GB Object support (Stage 2) extends the support to the tape tier of the OAM storage hierarchy. This support provides full functionality for objects up to 2000M in size on DASD and tape.
- The following OAM Archive Retention Enhancements have been added:
  - Deletion-hold: Prevents object deletion while the object is in deletion-hold mode.
  - Retention-protection: Prevents object deletion prior to object's expiration date, and do not allow expiration date to be changed to an earlier date.
  - Deletion-protection: Prevents object deletion prior to object's expiration date.
  - Event-based-retention: Object expiration date dependent on external event notification.
- Wildcards for OSREQ Query enhances the wildcard support for OSREQ QUERY requests. Prior to this support, a generic search could be requested by putting an asterisk (\*) in the right most qualifier of the name. With this support, one or more percent signs (%) and/or underscores (\_) can be used as wildcards anywhere in the object name.
- Utility to Modify Collection Defaults provides a utility to modify the storage class and management class defaults associated with an OAM collection.
- CBRUXSAE Enhancement provides more granular return codes to be processed by the CBRUXSAE security authorization user exit.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS DFSMS OAM Application Programmer's Reference*
- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*
- *z/OS DFSMS Sdfp Diagnosis*
- *z/OS DFSMS Using the New Functions*
- *z/OS DFSMS Access Method Services for Catalogs*
- *z/OS MVS System Messages, Vol 4 (CBD-DMO)*

## DFSMSrmm report generator enhancements

**Description:** The DFSMSrmm report generator is extensively enhanced. Using DFSMSrmm V1R11, you can now:

- Override a data type within the dialog. The updated data type is saved in the report type and report definition. The report generator remembers the original data type and your override.

- Inherit changes in report types into existing report definitions. This enables changes in data types, comments, and other criteria to be merged into pre-existing report definitions. This enables your existing reports to benefit from improved report types shipped with DFSMSrmm.
  - Select which fields are to be excluded from total and break totals. When you specify that a field used for a report column is not to be subject to totaling, the report generator uses the NOST option with the ICETOOL reporting tool. When used with ICETOOL, all numeric fields are automatically totaled, unless you request that they be excluded.
  - Specify a list of field values and the text to be used for them in the report. The report generator uses existing field equate values to construct an initial list of possible values. Before you can use any of these, you must provide a new value to which the field will be changed for the report. Only those that have a change value are used for report generation.
  - Use substring for record selection criteria, regardless of the data type of the field.
  - Specify that the reports created from the DFSMSrmm report extract include the date and time when the extract was created. The report extract type and samples are updated to exploit this. You can do this for any type of report where the input records include one or more values that you want to include in the report title. This exploits new DFSORT ICETOOL capability to specify multiple report TITLE strings
  - Use the equated assembler symbols, instead of the absolute value, when specifying field compare values used for record selection. An option in the dialog displays the available equates ready for you to use. When equates are available, the report generator uses these as a basic set to allow the use of an alternate value (called a 'change value') in the report. For example, 'I' can be changed to 'INFO'.
  - Override the default ICETOOL processing for the generated ICETOOL statements when you specify the column width to be used. If no override is provided, the width is set to the larger of the column header text or the data size.
  - Use guidance information that is now provided within report types and report definitions. This information is presented to the user on request and when generating JCL. You can edit and add to this information, which is stored in the definitions. Existing report types and definitions are updated with help and guidance information about (for example) what variables to set in JCL or how to run the HSM preprocessor to convert data. The help information is split into three parts; Type, Report, and JCL help. It is browsed or edited as a single set of help information.
- All report types are updated to include the relevant data types and help information. In addition, all report samples are updated to inherit all new information from the report type, including the data type and help information.
- Manipulate records with DFSORT by using a new DFSMSrmm reporting tool. The output of this tool is not a report, but rather reformatted records. The JCL generated by the reporting tool includes comments that contain DFSORT symbol definitions, so that you can easily process the record further using DFSORT or ICETOOL.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS DFSMSrmm Reporting*

## DFSMSrmm EDGXHINT programming interface

**Description:** The DFSMSrmm EDGXHINT programming interface provides a function call based interface, rather than an executable assembler macro.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS DFSMSrmm Application Programming Interface*

## DFSMSrmm operational and ease of use enhancements

**Description:** DFSMSrmm has been enhanced to improve operations and ease of use:

- The DFSMSrmm TSO SEARCHVOLUME subcommand has additional operands to provide more flexibility and scope for querying a wider range of volume attributes, such as dates, actions, options, and flag settings.
- DFSMSrmm TSO command line parsing is improved by ensuring that similar values support the same syntax, reducing variance and enabling a wider scope of values.
- You can now exploit multiple installation exit routines for each of the DFSMSrmm installation exits by exploiting the z/OS Dynamic Exit Facility for DFSMSrmm exits.
- Using the DFSMSrmm ISPF dialog, you have more flexibility in:
  - Adding new volumes. You can specify the volume type, storage group name, and creation date and time.
  - Navigating from data set information to the policies that are being used for the data set.
- DFSMSrmm vital record specifications (VRS) handling is simplified by allowing you to change location definitions after a VRS has been defined without re-defining all VRSes.
- A new EDGUPDT utility can process the CDS transactions from test and recovery systems back into the original CDS. This ensures that, even after testing or recovery exercises you can ensure that the DFSMSrmm CDS reflects the actual content of the tape volumes in your library. Based on a new JRNLTRAN parmlib option, DFSMSrmm now additionally writes the previous level of the updated record to the journal along with the updated record and updated, related records. This option results in additional journal records being written each time a CDS record is updated.
- The DFSMSrmm tape utility EDGINERS is updated to support the reading and cross-verification of label information with the records defined in the DFSMSrmm control data set.
- New DFSMSrmm parmlib options provide flexibility in how tape generation data sets are managed for cyclic retention. You no longer need a USERMOD to enable duplicate generation retention.
- The sample "volume not in library" installation exit, CBRUXVNL, is enhanced to enable fewer installations to require customization. Volumes will be requested to be entered into the tape library whenever possible.
- The scalability and performance of the DFSMSrmm TSO command line interface and API are planned to be improved by:
  - Enabling API callers to request multiple resources returned in a single API call (APAR OA25714 for z/OS V1R9 and z/OS V1R10 also shipped this function)
  - Reducing the overhead of API and command processing

- Setting Rexx variables to null instead of blank
- Reducing the numbers of REXX stem variables set with the count of entries returned

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS DFSMS Using the New Functions*

## Overriding space attributes in JCL with attributes set in the Data Class

**Description:** DFSMS now lets you specify that space attributes set in the data class should override corresponding attributes set in JCL DD statements or IDCAMS control statements. Use the new Override Space parameter on the ISMF Data Class Define and Data Class Alter panels to request this new function. This option makes it easier to enforce installation standards for space attributes. In previous releases, JCL specifications always overrode the corresponding data class space attributes.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMS Using the New Functions*
- *z/OS DFSMSdfp Storage Administration*

## DFSMS Extended Address Volumes

**Description:** Before z/OS V1R10, DASD storage was limited to 65 520 cylinders per volume. To satisfy growing DASD storage requirements, z/OS V1R10 supports extended address volumes. An extended address volume (EAV) is by definition 65 521 cylinders or larger. In this release, the maximum size is 262 668 cylinders.

The extra space on an extended address volume (the cylinders whose addresses are equal to or greater than 65 536) is referred to as the extended addressing space (EAS). These cylinder addresses are represented by 28-bit cylinder numbers. On an extended address volume, the cylinders whose addresses are below 65 536 are referred to as the base addressing space. These cylinder addresses are represented by 16-bit cylinder numbers or by 28-bit cylinder numbers whose high order 12 bits are zero.

The track address with 28-bit cylinder numbers has the following format: track address is a 32-bit number that identifies each track within a volume. It is in the format hexadecimal CCCCcccH, where CCCC is the low order 16 bits of the cylinder number, ccc is the high order 12 bits of the cylinder number, and H is the four-bit track number. For compatibility with older programs, the ccc portion is hexadecimal 000 for tracks in the base addressing space.

**Note:** 28-bit cylinder arithmetic and compares with these nonlinear cylinder address (CCCCccc) could be error-prone. A new tool, the EAV migration assistance tracker, is provided for general use to do conversions and compares.

Extended address volumes are divided into track-managed space and cylinder-managed space. Track-managed space is the space on a volume that is managed in tracks and cylinders. Track-managed space ends at cylinder address 65 519. Each data set occupies an integral multiple of tracks. Track-managed space also exists on all non-EAV volumes. Cylinder-managed space is the space on the

volume that is managed only in multicylinder units. Cylinder-managed space begins at cylinder address 65 520. Each data set occupies an integral multiple of multicylinder units. Space requests targeted for the cylinder-managed space will be rounded up to the next multicylinder unit. The cylinder-managed space only exists on EAV volumes. An EAS-eligible data set is one that can be allocated on cylinder numbers 65 536 or greater.

EAS-eligible data sets allocated on an EAV are created with format-8 and format-9 DSCBs in the VTOC. A format-8 DSCB is equivalent to a format-1 DSCB and the format-9 DSCB provides for additional attribute data and a set of pointers to possible format-3 DSCBs. The purpose of these DSCBs is to indicate that the extent descriptors contained in a format-8 or format-3 DSCB may contain 28-bit cylinder numbers. Programs may need to be modified to support extended attribute DSCBs.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSdfp Advanced Services*

## DFSMS OAM enhancements

**Description:** In z/OS V1R10, DFSMS increases the maximum size for objects that OAM can accept and manage. The previous maximum object size of 256 MB is increased to 2000 MB (2,097,152,000 bytes) for the DASD level of the OAM hierarchy

The Object Access Method (OAM) enhancements also include the following:

- Enhancement to the MODIFY OAM,UPDATE,VOLUME operator command
- OSMC Hard Stop
- Option to Query Backup
- Adding Lost Reason for Automatic Access to Backup
- Automatic Access to Backup for CBROAMxx PARMLIB member
- ONLYIF keyword added to the CBROAMxx PARMLIB member

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMS OAM Application Programmer's Reference*
- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*

## Using VSAM RLS secondary lock structures

**Description:** In z/OS V1R10, you can define multiple, secondary lock structures for VSAM record-level sharing (RLS) workloads, to reduce locking constraints. In previous releases, your VSAM applications were limited to a single coupling facility (CF) lock structure (the IGWLOCK00 lock table), for all record-level sharing—regardless of the number of systems that might need this function.

With a new SMS storage class attribute called the *lock set*, you can specify a secondary lock structure for VSAM records. You can define up to 256 lock sets per sysplex.

A secondary lock structure connection persists beyond data set closure. To delete the lock structure, you use the V SMS,SMSVSAM,FORCEDELETELOCKSTRUCTURE command.

Secondary lock structures are intended for record locks only. Other types of locks continue to use IGWLOCK00, which is still required for the initialization of the SMSVSAM address space. The usual tasks related to the definition, administration, and use of the primary lock structure, IGWLOCK00, do not change with this enhancement.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMS Using the New Functions*
- *z/OS DFSMS Using Data Sets.*

## Using Virtual-concurrent-copy (VCC) FlashCopy

**Description:** z/OS V1R10 provides the following enhancements to advanced copy services:

- **Virtual-concurrent-copy (VCC) FlashCopy:** In z/OS V1R10, you can use virtual-concurrent-copy FlashCopy, that is added to support the extended addressing volume (EAV) function, on Enterprise Storage Systems with the FlashCopy feature. Allocate the working-space dataset and specify the ANTMIN00 parmlib to use the VCC FlashCopy function.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMS Advanced Copy Services*

## OPEN, CLOSE and EOVS enhancements in z/os V1R10

**Description:** No Label, NL file positioning during OPEN processing for 3590 or higher tape technology now uses a high speed positioning algorithm. This results in exponentially faster positioning speeds as the number of files being spaced over increases. You may want to consider directing NL tape allocations to 3590 or later tape technologies.

In a JES3 tape libraryplex the allocation algorithm will immediately detect when a VARY offline of a device pool is issued. This keeps the allocation algorithm synchronized with changes in the sysplex configuration and therefore helps eliminate allocation failures or hang conditions.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *EREP Reference*

## DFSMSdss enhancements

**Description:** DFSMSdss supports the use of extended address volumes (volumes with more than 65520 cylinders) for all DFSMSdss operations.

Also, new and changed DFSMSdss commands are designed to help you manage space more efficiently, diagnose errors, and use concurrent copy, as follows:

- New command, CONSOLIDATE, allows you to consolidate the multiple extent data sets for a particular volume. This command replaces the CONSOLIDATE keyword used previously with the DEFRAG command.

- A new version of the DEFRAG command adds keywords to help you defragment volumes more efficiently, and control the amount of information that DFSMSdss provides for certain types of errors.
- For the COPY and DUMP commands, the existing keyword, CONCURRENT, is enhanced to allow you to request concurrent copy (or virtual concurrent copy) for your copy and dump operations, even on volumes that support FlashCopy as well as cache-based concurrent copy.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSdss Storage Administration*
- *z/OS DFSMSdfp Storage Administration*

## DFSMSdss: Renaming logical data set back-ups

**Description:** The keyword, NEWNAMEUNCONDITIONAL, is added to the DFSMSdss DUMP command for logical data set processing. With this keyword, you can assign new names to data sets during dump processing, rather than renaming them later during restore processing. You might find NEWNAMEUNCONDITIONAL to be useful if your installation keeps its dumped data sets cataloged to avoid name contention between the data sets that are backed up (dumped) and the production data sets.

The NEWNAMEUNCONDITIONAL keyword can only be used when invoking DFSMSdss through the application programming interface (API).

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSdss Storage Administration*
- *z/OS DFSMSdfp Storage Administration*

## DFSMShsm: Backup enhancements

**Description:** In z/OS V1R10.0, DFSMShsm provides the following backup enhancements:

- **CDS enhancement:** CDS backup must quiesce all activity to the CDSes in order to start CDS backup. To accomplish this, it acquires an exclusive enqueue on the CDSes. If other DFSMShsm functions have serialized the CDSes, CDS backup must wait until they have completed. This enhancement will take advantage of cross-system coupling (XCF) services to have any host performing CDS backup communicate to all other hosts in an HSMplex that the resources needed to serialize the CDSes for backup need to be temporarily released.
- **Data set backup NEWNAME enhancement:** A NEWNAME keyword is added to the DFSMShsm (H)BACKDS command. When users specify the (H)BACKDS NEWNAME command, DFSMShsm invokes DFSMSdss to create a backup version of the data set specified on the command, and makes the backup version look like it is a backup of the data set specified with the NEWNAME keyword. New DATE and TIME keywords are also added to the (H)BACKDS command. These keywords allow customers to assign the specified backup date and time to the backup copy created through the (H)BACKDS NEWNAME command.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSShsm Storage Administration*
- *z/OS DFSMSShsm Implementation and Customization Guide*
- *z/OS DFSMSShsm Diagnosis*
- *z/OS DFSMSShsm Managing Your Own Data*
- *z/OS DFSMSdftp Storage Administration*

## DFSMSShsm: Support for RMM Reporter

**Description:** The DFSMSrmm Report Generator is updated to support keywords for assembler macros from which report types are derived and also to add new built-in data extract steps. This is in support of the new SMF record types from DFSMSrmm and for updates to the DFSMSShsm macro, ARCUTILP, used for DCOLLECT reporting. Two new macros, ARCF SR2 and ARCWF SR2, are provided in SYS1.MACLIB. These macros map ARCF SR and ARCWWF SR after in-line conversion by DFSMSrmm Report Generator using skeletons ARCGF SRC and ARCGWF SC respectively. ARCGF SRC and ARCGWF SC are shipped in SYS1.DGTSLIB. New sample report types and report definitions are provided and will be shipped in SYS1.SAMPLIB.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSShsm Storage Administration*
- *z/OS DFSMSShsm Implementation and Customization Guide*
- *z/OS DFSMSShsm Diagnosis*
- *z/OS DFSMSdftp Storage Administration*

## DFSMSShsm: Extended Address Volumes (EAV)

**Description:** Extended Address Volumes (EAV) adds support for volumes with a size greater than the previous limit of 65520 cylinders. An extended address volume is by definition 65521 cylinders or larger, up to a maximum of 262,668 cylinders in z/OS V1R10.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSdftp Storage Administration*
- *z/OS DFSMSShsm Diagnosis*
- *z/OS DFSMSShsm Storage Administration*
- *z/OS DFSMSShsm Managing Your Own Data*
- *z/OS DFSMSShsm Implementation and Customization Guide*

## DFSMSShsm: RAS enhancements

**Description:** In z/OS V1R10, DFSMSShsm provides the following RAS enhancements:

- **Using a specified unit name for the Tape Copy Needed function:** This RAS item fixes an error that can occur for users in a mixed tape environment since they may use esoteric unit names to control allocations to the different technology tape drives. This item satisfies a customer requirement to use the specified SETSYS unit name in the tape copy MWE built from the TCN record. DFSMSShsm will now use the same logic to get unit names for duplex-failure generated tape copies that is used to get unit names for duplex output. The customer can override this and use the generic equivalent unit name for the duplex-failure tape copy by patching a new field in ARCCVT.

- **ARCBDEXT enhancement:** This RAS item will allow the ARCBDEXT installation exit to be invoked for individual data set backup commands and when migrated data sets are backed up.
- **LIST TTOC SELECT enhancement:** The LIST TTOC command lists the DFSMSShsm tape volume information from the OCDS. A parameter, RESUMEAUDIT, is being added to the optional SELECT keyword of LIST TTOC command. When RESUMEAUDIT is specified, only those tapes that are eligible for an AUDIT MEDIACONTROLS command to resume will be listed.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSShsm Implementation and Customization Guide*
- *z/OS DFSMSShsm Diagnosis*

## DFSMSrmm: Library partitioning

**Description:** DFSMSrmm provides new PARMLIB commands that provide more flexibility in partitioning and controlling the use of tape volumes. Through use of the PARTITION and OPENRULE commands, you can now simplify maintenance of PARMLIB members as your libraries and volume ranges change.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSrmm Application Programming Interface*

## DFSMSrmm: Report extract tailoring

**Description:** DFSMSrmm users can now select which records are written to the report extract file. You can use the RPTEXT command in the EDGHSKP SYSIN file to select the new extract processing. The default processing for the XREPTTEXT DD statement is changed so that only extended records are created.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSrmm Reporting*

## DFSMSrmm: Report generator

**Description:** The DFSMSrmm Report Generator is updated to support keywords for assembler macros from which report types are derived and also to add new built-in data extract steps. This is in support of the new SMF record types from DFSMSrmm and for DFSMSShsm and DCOLLECT reporting. New report types and report samples are provided.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSrmm Reporting*

## DFSMSrmm: SMI-S Storage Media Library profile

**Description:** DFSMSrmm supports the latest CIM/SMI-S levels; CIM 2.14, and SMI-S 1.2 profile levels. There are also changes to the RMM CIM classes and providers. Also, the DFSMSrmm CIM agent now has an option to register itself using the SMI-S Storage Media Library profile so that storage management clients

(and TPC in particular) can use Service Location Protocol (SLP) to detect the CIM agent and determine the registered profiles that it can support. This enables TPC for tape to display your installation media library contents as if it were a single tape library.'

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSrmm Implementation and Customization Guide*

## DFSMSrmm: Volume replacement policies

**Description:** DFSMSrmm supports policies for volume replacement. You define them in the MEDINF commands in PARMLIB. This enables you to define different replacement policies based on media type and recording format. The replacement policies are implemented for all types of volume other than logical volumes, and for both private and scratch volumes, but not for those which are pending release. Until you define one or more MEDINF commands in PARMLIB with the REPLACE operand, DFSMSrmm processing is unchanged. A hard-coded value of PERM(1) is used.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSrmm Implementation and Customization Guide*

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## DFSORT new functions to consider

This topic describes new DFSORT™ functions in z/OS.

### Find and Replace

**Description:** FINDREP is a new option that allows you to do various types of find and replace operations on your records. FINDREP makes it easy to replace character or hexadecimal input constants anywhere in your records with character, hexadecimal or null output constants. For input and output constants of different lengths, bytes after the replaced constants will be shifted left or right, as appropriate. For fixed-length records, blanks will be filled in on the right as needed. For variable-length records, the record length will be changed as needed.

FINDREP can be used in an INREC, OUTREC or OUTFIL statement, or in an IFTHEN clause, in the same way BUILD and OVERLAY can be used.

Various options of FINDREP allow you to define one or more input constants and a corresponding output constant (IN, OUT), define one or more pairs of input and output constants (INOUT), start and end the find scan at specified positions (STARTPOS, ENDPOS), stop after a specified number of constants are replaced (DO), increase or decrease the length of the output record (MAXLEN), define the action to be taken if nonblank characters overrun the end of the record (OVERRUN), and specify whether output constants are to replace or overlay input constants (SHIFT).

DFSORT symbols can be used for constants specified with FINDREP.

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

## DFSORT

### Reference information:

- *z/OS DFSORT Application Programming Guide*
- *z/OS DFSORT: Getting Started*

## Group Operations

**Description:** WHEN=GROUP is a new type of IFTHEN clause that allows you to do various types of operations involving groups of records. WHEN=GROUP makes it easy to propagate fields from the first record of a group to the other records of the group, add an identifier to each record of the group, or add a sequence number to each record of the group. These functions are useful by themselves, and can also facilitate other types of group operations such as sorting groups, including or omitting groups, and so on.

WHEN=GROUP can be used in IFTHEN clauses in an INREC, OUTREC or OUTFIL statement in the same way WHEN=INIT can be used.

Various options of WHEN=GROUP allow you to use logical expressions to define the beginning and end of a group (BEGIN, END), define the number of records in a group (RECORDS), and define the fields, identifiers and sequence numbers to be added to the records of each group (PUSH).

DFSORT symbols can be used for columns, fields and constants specified with WHEN=GROUP clauses.

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

### Reference information:

- *z/OS DFSORT Application Programming Guide*
- *z/OS DFSORT: Getting Started*

## DATASORT

**Description:** DATASORT is a new operator of ICETOOL that allows you to sort data records between header (first) records and trailer (last) records. DATASORT makes it easy to sort the data records while keeping one or more header records and/or one or more trailer records in place. DATASORT does not require an "identifier" in the header or trailer records; it can treat the first n records as header records and the last n records as trailer records.

Various options of DATASORT allow you to define the number of header records and/or trailer records (HEADER or FIRST, TRAILER or LAST), the ddname for the input data set (FROM), the ddname for the output data set (TO), and the SORT and other DFSORT control statements to be used for the DATASORT operation (USING).

DFSORT symbols can be used for the number of header and trailer records specified with DATASORT.

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

### Reference information:

- *z/OS DFSORT Application Programming Guide*

- *z/OS DFSORT: Getting Started*

## SUBSET

**Description:** SUBSET is a new operator of ICETOOL that allows you to create a subset of the input or output records by specifying that you want to keep or remove header (first) records, trailer (last) records, or records with specific relative record numbers. SUBSET makes it easy to keep or remove records based on these criteria. SUBSET does not require an "identifier" or "sequence number" in the records to be kept or removed.

Various options of SUBSET allow you to define the criteria (HEADER or FIRST, TRAILER or LAST, RRN), the ddname for the input data set (FROM), the ddname for the output data set to contain the records that meet the criteria and/or don't meet the criteria (TO, DISCARD), whether the records that meet the criteria are to be kept or removed (KEEP, REMOVE), whether the criteria are to be applied to the input or output records (INPUT, OUTPUT), and DFSORT control statements to be used for the SUBSET operation (USING).

DFSORT symbols can be used for the number of header and trailer records and for the relative record numbers specified with SUBSET.

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

**Reference information:**

- *z/OS DFSORT Application Programming Guide*
- *z/OS DFSORT: Getting Started*

## SELECT First n Duplicates

**Description:** ICETOOL's SELECT operator now allows you to select the first n records with each key or the first n duplicate records with each key. New FIRST(n) and FIRSTDUP(n) options make it easy to select records representing "top" and "bottom" categories (for example, the top 5 students in each class).

DFSORT symbols can be used for n with FIRST(n) or FIRSTDUP(n).

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

**Reference information:**

- *z/OS DFSORT Application Programming Guide*
- *z/OS DFSORT: Getting Started*

## SPLICE with Non-Blank Fields

**Description:** ICETOOL's SPLICE operator now allows you to create a single record for each key by splicing the base record with every specified nonblank field from each overlay record. A new WITHANY option makes it easy to collect information from multiple records with the same key. You can now do a splice involving duplicate records with nonconsecutive or missing WITH fields, something that could not be accomplished previously with the existing WITHEACH option.

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

### Reference information:

- *z/OS DFSORT Application Programming Guide*

## DISPLAY with Count

**Description:** ICETOOL's DISPLAY operator now allows you to display counts in reports. New COUNT('string'), EDCOUNT(formatting), BCOUNT('string') and EDBCOUNT(formatting) options make it easy to print overall record count and break record count statistics in various forms in a report, similar to the existing statistics for a report (overall total, maximum, minimum and average and break total, maximum, minimum and average).

DFSORT symbols can be used for 'string' with COUNT('string') and BCOUNT('string').

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

### Reference information:

- *z/OS DFSORT Application Programming Guide*
- *z/OS DFSORT: Getting Started*

## DISPLAY and OCCUR with Multiple and Multipart Titles

ICETOOL's DISPLAY and OCCUR operators now allow you to display up to three title lines, each composed of up to three strings. The enhanced TITLE('string1','string2','string3') option makes it easy to use multiple strings for each title, including a combination of inline constants, and constants from DFSORT symbols including system information. The use of up to three TITLE options makes it easy to display multiline titles.

A new TLEFT option allows you to left justify the title lines instead of centering them. A new TFIRST option allows you to only display the title lines on the first page of the report instead of on every page of the report.

DFSORT symbols can be used for 'string1', 'string2' and 'string3' with TITLE('string1','string2','string3').

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

### Reference information:

- *z/OS DFSORT Application Programming Guide*
- *z/OS DFSORT: Getting Started*

## DISPLAY and OCCUR without Carriage Control

**Description:** ICETOOL's DISPLAY and OCCUR operators now allow you to create reports without carriage control characters and with RECFM=FB instead of RECFM=FBA. A new NOCC option makes it easy to suppress the carriage control character. With NOCC, a blank line is used instead of a page eject control character to separate elements of the report.

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

**Reference information:**

- *z/OS DFSORT Application Programming Guide*
- *z/OS DFSORT: Getting Started*

**COUNT in Output Record**

**Description:** ICETOOL's COUNT operator now allows you to create a count data set with an output record containing the record count. New WRITE(countdd), TEXT('string'), DIGITS(n) and EDCOUNT(formatting) options make it easy to create an output data set with a record containing text and the record count in various forms.

DFSORT symbols can be used for 'string' with TEXT('string').

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

**Reference information:**

- *z/OS DFSORT Application Programming Guide*

**COUNT with Add and Subtract**

**Description:** ICETOOL's COUNT operator now allows you to add a value to, or subtract a value from, the record count. New ADD(n) and SUB(n) options make it easy to increase or decrease, respectively, the actual record count to get a resulting modified record count. This is especially useful for dealing with data sets that contain header and/or trailer records.

The resulting modified record count is displayed in the count message in TOOLMSG and in the count data set, and used to determine if the criteria specified by the existing EMPTY, NOTEMPTY, HIGHER(x), LOWER(y), EQUAL(v) or NOTEQUAL(w) option is satisfied.

DFSORT symbols can be used for n with ADD(n) and SUB(n).

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

**Reference information:**

- *z/OS DFSORT Application Programming Guide*

**BLKSIZE Default for Input DUMMY**

**Description:** DFSORT will no longer terminate for a SORTIN DD DUMMY or SORTINnn DD DUMMY statement with RECFM and LRECL, but no BLKSIZE. Instead, DFSORT will use an appropriate BLKSIZE to process the DUMMY data set successfully.

**Note:** If DFSORT's Blockset technique is not selected, DFSORT may still terminate for a SORTIN DD DUMMY or SORTINnn DD DUMMY statement with RECFM and LRECL, but no BLKSIZE.

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

**Reference information:**

- *z/OS DFSORT Application Programming Guide*

### SKIP=0L Default for SECTIONS

**Description:** DFSORT will no longer terminate when an OUTFIL SECTIONS field is not followed by a keyword (SKIP, HEADER3, TRAILER3). Instead, DFSORT will use a default keyword of SKIP=0L to process the sections successfully with no blank lines between sections on the same page.

DFSORT symbols can be used for section fields.

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

**Reference information:**

- *z/OS DFSORT Application Programming Guide*

### SORTOUT=ddname Default for FNAMES

**Description:** DFSORT will now use the ddname specified by a SORTOUT=ddname option in DFSPARM, the ddname specified by a SORTOUT=ddname option in a parameter list, or the ddname specified in a TO(ddname) option of an ICETOOL operator, as the default ddname for an OUTFIL statement without a FNAMES or FILES option.

**When change was introduced:** z/OS V1R10 with APAR PK66222/PTF UK90014 and DFSORT V1R5 with APAR PK66222/PTF UK90013.

**Reference information:**

- *z/OS DFSORT Application Programming Guide*

## Using PARMLIB members to set installation options

**Description:** ICEPRMxx members in concatenated PARMLIB can now be used to specify changes to DFSORT's installation options. Each ICEPRMxx member can contain options to be changed for any or all of DFSORT's eight installation environments (JCL, INV, TSO, TSOINV and TD1-TD4). Up to ten ICEPRMxx members can be activated by a START ICEOPT started task command. The options in the activated members will be merged with the ICEMAC defaults at run-time.

A different ICEPRMxx member, or combination of ICEPRMxx members, for different LPARs can be activated at IPL time by including a START ICEOPT command in an appropriate COMMNDxx member in PARMLIB, or at any time by issuing a START ICEOPT command from the console.

ICEPRMxx members are now the recommended way to change DFSORT installation defaults since they are easier to use and more flexible than the old method using the ICEMAC macro and usermods. However, the old method is still supported.

The ICETOOL DEFAULTS operator can be used at any time to produce a report showing the merged PARMLIB/ICEMAC installation default values for each environment that will be used at run-time, as well as the active ICEPRMxx and ICEMAC values.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSORT Installation and Customization*

**VSAM extended address volume**

**Description:** DFSORT now supports VSAM input and output data sets on Extended Address Volumes to the extent that z/OS supports these data sets.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSMSdfp Advanced Services*
- *z/OS DFSORT Application Programming Guide*
- *z/OS DFSORT Installation and Customization*

**Improvements in performance and resource usage**

**Description:** Memory object sorting can now be used for DFSORT applications that use the INREC, OUTREC or SUM functions.

The channel programs associated with DFSORT's input, output and work data sets can now reside above 16 megabytes virtual.

DFSORT now provides new fields ICEMNVLX, ICEMNVLY and ICEMNVLZ in its SMF type 16 record to aid in tuning main storage usage.

The information DFSORT passes to the termination exit (ICETEXIT) now includes setting ICEPTST flag bit 6 on if the phase TCB timings are not valid.

Total storage usage for dataspace sorting can now be controlled with the EXPMAX, EXPRES and EXPOLD installation options.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSORT Application Programming Guide*
- *z/OS DFSORT Installation and Customization*

**More flexible syntax for run-time parameters**

**Description:** DFSORT now allows additional syntactical forms for all of its PARM and control statement run-time parameters. Any parameter of the form keyword=value can now also be specified as keyword(value) or keyword=(value). Any parameter of the form keyword=(list) can now also be specified as keyword(list).

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSORT Application Programming Guide*

**Improved diagnostics**

**Description:** DFSORT now provides additional information in messages ICE098I, ICE253I and ICE254I to aid in diagnosing and correcting out-of-space conditions associated with message ICE046A.

DFSORT now provides specific reason codes and associated documentation to aid in diagnosing and correcting errors associated with the following messages: ICE017A, ICE018A, ICE024A, ICE042A, ICE043A, ICE109A, ICE126A and ICE251A.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS DFSORT Messages, Codes and Diagnosis Guide*

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## Distributed File Service new functions to consider

This topic describes new Distributed File Service functions in z/OS.

### SMB: Disallowing export of zFS sysplex-aware file systems

**Description:** Beginning with z/OS V1R11, the SMB server cannot export zFS read/write file systems when zFS is running sysplex-aware on the same system the SMB server is running or on the system that owns the zFS file system. If you want to export zFS file systems using the SMB server, ensure that zFS is configured as non-sysplex aware by specifying sysplex=off in the zFS IOEFSPRM configuration file.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Distributed File Service SMB Administration*
- *z/OS Distributed File Service zSeries File System Administration*
- *z/OS Distributed File Service Messages and Codes*

### SMB: Supporting Windows Vista

**Description:** SMB now supports Windows Vista Business and Windows Vista Enterprise. When you use Windows Vista, you might have to define your domain name, which was not necessary in previous releases of Windows.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Distributed File Service SMB Administration*

### SMB: Enhancing SMB trace variables

**Description:** The modify subcommand now supports reset, print, and resize of the internal trace table.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Distributed File Service SMB Administration*

### SMB: Supporting NT LAN Manager version 2 (NTLMv2)

**Description:** Beginning in z/OS V1R11, SMB now supports NT LAN Manager version 2 (NTLMv2) authentication protocol.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Distributed File Service SMB Administration*

**SMB: Running SMB under a unique nonzero UID**

**Description:** You now have the option of running SMB with a unique nonzero userid (UID(0)).

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Distributed File Service SMB Administration*

**zFS: New zFS checks from IBM Health Checker for z/OS**

**Description:** Beginning with z/OS V1R11, zFS introduces three new checks:

**ZOSMIGV1R11\_ZFS\_INTERFACELEVEL**

Verifies that the system is running sysplex\_admin\_level=2 for zFS V1R11 toleration support. After all members of the sysplex are running sysplex\_admin\_level=2, zFS V1R11 can be brought into the sysplex.

**ZOSMIGREC\_ZFS\_RM\_MULTIFS**

For z/OS V1R9 and above, verifies that the system has no multi-file system aggregates attached. Do not use multi-file system aggregates. Use compatibility mode aggregates.

**ZOSMIGV1R11\_ZFS\_RM\_MULTIFS**

For z/OS V1R9 – V1R11, verifies that a system running in a sysplex environment has no multi-file system aggregates attached. Do not use multi-file system aggregates. Use compatibility mode aggregates.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *IBM Health Checker for z/OS: User's Guide*
- *z/OS Migration*
- *z/OS Distributed File Service zSeries File System Administration*
- *z/OS Distributed File Service SMB Administration*
- *z/OS Distributed File Service Messages and Codes.*

**zFS: Running sysplex-aware for read/write and read-only mounted file systems**

**Description:** Beginning with z/OS V1R11, zFS can run sysplex-aware for read/write mounted file systems. As in previous releases, zFS continues to support running sysplex-aware for read-only mounted file systems. Typically, running zFS sysplex-aware for read/write mounted file systems on all systems in a shared file system environment provides a performance improvement. When you specify sysplex=on in the IOEFSPRM, in addition to supporting read/write mounted file systems that are accessed in sysplex-aware mode, zFS automatically moves zFS ownership of a zFS file system to the system that has the most read/write activity.

**Notes:**

1. The SMB server cannot export zFS read/write file systems when zFS is running sysplex-aware on the same system the SMB server is running or on the system that owns the zFS file system.

## Distributed File Service

2. The Fast Response Cache Accelerator support of the IBM HTTP Server for z/OS V5.3 uses an API called register file interest (BPX1IOC using the locc#RegFileInt subcommand). that cannot support zFS sysplex-aware file systems. Other servers that use this API can also be impacted. Typically, these are servers that cache files and must be aware of file updates from other sysplex members without having the server read the file or the file modification timestamp.
3. Even when your installation does not run sysplex-aware, you must follow the appropriate migration actions.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Distributed File Service zSeries File System Administration*
- *z/OS Distributed File Service SMB Administration*
- *z/OS Distributed File Service Messages and Codes.*

### zFS: Excluding multi-file system aggregates in a sysplex shared file system environment

**Description:** Beginning with z/OS V1R11 and above, you cannot attach a zFS multi-file system aggregate in a sysplex shared file system environment. Multi-file system aggregates are not supported in a sysplex shared file system environment. In z/OS V1R8, you became unable to mount zFS file systems contained in multi-file system aggregates in a shared file system environment. Multi-file system aggregate support is not planned to be enhanced and will be removed sometime in the future.

Compatibility mode aggregates have a single file system in the aggregate and are fully supported in a sysplex shared file system environment.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Distributed File Service zSeries File System Administration*
- *z/OS Distributed File Service Messages and Codes*

### zFS: Introducing namespace validation and correction

**Description:** zFS introduces the concept of namespace validation and correction. zFS namespace validation compares the zFS namespace information stored in each zFS member. If zFS validation detects an inconsistency, it issues messages and then begins to correct the inconsistency using one of the following actions:

- Updates the inconsistent information
- Remounts a file system
- Restarts the zFS address space on one or more members.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Distributed File Service zSeries File System Administration*
- *z/OS Distributed File Service Messages and Codes.*

## SMB performs syntax checking

**Description:** When you start SMB, the SMB server now validates the syntax of the SMB environment variables. Prior to starting SMB, a new command, `dfssyntax`, is available to validate the syntax of the `/opt/dfslocal/home/dfskern/envvar` file or another environment variable file you specify. This is recommended to avoid errors and to ensure that SMB uses the configuration options you intend.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Distributed File Service SMB Administration*

## SMB supports hang detection

**Description:** SMB supports hang detection by allowing you to enable either the `_IOE_HANG_DETECT_THREAD_TIMEOUT` or the `_IOE_HANG_DETECT_OENODE_TIMEOUT` environment variable.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Distributed File Service SMB Administration*

## Windows SMB clients can choose calling port

**Description:** A new environment variable, `_IOE_SMB_TRANSPORTS`, enables SMB clients to choose which port will handle SMB calls. Many SMB clients have configuration options to enable NETBIOS over TCP/IP, SMB directly over TCP/IP, or both. The default is now BOTH (ports 445 and 139), but you can set `_IOE_SMB_TRANSPORTS` to DIRECT (port 445), or NETBIOS (port 139). The server responds on the enabled ports; the client software can choose to attempt one protocol prior to the other or both in parallel.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Distributed File Service SMB Administration*

## zFS allows a unique auditid

**Description:** When all sysplex members are running z/OS V1R9 with APAR OA20614, zFS allows you to specify whether zFS is to use a new, more unique auditid for a zFS file or directory, or to continue using the existing, non-unique auditid.

**When change was introduced:** z/OS V1R9.

**Reference information:**

- *z/OS Distributed File Service zSeries File System Administration*

## zFS provides read-only mount recovery option

**Description:** zFS allows log recovery for read-only mounts.

You can specify that zFS is to automatically avoid a read-only mount failure because of the need to run log recovery for an aggregate. This can occur when an aggregate is mounted read-write, and then a failure occurs before it is unmounted.

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If the next mount is for read-only, log recovery needs to run for the mount to be successful. When this situation occurs and IOEFSPRM romount\_recovery=on, zFS temporarily mounts the aggregate read-write to allow log recovery to run, and then zFS will unmount and then mount the aggregate read-only.

**When change was introduced:** z/OS V1R9.

**Reference information:**

- *z/OS Distributed File Service zSeries File System Administration*

## Authority changes for zFS utilities

**Description:** A user with ALTER authority can now run the IOEAGFMT utility and a user with UPDATE authority to the VSAM data set can now run the IOEAGSLV utility.

**When change was introduced:** z/OS V1R9.

**Reference information:**

- *z/OS Distributed File Service zSeries File System Administration*

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## EREK new functions to consider

This topic describes new EREK functions in z/OS.

## EREK enhancements in z/OS V1R10

**Description:** EREK adds new reports and updates existing reports to support Extended Address Volume (EAV) and the 3592-E06 tape drives.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *EREK Reference*

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## HCD and HCM new functions to consider

This topic describes new HCD and HCM functions in z/OS.

### HCD: Profile Options dialog

**Description:** HCD provides a new Profile Options dialog which displays the current values of all possible HCD profile keywords as they are either explicitly set in the HCD profile data set or as they are defaulted by HCD. This dialog allows you to verify or modify HCD profile options.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS HCD User's Guide*

### HCD: New profile option

**Description:** There are new profile keywords for the following purposes:

- **Showing partition information in IOCP decks:** Use profile option SHOW\_IOCP\_DEFAULTS to explicitly show and document the partition defaults

of CHPID and IODEVICE statements in generated IOCP decks. The option causes HCD to write this additional information as comments into the IOCP deck.

- **Extend the change log data set to provide space for updates:** Use profile option CHLOG\_EXTENSION to specify the percentage of additional space that is to be allocated beyond the default size of the IODF when a change log data set is created.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS HCD User's Guide*

## HCD: Changes in HCD reports

**Description:** The following HCD reports are enhanced:

- The **Control Unit Summary Report** now shows the number of logical paths per control unit.
- The **Control Unit Detail Report** now shows the number of logical paths for a control unit per channel subsystem and the number of logical paths per control unit port.
- The **EDT Report** now shows values for columns NAME, NAME TYPE, VIO, and TOKEN also for an esoteric that has no device numbers assigned to it.
- For the **Processor Compare Report**, HCD now also compares the processor tokens of work/production or work/work IODFs. In previous releases, HCD compared only the tokens of production IODFs.
- In the **CSS/OS Device Compare Report**, devices with adjacent ranges are joined before printing. Additionally, the device range is increased to show a maximum of 4 digits.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS HCD User's Guide*

## HCD: Indicating channel path mode changes

**Description:** When working with channel paths in the HCD dialog, you could specify a partition assignment that does not match the specified channel path mode, or vice versa. In such a case, HCD would not accept your channel path mode specification but would implicitly adjust it to the defined partition assignment. Starting with this release, HCD issues a new informational message to inform you that the channel path mode is adjusted to reflect the specified partition assignment.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS HCD User's Guide*

## HCD: Specifying multi-user access mode when creating a work IODF from a production IODF

**Description:** You can now choose multi-user access mode for a new work IODF that you create from a production IODF.

**When change was introduced:** z/OS V1R11.

### Reference information:

- *z/OS HCD User's Guide*

## HCD: Support of the WWPN Prediction Tool

**Description:** From the currently accessed IODF, you can export the FCP channel/device specific part of the I/O configuration into a comma-separated value (CSV) output format. You can then use the generated file as input to the WWPN Prediction Tool to assign world-wide port names to virtualized FCP ports for configuring SAN devices.

**When change was introduced:** z/OS V1R11.

### Reference information:

- *z/OS HCD User's Guide*

## HCD: Miscellaneous dialog enhancements

**Description:** HCD provides the following dialog enhancements:

- **Enhanced prompting for available IODFs:** The **Available IODFs** panel invoked by prompting for IODFs indicates whether an IODF can be accessed in multi-user access or in single-user access mode only.
- **Enhanced Channel Path List:** The **Channel Path List** is enhanced to show the processor ID when you scroll to the right to see which partitions are in the access and candidate lists for a channel path (partition matrix).
- **Enhanced deleting of partitions with CHPIDs uniquely assigned:** A partition that has CHPIDs uniquely assigned to it in either the access or candidate list, can't be deleted until you first remove the CHPIDs from the partition. If you try, you receive a message informing you that you can't delete the partition and which identifies a single CHPID that has to be removed first. If the partition has more than a single CHPID uniquely assigned to it, you receive multiple messages, one for each CHPID uniquely assigned to the partition. This could make deleting a partition a cumbersome and inefficient task.

To address this problem, the **Confirm Delete Partition** dialog is enhanced to indicate all CHPIDs exclusively assigned to a partition by flagging them with an asterisk (\*). Now you can remove the flagged CHPIDs in one step and then delete the partition more efficiently.

**When change was introduced:** z/OS V1R11.

### Reference information:

- *z/OS HCD User's Guide*

## HCD: Hardware support

**Description:** HCD provides the following hardware support:

- HCD supports the IBM z10 BC processor (processor type 2098-E10).
- For the z/TPF operating system, 3215 consoles are supported on channel paths of type OSC. IOCP needs to distinguish between OSC-3270 and OSC-3215 attachments. This is done using the CHPARM keyword on the CHPID statement

**When change was introduced:** z/OS V1R10 via SPE.

### Reference information:

- *z/OS HCD User's Guide*

## HCM: New installation process

**Description:** The installation process for HCM has changed. The code is delivered as an MSI package and is installed using the Windows Installer.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS and z/VM HCM User's Guide*

## HCM: New location of the HCM INI file

**Description:** The location of the EEQHCM.INI file has changed from C:\WINDOWS user-specific application data directory. HCM creates separate versions if multiple users are working on the same workstation. Each user has the advantage of his own preferred session settings. Due to changes in the user authorization methods for Windows versions, the change of the location is necessary to allow users who are administrators to update this file.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS and z/VM HCM User's Guide*

## HCM: Supporting IPv6

**Description:** HCM supports the Internet Protocol Version 6 (IPv6) which you allows you to establish a communication session with HCD.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS and z/VM HCM User's Guide*

## HCM: Handling multi-user access enabled IODFs

**Description:** HCM lets you load a multi-user access enabled IODF from HCD configuration file and lets you also open an existing HCM configuration with a multi-user access enabled IODF. You can use the viewing features of HCM on such configuration diagrams and you may changes. However, you cannot update the associated IODF.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS and z/VM HCM User's Guide*

## HCD: Multi-user access

**Description:** When creating an IODF, you can specify a multi-user access option so that multiple users can simultaneously update an IODF. An IODF is kept in exclusive update mode only for the duration of a single transaction. If the updates of the transaction are committed, another user may update the IODF without requiring the first user to release it. Users can switch between single-user and multi-user access using a new option in the Change I/O Definition File Attributes dialog.

## HCD and HCM

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS HCD User's Guide*

### HCD: Changed HCD LDAP support

**Description:** The HCD LDAP Backend now works as a plug-in to the IBM Tivoli Directory Server for z/OS. Support of the z/OS Integrated Security Services LDAP Server has been discontinued.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS HCD User's Guide*

### HCD: CUADD value is shown on the Control Unit List

**Description:** A new column CUADD is introduced on the Control Unit List to display the defined logical address for a control unit where available.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS HCD User's Guide*

### HCD: Changes to the Switch IOCDS request

**Description:** Whenever an HCD Switch IOCDS request is performed, an informational message (CBDG323I) will be written from the HCD session to the console.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS HCD User's Guide*

### HCD: Enhanced spanning of channel paths

**Description:** Through z/OS V1R9 HCD, connected control units and devices were not defined for the new CSS when spanning a channel path to a new CSS. You had to explicitly do this by invoking an action from the Control Unit List.

Beginning with z/OS V1R10, when spanning a channel path with connected control unit(s) (and devices) to a new CSS, HCD invokes a dialog asking whether the control units should also be reachable from the new CSS.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS HCD User's Guide*

### HCM: Enhanced named view

**Description:** HCM now handles the display of named views in a more intuitive way saving the following additional information when creating a named view:

- **List of selected objects:** Objects that had been highlighted when the view was saved will be highlighted again in the restored view.
- **Zooming and scrolling:** The zoom factor as well as the horizontal and vertical scroll position is saved.
- **Connected objects:** If you restore a named view that has been created with Shift+F4, you will see the currently connected objects, even if the connections changed after the view was saved.

If in the **Change View Attributes** dialog, you checked **Objects not connected to processors**, all disconnected devices and their controllers are not shown, but only disconnected devices/controllers of those types that you included in that dialog. If the **Objects not connected to processors** checkbox is not selected, only connected devices/controllers of included types are displayed.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS and z/VM HCM User's Guide*

## HCM: Using configuration packages with HCM

**Description:** A configuration package is a subset of a centrally maintained master IODF that is extracted from it and distributed for activation at specified target systems.

Up until now, working with configuration packages was only possible with HCD. Beginning with z/OS V1R10, new HCM dialogs let you define, edit, transmit, and delete configuration packages corresponding to the HCD functionality.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS and z/VM HCM User's Guide*

## HCM: Create and migrate I/O configuration statements

**Description:** HCM implements new dialogs that let you perform the following tasks (previously, only available in HCD):

- Export/build IOCP input data set
- Export/build I/O configuration statements
- Import/migrate IOCP input data or I/O configuration statements into an IODF

For exporting, users can select where to store the resulting output data, and for importing, they can specify where the source data is located (either on the host or on the workstation).

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS and z/VM HCM User's Guide*

## HCM: Enhanced copy wizards

**Description:** The **Copy Channel Subsystem** wizard allows you to specify an existing target CSS if it contains reserved partitions only.

The **Copy Partition** wizard allows you to specify an existing reserved partition as target partition.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS and z/VM HCM User's Guide*

## HCM: CUADD value is shown on the Control Unit List

**Description:** A new column **CUADD** is introduced on the **Control Unit List** to display the defined logical address for a control unit where available.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS and z/VM HCM User's Guide*

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## IBM Tivoli Directory Server for z/OS (IBM TDS for z/OS) new functions to consider

This topic describes new IBM Tivoli Directory Server for z/OS (IBM TDS for z/OS) functions in z/OS.

### Displaying and managing RACF classes and general resource profiles

**Description:** The SDBM backend is enhanced to display and manage RACF general resource profiles using SDBM add, compare, delete, modify, and search operations. In addition, the hierarchy of RACF classes and the resource profiles in each class can be displayed. RACF SETROPTS options that affect classes (such as refreshing RACLIST) can also be performed using LDAP. New attributes and object classes are added to the LDAP schema to represent the fields in RACF classes, general resource profiles, and class options.

This support also includes enhancing the GDBM backend to create a change log entry to represent a change to a RACF general resource profile. The change log entry is similar to those created when RACF user, group, or connection profiles are changed.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *IBM Tivoli Directory Server Administration and Use for z/OS*

### WLM support: Setting performance goals

**Description:** The LDAP server is enhanced to use Workload Manager (WLM) which enables an installation to set performance goals for LDAP server operations.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *IBM Tivoli Directory Server Administration and Use for z/OS*

## Advanced replication

**Description:** Advanced replication supports many functions that are not available in basic replication. These functions provide better synchronization of data throughout an enterprise.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *IBM Tivoli Directory Server Administration and Use for z/OS*
- *IBM Tivoli Directory Server Client Programming for z/OS*

## CDBM backend

**Description:** CDBM stores some LDAP server configuration information, including the information used to configure advanced replication. The CDBM backend, like the LDBM backend, uses a z/OS UNIX System Services file system to store its entries.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *IBM Tivoli Directory Server Administration and Use for z/OS*

## Control values in ds2ldif LDIF output file

**Description:** The ds2ldif utility has been enhanced to unload by default the replicateOperationalAttributes control for each entry that is unloaded.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *IBM Tivoli Directory Server Administration and Use for z/OS*

## SHA and MD5 Encrypted passwords

**Description:** To improve compatibility, support is added to permit usage of SHA and MD5 passwords that are encrypted in the format used by many LDAP servers on other platforms. This format can also be returned by an LDAP search.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *IBM Tivoli Directory Server Administration and Use for z/OS*

## SASL EXTERNAL bind

**Description:**

- The LDAP server can check that the certificate used in a SASL EXTERNAL bind is mapped to a RACF user ID.
- SDBM operations can be performed after a SASL EXTERNAL bind or a native authentication bind.

**When change was introduced:** z/OS V1R10.

**Reference information:**

## IBM Tivoli Directory Server for z/OS (IBM TDS for z/OS)

- *IBM Tivoli Directory Server Administration and Use for z/OS*

### Wait for DB2 during startup

**Description:** If the LDAP server uses DB2 and DB2 is not available during LDAP server initialization, the LDAP server can wait and periodically try to connect to DB2.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *IBM Tivoli Directory Server Administration and Use for z/OS*

### Password phrase and RACF custom user fields

**Description:** Enhancements have been made to password phrase and custom user fields support:

- **RACFFIELD** keyword in **ibmAttributeTypes** definition has been added to support RACF custom fields.
- **racfPassPhraseEnvelope** and **racfHavePassPhraseEnvelope** attributes have been added in support of RACF password phrase support.
- A password phrase can be specified instead of a password when binding using native authentication or SDBM.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *IBM Tivoli Directory Server Administration and Use for z/OS*

### Monitoring search performance

**Description:** The LDAP server gathers statistics on LDAP search requests. These statistics can be displayed to detect search problems such as poor performance and unsolicited repetitive searches.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *IBM Tivoli Directory Server Administration and Use for z/OS*

### IBM Tivoli Directory Server for z/OS plug-in support

**Description:** IBM Tivoli Directory Server for z/OS now allows you to program directory server plug-ins. In general, a plug-in is a software module that adds function to an existing application or program. In this case, configured plug-ins extend the capabilities of the directory server. It is intended for application programmers who wish to extend the directory server operations, such as database, replication, dynamic schema update or possibly auditing type operations.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *IBM Tivoli Directory Server Plug-in Reference for z/OS*

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## ICKDSF new functions to consider

This topic describes ICKDSF (Device Support Facilities) functions in z/OS.

### EAV support

**Description:** ICKDSF now provides support for extended access volumes (EAVs).

**When change was introduced:** ICKDSF R17 with APAR PK56092.

**Reference information:**

- *Device Support Facilities (ICKDSF) User's Guide and Reference*

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## Infoprint Server new functions to consider

This topic describes new Infoprint Server functions in z/OS.

### Infoprint Port Monitor Version 3.0

**Description:** Version 3.0 of Infoprint Port Monitor for Windows adds support for Windows Vista. It lets you print from Windows Vista, Windows Server 2003, Windows Server 2008, and Windows XP systems to any printer defined in the Infoprint Server Printer Inventory. Version 3.0 also adds support for Windows Terminal Services and Windows fast user switching.

Version 2.6.0 runs on Windows Server 2003 and Windows XP. Version 2.0.6 also runs on Windows NT 4.0, Windows 95, Windows 98, Windows Millennium Edition (ME), and Windows 2000; however, IBM support for these Windows systems has been discontinued.

You can download the z/OS Infoprint Port Monitor for Windows from:

- <http://www.ibm.com/printers/download.html>
- z/OS: /usr/lpp/Printsrv/win/En\_US/aopwin.msi (Version 3.0)
- z/OS: /usr/lpp/Printsrv/win/En\_US/aopwin.exe (Version 2.6)

For Windows configuration information, see the Infoprint Port Monitor help that is installed on your desktop with the Infoprint Port Monitor.

**When change was introduced:** Available in z/OS V1R8, z/OS V1R9, z/OS V1R10, and z/OS V1R11 with APAR OA28158/PTF UA46392.

**Reference information:** None.

### Infoprint Central performance improvement

**Description:** In z/OS R11, Infoprint Central has improved the performance of searches for JES print jobs when you search either by job name or by job ID. To obtain the performance improvement, you must run either JES3 at the R11 level or JES2 in z11 mode. You must use the JES2 \$ACTIVATE command to activate z11 mode.

**When change was introduced:** Available in z/OS V1R11 with the PTF for APAR OA28194.

**Reference information:** For information about the \$ACTIVATE command, see:

- *z/OS JES2 Commands*

### AFP Download Plus support

**Description:** Infoprint Server administrators can now create Print Services Facility (PSF) functional subsystem (FSS) and functional subsystem application (FSA) definitions in the Printer Inventory for AFP Download Plus, a feature of PSF for z/OS. The new ISPF panel for AFP Download Plus FSA definitions lets administrators specify new attributes for AFP Download Plus. In addition:

- The Infoprint Server migration program can migrate AFP Download Plus configuration information from PSF startup procedures to the Printer Inventory.
- Infoprint Central, a Web-based print management system, lets operators work with AFP Download Plus senders that are defined in the Printer Inventory. Operators can do a limited set of PSF printer actions: start, stop, change forms and other job-selection criteria, ping, view printer properties, and see messages from Infoprint Central.

**When change was introduced:** Available in z/OS V1R8, z/OS V1R9, and z/OS V1R10 with these APARs/PTFs:

- APAR OA22697/PTF UA37619
- APAR OA22673/PTF UA38345
- APAR OA23077/PTF UA39898

**Reference information:**

- *z/OS Infoprint Server Operation and Administration*

### Printer Inventory for PSF

**Description:** The “Printer Inventory for PSF” function lets PSF customers who have not purchased an Infoprint Server license use the Infoprint Server Printer Inventory. PSF administrators can now create PSF functional subsystem (FSS) and functional subsystem application (FSA) definitions in the Printer Inventory using the Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) program. In addition, PSF administrators can use the Infoprint Server migration program to migrate printer configuration information from PSF startup procedures to the Printer Inventory.

**When change was introduced:** Available for z/OS V1R8, z/OS V1R9, and z/OS V1R10 with these APARs/PTFs:

- APAR OA22697/PTF UA37619
- APAR OA22673/PTF UA38345

**Reference information:**

- *z/OS Infoprint Server Printer Inventory for PSF*

### Sample job to retrieve messages

**Description:** A new sample job in SYS1.SAMPLIB, AOPLOGUS, can run the z/OS UNIX **aoplogu** command as a batch job. The **aoplogu** command lets Infoprint Server administrators select messages in the Infoprint Server common message log in a particular time range and copy them to a file or view them on the terminal.

**When change was introduced:** Available for z/OS V1R8, z/OS V1R9, and z/OS V1R10 with these APARs/PTFs:

- APAR OA22429/PTF UA37454
- APAR OA23077/PTF UA39898

**Reference information:**

- *z/OS Infoprint Server Operation and Administration*

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## Integrated Security Services new functions to consider

This topic describes new Integrated Security Services functions in z/OS.

Integrated Security Services includes DCE Security Server, Open Cryptographic Enhanced Plug-ins (OCEP), Network Authentication Service, and Enterprise Identity Mapping (EIM).

### Enterprise Identity Mapping: Remote services configuration change

**Description:** When the remote services were introduced in z/OS V1R8, the interface between IBM TDS and ICTX was defined through an IBM TDS database configuration statement. This has been changed, and now the interface between IBM TDS and ICTX is an IBM TDS plug-in. The ICTX extended operations support is enabled by a configuration statement in the IBM TDS configuration file.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Migration*
- *z/OS Integrated Security Services EIM Guide and Reference*

### Enterprise Identity Mapping: Remote authorization enhancement

**Description:** The remote authorization service (part of the ICTX component shipped with EIM) has been enhanced with a new authorization check. The remote authorization service can now be used to query a z/OS system to check if a RACF group ID has authority to access a resource. Previously, the remote authorization service could only check if a user ID had authority to access a resource.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Integrated Security Services EIM Guide and Reference*

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## ISPF new functions to consider

This topic describes new ISPF functions in z/OS.

### ISPF product changes

**Description:** ISPF product changes include:

- Changes to the ZENVIR variable. Characters 1 through 8 contain the product name and sequence number in the format ISPF x.y, where x.y indicates the version number and release. Note that the x.y value is not the same as the operating system version. For example, a value of "ISPF 6.1" represents ISPF for z/OS Version 1 Release 11.0.
- The ZOS390RL variable contains the level of the z/OS release running on your system.
- The ZISPFOS system variable contains the level of ISPF that is running as part of the operating system release on your system. This might or might not match ZOS390RL. For this release of ISPF, the variable contains ISPF for z/OS 01.11.00.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS ISPF Services Guide*
- *z/OS ISPF User's Guide Vol II*

## ISPF Dialog Manager component changes

**Description:** The DM component of ISPF includes these new functions and enhancements:

- The new )INEXIT panel processing statement allows a panel source statement input exit to be specified. The input exit can perform dynamic modification of the ISPF panel. The exit is passed each panel source record as it is read by ISPF and is able to change, insert, or delete panel source records.
- Support for extended member statistics. This allows ISPF to store number of lines values greater than 65,535.
- The File Tailoring )DOT control statement supports the OPT parameter. If the OPT parameter is used and the table specified with the )DOT control statement does not exist ISPF will behave as though the table is empty rather than terminate file tailoring processing with message ISPF122.
- ISPF Configuration Utility changes:
  - New keyword USE\_ADDITIONAL\_QUAL\_FOR\_PDF\_DATA\_SETS is used to specify an additional qualifier included in the default data set name for data sets generated by PDF utilities.
- Dialog Tag Language (DTL) changes:
  - There are no changes to Dialog Tag Language (DTL) for this release.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS ISPF Dialog Developer's Guide and Reference*

## ISPF PDF component changes

**Description:** The ISPF PDF component contains these new functions and enhancements:

- Support for the display of Extended Address Volumes (EAV) data set level attribute EATTR.
- The ISPF Editor COMPARE command is enhanced to allow the name of a data set containing SuperC process statements and allocated to the SYSIN DD to be specified as part of the command syntax.
- New ISPF Editor line commands HX and HXX are provided to allow the display of individual records in hexadecimal format.
- New option Prefix Dsname Level is added to the Data Set list Utility entry panel. When this option is selected the Dsname Level can be specified with or without quotes. When the quotes are omitted the TSO prefix (if running with PREFIX ON) will be prefixed as the first qualifier of the Dsname Level. When the option is not selected the behavior of the entry panel remains unchanged.
- These enhancements to the z/OS UNIX Directory List Utility are provided:
  - New line commands are available to display and update these attributes for files and directories:
    - Owning user
    - Owning group

- File format and tag information
- User auditing options
- Auditor auditing options
- A new line command is available to display information about the file system for a file or directory.
- z/OS UNIX commands can be entered from the primary command field on the directory list display panel.
- Options are provided to allow a user to define default line commands for different file types. The default line command is invoked when a user puts the cursor in the line command field and presses enter without supplying a line command.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS ISPF Edit and Edit Macros*
- *z/OS ISPF User's Guide Vol II*

## ISPF SCLM component changes

**Description:** The ISPF SCLM component contains these new functions and enhancements:

- The Search utility is provided to allow users to search a combination of SCLM groups, types and members for one or more strings.
- The ability to encode members stored in SCLM is available. These members are stored in a compressed format and are not viewable from outside SCLM.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS ISPF Software Configuration and Library Manager Guide and Reference*

## Multiple targets for ISPF Editor MOVE and COPY

**Description:** The enhanced ISPF Editor MOVE and COPY primary commands lets you move or copy data to many locations within the edit session in one operation, reducing the time you spend editing files. Previously, you would have had to move or copy data to one location at a time.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS ISPF Edit and Edit Macros*

## z/OS UNIX interface to TSO and ISPF commands

**Description:** An interface, executing with z/OS UNIX, lets you invoke TSO and ISPF commands and applications. The interface supports multiple TSO and multiple ISPF sessions and allows these sessions to maintain state between command invocations. This interface allows client applications communicating with z/OS through connections, such as HTTP protocol (web-based services), or direct TCP/IP socket connections to invoke TSO and ISPF commands.

**When change was introduced:** z/OS V1R10.

### Reference information:

- *z/OS ISPF Planning and Customizing*

## ISPF service to display a z/OS UNIX directory

**Description:** The new DIRLIST service allows an application to invoke the z/OS UNIX Directory List Utility (option 3.17). This new service allows the application to tailor the layout of the directory list display and to define and process directory list line commands. The new UDLIST system command lets you work with z/OS UNIX files from anywhere within ISPF.

**When change was introduced:** z/OS V1R10.

### Reference information:

- *z/OS ISPF Services Guide*
- *z/OS ISPF Planning and Customizing*

## ISPF enhanced screen swapping

**Description:** This enhancement allows you to view all the logical screens in your ISPF session and navigate more easily between them. ISPF now provides an option which displays a line at the bottom of the physical screen that contains point-and-shoot fields showing the logical screens for your ISPF session. You can put the cursor on the point-and-shoot field for a logical screen, press Enter, and the logical screen becomes the active screen.

**When change was introduced:** z/OS V1R10.

### Reference information:

- *z/OS ISPF User's Guide Vol I*
- *z/OS ISPF Dialog Developer's Guide and Reference*

## Block commands allowed in ISPF Data Set List Utility

**Description:** You can now enter line commands in blocks using the ISPF Data Set List Utility (option 3.4). This greatly reduces the number of line commands you are required to enter on the data set list utility when you need to process a number of data sets grouped together in the list. For example, if you want to delete all the data sets displayed in the data set list, you are only required to enter the delete block line command against the first and last data sets in the list.

**When change was introduced:** z/OS V1R10.

### Reference information:

- *z/OS ISPF User's Guide Vol II*

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## JES2 new functions to consider

This topic describes new JES2 functions in z/OS.

### JES2 supports z11 mode

**Description:** In z/OS V1R11, JES2 introduces several new functions that are available when the member is operating in z11 mode. The primary new function is the ability to extend the \$JOE with variable size extensions. Other new functions include an increase in the maximum number of JQEs (up to 400,000), an increase

in the maximum number of JOEs (up to 1,000,000), an increase in the maximum number of BERTs (up to 1,000,000), and an increase in the number of checkpoint versions (up to 50). To control the activation of these new functions in the release, JES2 reintroduces the \$ACTIVATE command. The \$ACTIVATE command can be used to activate the new level of functions once all members have completed their migration to z/OS V1R11. The \$ACTIVATE command can also be used to fall back to the pre-z11 mode (z2 mode), if necessary.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS JES2 Commands*
- *z/OS JES2 Diagnosis*
- *z/OS JES2 Initialization and Tuning Reference*
- *z/OS JES2 Installation Exits*
- *z/OS JES2 Macros*
- *z/OS JES2 Messages*

## JES2 supports data set creation on Start Spool

**Description:** JES2 has enhanced the Start SPOOL (\$S SPL) command to enable the creation of a new SPOOL volume data set, if the SPOOL volume being started is a new volume.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS JES2 Commands*
- *z/OS JES2 Messages*

## JES2 enhances Spool Data Set Browse

**Description:** Spool Data Set Browse (SDSB) has been enhanced to allow applications to read the SYSLOG data set.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS JES Application Programming*

## JES2 returns APPC transaction data for extended status

**Description:** JES2 now includes APPC transaction data in the terse output from extended status. More fields are added to the IAZSSST (extended status SSOB extension) data area to return terse information for APPC transaction output.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Using the Subsystem Interface*

## JES2 supports APPC filters

**Description:** JES2 now supports filtering for APPC transaction output with Subsystem Interface requests using code 79 (SYSOUT Application Programming

## JES2

Interface – SAPI) and 80 (Extended Status). APPC transactions can be identified by APPC transaction job name, APPC transaction job id, and APPC transaction owner (SSI 80 only). Transactions are typically entered because a task to be performed by a user (typically on a workstation) is to run under an APPC or BPXAS initiator and is given its own job identifier. Therefore, if the task prints output, it can be distinguished from other similar tasks performed by different users.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Using the Subsystem Interface*

## JES2 supports SSI 82

**Description:** JES2 supports Subsystem Interface code 82 (JES Property Information Services). This provides a requesting program with the ability to obtain information about JES managed structures. Five requests types are provided: NJE node information, SPOOL volume information, Initiator information, JESplex information, and Job Class information.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Using the Subsystem Interface*

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## JES3 new functions to consider

This topic describes new JES3 functions in z/OS.

## JES3 returns APPC transaction data for extended status

**Description:** JES3 includes APPC transaction data in the output from extended status. More fields are added to the IAZSSST (extended status SSOB extension) data area to return both terse and verbose information for APPC transaction output.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Using the Subsystem Interface*

## JES3 supports APPC filters

**Description:** JES3 now supports filtering for APPC transaction output with Subsystem Interface requests using code 79 (SYSOUT Application Programming Interface - SAPI) and 80 (Extended Status). APPC transactions can be identified by APPC transaction job name, APPC transaction job id, and APPC transaction owner (SSI 80 only). Transactions are typically entered because a task to be performed by a user (typically on a workstation) is to run under an APPC or BPXAS initiator and is given its own job identifier. Therefore, if the task prints output, it can be distinguished from other similar tasks performed by different users.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS MVS Using the Subsystem Interface*

## JES3 adds an SVC dump exit

**Description:** In z/OS V1R11, JES3 establishes a dump exit. Whenever a dump is taken in a user address space, either because it fails, because the operator requests a dump, or because a dump is triggered by a SLIP trap, JES3 determines if a subsystem interface request is active for the address space. If so, the dump exit adds the JES3, JES3AUX, and JESXCF address spaces to be included in the dump.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS JES3 Diagnosis Reference*

## JES3 supports SSI 70

**Description:** JES3 supports Subsystem Interface code 70 (Scheduler Facilities Call). This provides a requesting program with the ability to modify or obtain the characteristics of SYSOUT data sets which are controlled by subsystem maintained scheduler data (for example, SWBTU).

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS JES3 Diagnosis*
- *z/OS JES3 Diagnosis Reference*
- *z/OS MVS Using the Subsystem Interface*

## JES3 supports SSI 82

**Description:** JES3 supports Subsystem Interface code 82 (JES Property Information Services). This provides a requesting program with the ability to obtain information about JES managed structures. There are five requests types:

- NJE node information
- SPOOL volume information
- Initiator information
- JESplex information
- Job Class information

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS JES3 Diagnosis*
- *z/OS JES3 Diagnosis Reference*
- *z/OS MVS Using the Subsystem Interface*

## JES3 enhances Spool Data Set Browse

**Description:** Spool Data Set Browse (SDSB) has been enhanced to include active buffers of a SYSOUT data set across systems. The JES3 z/OS V1.10 support for SDSB provided access to active buffers only when the browser and data set owning jobs were on the same system. This has been added to enhance the SDSF support for JES3.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS JES3 Diagnosis*
- *z/OS JES3 Diagnosis Reference*
- *z/OS JES Application Programming*

**JES3 adds SYSLOG browse**

**Description:** JES3 provides the capability to browse all SYSLOG data sets for all SYSLOG jobs on a system as a single, logically concatenated SYSLOG data set. This has been added to enhance SDSF support for JES3.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS JES3 Diagnosis*
- *z/OS JES3 Diagnosis Reference*
- *z/OS JES Application Programming*

**JES3 adds Spool Data Set Browse**

**Description:** JES3 adds Spool Data Set Browse (SDSB) to view SYSOUT data sets. SDSB has advantages over the SYSOUT Application Programming Interface (SAPI) including viewing SYSOUT data sets which are open and allowing multiple users to concurrently access a data set. This provides the initial SDSF support for JES3.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS JES3 Diagnosis*
- *z/OS JES3 Diagnosis Reference*
- *z/OS JES Application Programming*

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**Language Environment new functions to consider**

This topic describes new Language Environment functions in z/OS.

**Application enablement in z/OS V1R11**

**Description:** z/OS V1R11 provides the following application enablement enhancements:

- **IEEE decimal floating-point (DFP) support** z/OS Language Environment provides additional DFP functions in the C/C++ run-time library and adds new conversion specifiers for the printf() family of functions.
- **Assembler macro support** z/OS Language Environment provides a new assembler macro, CEEGLOB. Support is added for the RMODE and AMODE keywords on the CEEENTRY macro. Support is added to the CEEFETCH macro to handle non-Language Environment routines. Support is added for the SERVICE keyword on the CEEPPA macro.
- **CICS additional floating-point support** Language Environment, with CICS Transaction Server for z/OS V4, is designed to support IEEE binary floating-point (BFP) and IEEE decimal floating-point (DFP) in applications run under the Language Environment-CICS extended run-time language interface (ERTLI).

**When change was introduced:** z/OS V1R11.

**Reference information:**

- For more information on IEEE decimal floating-point (DFP) support, see:
  - *z/OS XL C/C++ Run-Time Library Reference*
  - *z/OS XL C/C++ Programming Guide*
- For more information on Assembler macro support, see:
  - *z/OS Language Environment Programming Guide*
  - *Enterprise COBOL for z/OS Migration Guide*
- For more information on CICS additional decimal floating-point support, see the CICS chapter in:
  - *z/OS Language Environment Programming Guide*

## AMODE 64 enhancements in z/OS V1R11

**Description:** z/OS V1R11 provides the following AMODE 64 enhancements:

- **Support for GETSTORE, FREESTORE, and MSGRTN** z/OS Language Environment provides support in CELQPIPI for the GETSTORE, FREESTORE, and MSGRTN service routines similar to those routines in CEEPIPI.
- **Large page support** Language Environment provides support in \_\_moservices() for allocating memory objects that are to be backed with large page frames.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- For more information on GETSTORE, FREESTORE, and MSGRTN support, see:
  - *z/OS Language Environment Programming Guide for 64-bit Virtual Addressing Mode*
- For more information on large page support, see:
  - *z/OS XL C/C++ Run-Time Library Reference*

## Reliability, availability, and serviceability in z/OS V1R11

**Description:** z/OS V1R11 provides the following reliability, availability, and serviceability enhancements:

- **Syscall trace**  
Language Environment, with z/OS UNIX System Services, provides a new signal, SIGTRACE, that can be used to start and stop the syscall trace.
- **Heap pools**  
Language Environment provides LEDATA formatting of heap pool information. In addition, the heap pools trace capability is enhanced.
- **File I/O tracing**  
Language Environment provides a stream I/O tracing mechanism within the C/C++ run-time library.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- For more information on syscall trace, see:
  - *z/OS UNIX System Services Programming: Assembler Callable Services Reference*

## Language Environment

- *z/OS Language Environment Debugging Guide*
- 
- For more information on heap pool enhancements, see;
  - *z/OS Language Environment Debugging Guide*
  - *z/OS Language Environment Programming Reference*
- For more information on file I/O tracing, see:
  - *z/OS XL C/C++ Programming Guide*

## Globalization

**Description:** z/OS Language Environment provides locale support for Serbia.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS XL C/C++ Programming Guide*

## File system remount

**Description:** Language Environment, with z/OS UNIX System Services, provides a new option for `umount()` that supports a remount (`unmount` and `mount`) in the same mode.

**Reference information:**

- *z/OS XL C/C++ Run-Time Library Reference*
- *z/OS UNIX System Services Programming: Assembler Callable Services Reference*

## Asynchronous I/O support

**Description:** Along with z/OS UNIX System Services changes, updates made to the C/C++ run-time header file `<aio.h>` support an asynchronous I/O form of `accept_and_recv()`.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS XL C/C++ Run-Time Library Reference*
- *z/OS UNIX System Services Programming: Assembler Callable Services Reference*

## I/O support for extended address volumes (EAVs)

**Description:** Language Environment provides I/O support within the C/C++ run-time library for extended format sequential data sets residing in the extended addressing space on extended address volumes (EAVs).

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS XL C/C++ Programming Guide*

## XPLINK

**Description:** z/OS Language Environment improves performance for certain pthread condition variable functions.

**When change was introduced:** z/OS V1R11.

**Reference information:** None.

## Ease of use in z/OS V1R10

**Description:** Language Environment provides the following ease of use enhancements:

- **CEEROPT enhancements** CEEROPT is expanded so that it can now be loaded outside of the CICS and LRR environments.  
This support is controlled by using keywords in CEEPRMxx parmlib members.
- **Tool for checking the syntax of CEEPRMxx members** Language Environment is enhanced to provide a tool for syntax checking of one or more CEEPRMxx members of PARMLIB before attempting to activate them.
- **IBM Health Checker for z/OS and Sysplex support** Support is added to verify the use of parmlib members for Language Environment on z/OS V1R8, z/OS V1R9, and z/OS V1R10. The check is to verify that at least one parmlib member is defined and at least one option group is in use. It reports on which option groups are in use.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- For more information on CEEROPT enhancements and the tool for checking the syntax of CEEPRMxx members, see:
  - *z/OS Language Environment Customization*
- For more information on IBM Health Checker for z/OS and Sysplex support, see:
  - *IBM Health Checker for z/OS: User's Guide*

## Performance enhancements in z/OS V1R10

**Description:** Performance is enhanced with the following:

- **Heap pools performance improvements**  
Enhancements are made to reduce contention when heap pool cells are allocated and freed.
- **AMODE 64 support for HEAPPOOLS** Language Environment provides support for the HEAPPOOLS run-time option in AMODE 64 applications. This allows AMODE 64 applications that use `__malloc31()` to exploit the optional heap pools algorithm to manage 31-bit user heap storage (above the 16MB line and below the 2GB bar).
- **Performance improvement for I/O** The Language Environment C/C++ run-time library provides support to improve I/O performance in multithreaded C/C++ applications. A new keyword, **samethread**, is added to the `fopen()` function. The `unlock()` family of functions is expanded.
- **Middleware performance improvement** Language Environment now provides a way to save and restore the stack pointer when not running on the Language Environment stack. This can be used by vendors in middleware and Assembler programs to achieve better optimization because another register is available.

**When change was introduced:** z/OS V1R10.

## Language Environment

### Reference information:

- For more information on heap pools performance improvements, see:
  - *z/OS Language Environment Customization*
  - *z/OS Language Environment Programming Reference*
- For more information on AMODE 64 support for HEAPPOOLS performance improvements, see:
  - *z/OS Language Environment Run-Time Application Migration Guide*
  - *z/OS Language Environment Customization*
  - *z/OS Language Environment Programming Reference*
- For heap pools usage tips, see:
  - *z/OS Language Environment Programming Guide*
  - *z/OS Language Environment Programming Guide for 64-bit Virtual Addressing Mode*
- For more information on heap pools, see:
  - *z/OS Language Environment Debugging Guide*
- For more information on performance improvement for I/O, see:
  - *z/OS XL C/C++ Run-Time Library Reference*
- For more information on middleware performance improvement, see:
  - *z/OS Language Environment Debugging Guide*
  - *z/OS Language Environment Vendor Interfaces*

## Reliability, availability, and serviceability enhancements in z/OS V1R10

**Description:** Language Environment is enhanced to provide the following:

- **IPCS LEDATA for C control blocks** Language Environment debugging is enhanced to show the format of specific control blocks in the IPCS LEDATA report.

A new report-type parameter, COMP, is added to LEDATA. This new parameter gives the user flexibility to format component-specific control blocks.
- **SDUMP serviceability** Language Environment in AMODE 64 now assigns a dump priority to each memory object that is obtained. This priority helps to ensure that information important for problem determination, such as stacks and control blocks, is available in a partial dump.

A Memory Object Services function, `__moservices()`, is also provided. This function allows a user to get and detach memory objects with a user-defined dump priority, and also to set the dump priority for shared memory.

**When change was introduced:** z/OS V1R10.

### Reference information:

- For more information on IPCS LEDATA for C control blocks, see:
  - *z/OS Language Environment Debugging Guide*
- For more information on SDUMP serviceability, see:
  - *z/OS Language Environment Programming Guide for 64-bit Virtual Addressing Mode*
- For information on pthread stack tuning considerations, see:
  - *z/OS Language Environment Programming Reference*
  - *z/OS Language Environment Customization*
- For information on the `__moservices()` function, see:

– *z/OS XL C/C++ Run-Time Library Reference*

## Security enhancements in z/OS V1R10

**Description:** Language Environment provides the following security enhancements:

- **Password phrase support** The C/C++ run-time library functions `__login()`, `__passwd()`, and `pthread_security_np()` are updated to provide password phrase support.
- **Specifying applid for services accepting passtickets**  
C/C++ runtime library APIs are added that accept an application identifier (APPLID) in addition to the existing arguments for the functions `__login()`, `__passwd()`, and `pthread_security_np()`. New versions of these functions are provided to allow specification of an APPLID.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- For more information on password phrase support, see:  
– *z/OS XL C/C++ Run-Time Library Reference*
- For more information on APPLID, see:  
– *z/OS XL C/C++ Run-Time Library Reference*

## Decimal floating-point (DFP) support

**Description:** Additional support is provided in the C/C++ run-time library for decimal floating-point based on the ISO Technical Report draft.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS XL C/C++ Run-Time Library Reference*

## Virtual storage constraint relief

**Description:** The amount of below-the-line storage used by Language Environment is reduced.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Language Environment Run-Time Application Migration Guide*
- *z/OS XL C/C++ Compiler and Run-Time Migration Guide for the Application Programmer*

## Support for the compare and trap data exception

**Description:** Language Environment is enhanced to provide information to condition handling routines so that they can detect that a compare and trap data exception has occurred.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS XL C/C++ Run-Time Library Reference*

### Support for zFS file system status

**Description:** Language Environment provides support by using the `w_getmntent()` function to obtain status information about the zFS physical file system (PFS).

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS XL C/C++ Run-Time Library Reference*

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### Library Server new functions to consider

This topic describes new Library Server functions in z/OS.

#### Administration interface upgrade

**Description:** Library Server V3.3 has added an entirely new administration interface which is implemented as a Java applet. This new interface replicates and extends all existing administrative functions using an object-based design in which an Windows Explorer-like dialog exists for each of the LibraryCenters, Bookcases, InfoCenters, Shelves, Collections and Settings objects. The new dialogs now provide a tree node selection interface for specifying directories, and the ability to navigate between dialogs without the user ever needing to push the browser's back-arrow button. The original HTML-based administration interface is still available, and the administrative user has the ability to toggle between the Html and Java based administration interfaces, as desired.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *Library Server: Getting Started*

#### InfoCenter indexing performance enhancements

**Description:** Performance improvements for indexing and displaying InfoCenters have been implemented in Library Server V3.3. These improvements greatly enhance Library Server's scalability for InfoCenters that contain huge numbers of topic nodes.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *Library Server: Getting Started*

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### NFS new functions to consider

This topic describes new Network File System (NFS) functions in z/OS.

#### mvslogin and mvslogout requirement for RPCSEC\_GSS requests in the NFS Server eliminated

**Description:** `mvslogin` and `mvslogout` are no longer required for `RPCSEC_GSS` requests in the NFS server.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Network File System Guide and Reference*

## New z/OS NFS server site attributes added

**Description:** The following new z/OS NFS server site attributes are added:

- A new mvs prefix enables the customer to explicitly specify a prefix for identifying MVS data sets, like the hfs prefix does for z/OS Unix files. This includes new server site attributes: HFSPREFIX(*prefix*), MVSPREFIX(*prefix*), and IMPPREFIX(*impprefix*)
- DELEGATION/NODELEGATION specifies whether the NFS server will allow NFS v4 file management delegation to NFS clients for MVS data sets or not. The default setting is NODELEGATION.
- DlyDTimeout specifies the minimum delay detection time value in seconds before the Delay Detection mechanism observes a delay in an external call from the NFS component and prints a warning console message. The valid range is from 5 to 60 seconds, with a default of 10. The mechanism can be disabled by specifying a value of zero.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Network File System Guide and Reference*

## Console completion messages added

**Description:** z/OS NFS Server has added console completion messages for all NFS server console operator commands that did not previously display a successful completion message.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Network File System Guide and Reference*

## Reasons code format generation enhanced

**Description:** z/OS NFS Client has changed its generation of the reason code format such that more of the reason codes are publishable and more meaningful.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Network File System Guide and Reference*

## NFS Client console message Japanese National Language Support

**Description:** z/OS NFS Client now provides Japanese language National Language Support (NLS) for NFS Client console messages.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Network File System Guide and Reference*

## Support to dynamically detect excessive delays from requests external to NFS

**Description:** z/OS NFS Server adds support to dynamically detect excessive delays from requests external to the NFS component. The z/OS NFS Server will report these delays with a console message.

The DlyDTimeout site attribute has been added to provide the customer with the capability of configuring the timeout value.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Network File System Guide and Reference*

## NFS V4 file access delegation support

**Description:** z/OS NFS Server adds support to exploit NFS V4 File access delegation for MVS data sets to NFS Clients. File access delegation for z/OS UNIX files is not supported in this release.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Network File System Guide and Reference*

## NFS Server NFS V4 Mount with symlink restriction is eliminated

**Description:** z/OS NFS Server NFS V4 Mount with symlink restriction is eliminated. NFS v4 mounts can now contain symlinks in the mount path specification.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Network File System Guide and Reference*

## Value range expanded for client BUFHIGH space attribute

**Description:** The buffer space attribute value range - BUFHIGH(n) - will be expanded so that the maximum value is 1024 (i.e. 1GB) and its default value will be changed from 32 (i.e. 32 MB) to 128 (i.e. 128 MB). For compatibility with prior releases and to avoid migration impacts, the minimum value will be left at 4 (i.e. 4 MB).

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Network File System Guide and Reference*

## z/OS NFS Client implementation of security negotiation through SECINFO

**Description:** Security Negotiation using the SECINFO operation is now performed by the z/OS NFS Client in the following instances:

- During mount point establishment
- During NFS4ERR\_WRONGSEC handling

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Network File System Guide and Reference*

## 64-bit addressing support

**Description:** z/OS NFS now supports 64-bit addressing for the NFS Client Utilities (mvslogin, mvslogout, showattr) for non-z/OS platform usage.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Network File System Guide and Reference*

## -norpcbind keyword

**Description:** Keyword -norpcbind has been added to the mvslogin, mvslogout, showattr, and showmount commands.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Network File System Guide and Reference*

## Japanese NLS for server console messages

**Description:** z/OS NFS now provides Japanese language National Language Support (NLS) for NFS Server Console messages.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Network File System Guide and Reference*

## Filtering criteria panels

**Description:** z/OS NFS adds support for NFS Server Filtering Criteria and new NFS Client Filtering Criteria panels.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Network File System Guide and Reference*

## nfstasks attribute

**Description:** The nfstasks attribute has been updated to include values to specify the number of transport subtasks that handle TCP and UDP network requests.

**When change was introduced:** z/OS V1R10

**Reference information:**

- *z/OS Network File System Guide and Reference*

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## RMF new functions to consider

This topic describes new Resource Measurement Facility (RMF) functions in z/OS.

### New report on OPT parameter settings

**Description:** RMF provides a new Monitor II **OPT Settings** report which displays information about the active OPT PARMLIB member and the settings of all OPT parameters.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS RMF Report Analysis*

### Replacement of the Postprocessor Plot report

**Description:** Plot reports by the RMF Postprocessor are no longer available. Each type of plot report can be replaced by a corresponding Overview control statement. After creating Overview records, the Spreadsheet Reporter with the **Open RMF Overview Spreadsheets** macro can be used for graphical presentation of Postprocessor data.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS RMF User's Guide*

### New real storage measurements

**Description:** The **Frame and Slot Counts** section of the Postprocessor **Paging Activity** report is enhanced to provide measurements about real storage requests and page faults.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS RMF Report Analysis*

### Measuring WLM's promotion for workloads holding locks

**Description:** The Postprocessor **Workload Activity** report is enhanced to show the CPU time consumed for work units while they have been promoted by WLM to free a local suspend lock quicker. In addition, RMF provides new overview conditions for the Postprocessor based on SMF record 72-3.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS RMF Report Analysis*

### Enhanced group capacity reporting

**Description:** RMF enhances its reporting about capacity groups. The **Partition Data** report displays the long term average capacity which is not used by members of the group but would be allowed by the defined limit. The **Group Capacity** report displays a column CAPPING WLM% which indicates to what extent the partition is

subject to capping. Column CAPPING ACT% is added which displays how capping really limited the usage of processor resources. In addition, the RMF Distributed Data Server provides a new metric. Besides the remaining time until capping, RMF PM can display the remaining time until group capping which is the projected time until the group becomes subject to capping.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS RMF Report Analysis*

## New Overview conditions for special purpose processors

**Description:** The RMF Postprocessor provides additional Overview conditions based on SMF record 70 for measuring the CPU activity of zAAPs and zIIPs.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS RMF User's Guide*

## RMF Postprocessor reports in XML format

**Description:** The Postprocessor can now generate certain reports in XML format. You can generate reports in XML format instead of in text format by specifying new ddnames for the Postprocessor output. Currently available in XML format are the CPU, CRYPTO, ESS, FCD, and OMVS reports as well as the Overview report. You can use the RMF Spreadsheet Reporter to request the reports in XML format for display in a web browser.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS RMF User's Guide*

## Selective deactivation of Monitor III reports

**Description:** You can temporarily deactivate selected Monitor III reports which are not required by any monitoring client from being provided by the Distributed Data Server.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS RMF User's Guide*

## 64-Bit common storage measurements

**Description:** The new Monitor III **Storage Memory Objects** report (STORM) contains of 64-bit virtual common storage consumption per system and per job. Measurements about the usage of memory objects previously contained in the Monitor III **Storage Resource Delays (STORR)**, **Storage Delay Summary (STORS)**, and **Storage Frames (STORF)** reports are moved to this new report.

Also, the following Postprocessor reports are enhanced to provide 64-bit virtual common storage usage information:

## RMF

- In the **Frame and Slot Counts** section of the **Paging Activity report**, a new **Memory Objects and Frames** category is added.
- In the **Private Area Detail** section of the **Virtual Storage Activity** report, the section containing memory allocation values above 2GB is enhanced with new information about memory objects and 1 MB frames.

In addition, RMF provides new overview conditions for the Postprocessor based on SMF record 71.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS RMF Report Analysis*

## New reports on spin locks and suspend locks

**Description:** RMF periodically checks all types of system resource locks and provides information about lock holders and lock contention in two new Monitor III reports:

- **Spin Lock Report**
- **Suspend Lock Report**

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS RMF Report Analysis*

## Support of WLM enqueue management

**Description:** The Postprocessor **Workload Activity** report is enhanced to show the CPU times for work units that have been promoted by WLM for reasons of enqueue management and chronic resource management.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS RMF Report Analysis*

## Providing DASD volume capacity

**Description:** The Postprocessor **Direct Access Device Activity** report shows the volume capacity for DASD devices specified by the number of cylinders. In addition, RMF provides a new overview condition for the Postprocessor based on SMF record 74-1.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS RMF Report Analysis*

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## Run-Time Library Extensions new functions to consider

This topic describes new Run-Time Library Extensions functions in z/OS.

## Ddpi\_Sourcefile APIs provide information about a source file

**Description:** The `ddpi_sourcefile_get_source_lines` operation returns the contents of the source file at the given line numbers. The returned string will be NULL terminated.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Common Debug Architecture Library Reference*

## Common Debug Architecture support for creating a module map for debugging

**Description:** Common Debug Architecture libraries include APIs that support creation of a module map for debugging. Debuggers that support demand load can use the module map for faster access to debug information.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Common Debug Architecture Library Reference*
- *z/OS Common Debug Architecture User's Guide*

## DWARF/ELF library extensions

**Description:** Common Debug Architecture libraries include additional extensions to the `libelf` library for initialization and termination. DWARF initialization and termination consumer operations have also been updated.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *DWARF/ELF Extensions Library Reference*

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## SDSF new functions to consider

This topic describes new SDSF functions in z/OS.

### Expanded support for the JES3 environment

**Description:** SDSF has added support for the SYSLOG, Job Class (JC) and Spool Volumes (SP) panels in the z/OS JES3 environment. These complement the support for the Display Active Users (DA), Input Queue (I) and Status (ST) panels that was made available in z/OS V1R10 SDSF.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS SDSF Operation and Customization*

### Enhanced support for the REXX programming language

**Description:** SDSF simplifies entering system commands with a new ISFSLASH command, and allows multiple actions or column modifications to be performed with a single ISFACT command. A new ISFRESET function drops all special variables.

## SDSF

The COLSHELP command, which shows information about columns, is now context-sensitive and includes filter and locate functions.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS SDSF Operation and Customization*

## Elimination of the need for the HASPINDEX data set with the SYSLOG

**Description:** The HASPINDEX-based SYSLOG is replaced by a logical log that eliminates the need for a HASPINDEX data set.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS SDSF Operation and Customization*

## Elimination of the need for the SDSF sysplex support with the SYSLOG

**Description:** When displaying the SYSLOG for a system other than the one you are logged on to, you no longer need the SDSF sysplex support, which uses the SDSF server and WebSphere MQ, to see the latest data (data not yet written to spool). The SDSF sysplex support is still required for JES2 sysplex-wide device panels.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS SDSF Operation and Customization*

## Support for the JES3 environment

**Description:** SDSF now operates in the z/OS JES3 environment. You can use these SDSF panels to manage JES3 jobs and browse their data sets: Display Active Users (DA), Input Queue (I) and Status (ST). Those SDSF panels that do not depend on JES are also available in the JES3 environment, such as IBM Health Checker for z/OS (CK), Processes (PS), and Operlog (LOG).

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS SDSF Operation and Customization*

## Enhanced support for the REXX programming language

**Description:** SDSF's support for the REXX programming language now includes the ability to specify an unlimited number of filters and new options that make it easier to specify the columns that you want to include when accessing a panel.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS SDSF Operation and Customization*

## Security Server new functions to consider

This topic describes new Security Server functions in z/OS.

### EAV R2 toleration

**Description:** A RACF database must not reside in the extended addressing area of DASD volumes. If a RACF database is allocated in the extended addressing area, RACF and its related utilities may not work correctly. To ensure that RACF databases are not allocated in the extended addressing area, the following DD statements for the following RACF utilities must not contain the keyword parameter EATTR unless its value is NO (EATTR=NO):

- the SYSRACF DD statement for the IRRMIN00 utility
- the SYSUT1 DD statement for the IRRUT200 utility
- the OUTDD DD statement for the IRRUT400 utility

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Security Server RACF System Programmer's Guide.*

### Extending support for multi-byte UTF8 characters that are outside the IBM-1047 code page

**Description:** You can now install, display certificates, retrieve, and authenticate certificates, certificate requests and certificate filters with distinguished or alternate names containing UTF8 characters that are outside of the IBM-1047 code page through the RACDCERT command, and the R\_Datalib and initACEE callable services.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Security Server RACF Callable Services.*
- *z/OS Security Server RACF Command Language Reference.*

### Automatically assign unique IDs through UNIX applications

**Description:** You can now automatically assign a unique UID for each user and a unique GID for each group that needs access to z/OS UNIX functions and resources. This assignment does not require the specification of the AUTOUID or AUTOGID operands on the RACF TSO commands but happens automatically when a user without an OMVS segment invokes a UNIX function. The support uses the BPX.UNIQUE.USER profile in the FACILITY class, which is the recommended replacement for using a shared UID or GID from the BPX.DEFAULT.USER profile.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Security Server RACF Auditor's Guide*
- *z/OS Security Server RACF Callable Services*
- *z/OS Security Server RACF Command Language Reference*
- *z/OS Security Server RACF Macros and Interfaces*
- *z/OS Security Server RACF Security Administrator's Guide*

### Signing and verifying programs

**Description:** z/OS signature verification is now provided in order for RACF to digitally sign and verify programs. As an option, RACF can enforce that a program module be digitally signed and verified before being loaded for execution on a z/OS system. In addition, you can now authorize selected users to digitally sign program modules that are bound at your installation.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Security Server RACF Auditor's Guide*
- *z/OS Security Server RACF Callable Services*
- *z/OS Security Server RACF Command Language Reference*
- *z/OS Security Server RACF Macros and Interfaces*
- *z/OS Security Server RACF Security Administrator's Guide*
- *z/OS Security Server RACF Data Areas*
- *z/OS Security Server RACF Diagnosis Guide*
- *z/OS Security Server RACF Messages and Codes*
- *z/OS Security Server RACROUTE Macro Reference*
- *z/OS Security Server RACF System Programmer's Guide*

### Define distributed identity mappings

**Description:** The ability to associate a RACF user ID with a distributed identity, while maintaining the user's original identity information for audit purposes, is added.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Security Server RACF Auditor's Guide*
- *z/OS Security Server RACF Callable Services*
- *z/OS Security Server RACF Command Language Reference*
- *z/OS Security Server RACF Macros and Interfaces*
- *z/OS Security Server RACF Security Administrator's Guide*
- *z/OS Security Server RACF Data Areas*
- *z/OS Security Server RACF Diagnosis Guide*
- *z/OS Security Server RACF Messages and Codes*
- *z/OS Security Server RACROUTE Macro Reference*
- *z/OS Security Server RACF System Programmer's Guide*
- *z/OS Security Server RACF General User's Guide*

### Recording logon statistics

**Description:** You can reduce the system impact of recording logon statistics for selected applications by recording statistics for only the first daily logon by each user, rather than for every daily logon by each user.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Security Server RACF Auditor's Guide*
- *z/OS Security Server RACF Command Language Reference*
- *z/OS Security Server RACF Macros and Interfaces*
- *z/OS Security Server RACF Security Administrator's Guide*
- *z/OS Security Server RACF Data Areas*
- *z/OS Security Server RACF Messages and Codes*
- *z/OS Security Server RACROUTE Macro Reference*
- *z/OS Security Server RACF System Programmer's Guide*

## R\_admin (IRRSEQ00) callable service support for extracting RACF general resource profiles

**Description:** The R\_admin callable service (IRRSEQ00) has added a new function code, ADMN\_XTR\_RESOURCE, which extracts a general resource profile, and a new function code, ADMN\_XTR\_NEXT\_RESOURCE, which iteratively extract profiles within a class. In addition, supervisor state callers can now enforce an authorization check in the FACILITY class.

**When change was introduced:** z/OS V1R11.

### Reference information:

- *z/OS Security Server RACF Callable Services*
- *z/OS Security Server RACF Security Administrator's Guide*
- *z/OS Security Server RACF Data Areas*
- *z/OS Security Server RACROUTE Macro Reference*

## R\_admin (IRRSEQ00) callable service enhancement to the SETROPTS extract function

**Description:** The R\_admin callable service (IRRSEQ00) has changed to allow problem state callers to extract SETROPTS information. A FACILITY class check is enforced, as are the rules of the SETROPTS LIST command. Supervisor state callers can control which authorization checks are performed.

**When change was introduced:** z/OS V1R11.

### Reference information:

- *z/OS Security Server RACF Callable Services*
- *z/OS Security Server RACF Security Administrator's Guide*
- *z/OS Security Server RACF Data Areas*

## A new REXX interface to extract RACF profile and SETROPTS information

**Description:** An interface is being added for use by REXX programs to obtain RACF profile and SETROPTS information using the R\_admin (IRRSEQ00) callable service. The extracted information is saved in a REXX stem variable. An interface (IRRXUTIL) is being added.

**When change was introduced:** z/OS V1R11.

### Reference information:

- *z/OS Security Server RACF Callable Services*

## Security Server (RACF)

- *z/OS Security Server RACF Macros and Interfaces*

### Providing profile name in authorization exits

**Description:** RACF will provide the RACF profile name used in the authorization check to RACROUTE REQUEST=AUTH and RACROUTE REQUEST=FASTAUTH post-processing exits.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Security Server RACF Data Areas*
- *z/OS Security Server RACF System Programmer's Guide*
- *z/OS Security Server RACF Macros and Interfaces*

### New ICSF segment on the RACF general resource profile

**Description:** An ICSF segment is added to contain ICSF policy information. The segment applies to profiles in the CSFKEYS/GCSFKEYS and XCSFKEY/GXCSFKEY classes which protect symmetric and asymmetric keys stored in the ICSF CKDS and PKDS. This limits the symmetric keys that can be exported from ICSF and identifies the asymmetric keys that can be used in the export operation.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS Security Server RACF Command Language Reference*
- *z/OS Security Server RACF Macros and Interfaces*
- *z/OS Security Server RACF Security Administrator's Guide*
- *z/OS Security Server RACF Data Areas*
- *z/OS Security Server RACF Messages and Codes*
- *z/OS Security Server RACROUTE Macro Reference*
- *z/OS Security Server RACF System Programmer's Guide*
- *z/OS Security Server RACF Callable Services*

### Increased cryptographic key size

**Description:** Support is added for increased cryptographic key size up to 4096 bit. RACDCERT will call the ICSF callable service to generate a RSA PCICC key with a size up to 4096 bits.

To improve information retrievability and clarity, the RACDCERT command documentation is now presented in a full set of new topics that individually describe each RACDCERT function. Each topic is entitled with the name of the RACDCERT command function, and contains the purpose, authorization required, syntax, parameter descriptions, examples, and other specific information about using each function. In addition, the online TSO/E help information for the RACDCERT command is similarly restructured. Additional TSO/E command aliases are now added to invoke help information for each RACDCERT function.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Security Server RACF Command Language Reference*
- *z/OS Security Server RACF Callable Services*

- *z/OS Security Server RACF Diagnosis Guide*
- *z/OS Security Server RACF Messages and Codes*
- *z/OS Security Server RACF Security Administrator's Guide*
- *z/OS Cryptographic Services PKI Services Guide and Reference*

## z/OS password phrase use for Kerberos user authentication

**Description:** RACF password phrases offer an alternative to traditional eight character passwords, which by virtue of their length and composition offer stronger authentication than traditional passwords. Support is added to allow the z/OS Network Authentication Service to use z/OS password phrase support for Kerberos user authentication, by supporting authentication using a 1 to 100 character password.

Also added:

- With TSO/E adding support for logging on with a password phrase, the SETROPTS PASSWORD(WARNING(n)) setting will now apply to password phrases in addition to passwords.
- A current restriction regarding message return processing in RACROUTE is being removed. Now, messages ICH70001I and ICH70002I can be returned to a RACROUTE application specifying MSGRTRN=YES, even when ACEE= is specified.

**When change was introduced:** z/OS V1R10.

### Reference information:

- *z/OS Security Server RACF Callable Services*
- *z/OS Security Server RACF Command Language Reference*
- *z/OS Security Server RACF Data Areas*
- *z/OS Security Server RACF General User's Guide*
- *z/OS Security Server RACF Macros and Interfaces*
- *z/OS Security Server RACROUTE Macro Reference*
- *z/OS Security Server RACF Messages and Codes*
- *z/OS Security Server RACF Security Administrator's Guide*
- *z/OS Security Server RACF System Programmer's Guide*

## Miscellaneous password phrase enhancements

**Description:** z/OS V1R10 includes the following password phrase enhancements:

- With TSO/E adding support for logging on with a password phrase, the SETROPTS PASSWORD(WARNING(n)) setting will now apply to password phrases in addition to passwords.
- A current restriction regarding message return processing in RACROUTE is being removed. Now, messages ICH70001I and ICH70002I can be returned to a RACROUTE application specifying MSGRTRN=YES, even when ACEE= is specified.
- Password phrase changes can be change logged in LDAP, the same way passwords currently are. This allows a password synchronization application to recognize when password phrase changes occur on z/OS. RACF can also create encrypted envelopes for password phrases as it can currently do for passwords. This allows for the clear text phrase to be recovered by such a trusted password synchronization application, and propagated throughout the enterprise.

**When change was introduced:** z/OS V1R10.

### Reference information:

## Security Server (RACF)

- *z/OS Security Server RACF Callable Services*
- *z/OS Security Server RACF Command Language Reference*
- *z/OS Security Server RACF General User's Guide*
- *z/OS Security Server RACF Macros and Interfaces*
- *z/OS Security Server RACROUTE Macro Reference*
- *z/OS Security Server RACF Messages and Codes*
- *z/OS Security Server RACF Security Administrator's Guide*

## IPCS formatting for RACF control blocks

**Description:** IPCS formatting for RACF control blocks is added for analyzing RACF dump information.

IPCS formatting is intended only for diagnosis use when requested by the IBM support center.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Security Server RACF Diagnosis Guide*

## Custom user and group fields

**Description:** Additional fields are added within the RACF database which can be customized to hold specific security information. You will be able to tailor the names and attributes of those fields to suit your purposes. These custom fields can be administered using RACF commands and the R\_admin callable service.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Security Server RACF Auditor's Guide*
- *z/OS Security Server RACF Callable Services*
- *z/OS Security Server RACF Command Language Reference*
- *z/OS Security Server RACF Data Areas*
- *z/OS Security Server RACF Diagnosis Guide*
- *z/OS Security Server RACF General User's Guide*
- *z/OS Security Server RACF Macros and Interfaces*
- *z/OS Security Server RACROUTE Macro Reference*
- *z/OS Security Server RACF Messages and Codes*
- *z/OS Security Server RACF Security Administrator's Guide*
- *z/OS Security Server RACF System Programmer's Guide*

## Resetting RACF passwords

**Description:** Access to the IRR.PASSWORD.RESET resource will allow the password reset function to be carried out on all users. New support is added to allow the password reset function to be carried out on a limited set of users based on either the owner of the user profile or by the scope of the group of the user profile.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Security Server RACF Command Language Reference*
- *z/OS Security Server RACF Security Administrator's Guide*

## SMP/E new functions to consider

This topic describes new SMP/E functions in z/OS.

### Fix Category HOLDDATA

**Description:** SMP/E has been extended to help simplify the task of verifying required software fixes identified in Preventive Service Planning (PSP) buckets are installed. PSP buckets identify required software fixes for new hardware devices, toleration and coexistence of new software releases, and for enabling new functions. IBM consolidates the lists of required fixes from PSP buckets and produces new Fix Category (FIXCAT) HOLDDATA to identify those fixes. Some example fix categories are IBM.Device.z9-BC-2096 and IBM.Coexistence.z/OS.V1R10. SMP/E uses the new type of ++HOLD statement to identify APARs, their fix categories, and the PTF that resolves the APAR.

When FIXCAT HOLDDATA statements are received into a global zone, SMP/E assigns the fix category values as sourceids to the PTFs that resolve the APARs. These sourceids then simplify selecting and installing required fixes. During APPLY and ACCEPT command processing you can specify the assigned sourceids on the SOURCEID and EXSRCID operands to select the SYSMODs associated with a particular fix category.

In addition, for the APPLY and ACCEPT commands you can specify which Fix Categories are of interest using the new FIXCAT operand. This tells SMP/E to process only FIXCAT HOLDDATA for the categories you specify, and all others are ignored.

Finally, SMP/E uses the new FIXCAT HOLDDATA to identify what required fixes are missing. A new REPORT MISSINGFIX command analyzes the new FIXCAT HOLDDATA and determine which fixes (APARs) identified by the HOLDDATA are not yet installed. Only the fixes associated with the fix categories of interest to you, specified by you, are analyzed and identified. For example, you can identify only the missing fixes associated with a particular hardware device or coexistence for a specific new software release.

**When change was introduced:** SMP/E for z/OS V3R5 (z/OS V1R10).

**Reference information:**

- *SMP/E Commands*
- *SMP/E Reference*

### Long Sourceids

**Description:** SMP/E has increased the maximum length allowed for a sourceid value from 8 characters to 64 characters. In addition, the wildcard characters "\*" and "%" can be used to implicitly select a list of sourceids for SMP/E commands that support their use. Sourceids can be defined on ++ASSIGN statements, on the SOURCEID operand of the RECEIVE command, and derived from fix categories specified on FIXCAT HOLDDATA statements.

**When change was introduced:** SMP/E for z/OS V3R5 (z/OS V1R10).

**Reference information:**

- *SMP/E Commands*
- *SMP/E Reference*

## ZONEEDIT command enhancements

**Description:** The ZONEEDIT command has been extended to allow wildcard specifications in the conditional CHANGE subcommand, and to allow the UNIT, VOLUME and WAITFORDSN subentries for DDDEF entries to be added if they do not already exist. Formerly the ZONEEDIT command only allowed existing subentries to be changed, but did not allow subentries to be added.

**When change was introduced:** SMP/E for z/OS V3R5 (z/OS V1R10).

**Reference information:**

- *SMP/E Commands*

## HTTPS and FTP Reconnect and Retry support

**Description:** SMP/E has added reconnect and retry capabilities for HTTPS and FTP operations that fail due to apparent network outages and anomalies. This will help prevent SMP/E RECEIVE command and GIMGTPKG service routine failures because of short lived network outages.

**When change was introduced:** SMP/E for z/OS V3R5 (z/OS V1R10).

**Reference information:**

- *SMP/E Commands*

## RECEIVE ORDER command enhancements (Part 1)

**Description:** The RECEIVE ORDER command has been extended to resubmit orders when the request cannot be satisfied. Specifically, if an order request for CRITICAL, RECOMMENDED, or ALL PTFs results in no applicable PTFs, SMP/E will resubmit the order to obtain the latest HOLDDATA.

**When change was introduced:** Integrated in SMP/E for z/OS V3R5 (z/OS V1R10) and available in SMP/E for z/OS V3R4 (z/OS V1R7) with PTF UO00335.

**Reference information:**

- *SMP/E Commands*

## RECEIVE ORDER command enhancements (Part 2)

**Description:** When you specify PTFs by name or you request PTFs to fix specified APARs but not all requested PTFs are found or available, SMP/E will resubmit the order to only obtain those requested PTFs that can be found by the server.

In addition, when a requested order cannot be fulfilled within the WAIT time specified (or defaulted), SMP/E will now end the RECEIVE command with a return code of 12 rather than 4. This helps differentiate a failing operation from a successful one.

**When change was introduced:** SMP/E for z/OS V3R5 (z/OS V1R10).

**Reference information:**

- *SMP/E Commands*

## HOLDDATA report changes

**Description:** SMP/E has defined a new report destination, SMPHRPT, for HOLDDATA reports. If the SMPHRPT ddname is allocated (either by DD statement

or DDDEF entry), the HOLDDATA reports produced by the RECEIVE, APPLY and ACCEPT commands will be written to this ddname while other reports are written to the SMPRPT ddname. If the SMPHRPT ddname is not allocated, all reports are written to SMPRPT. If you do not want to review the APPLY, ACCEPT or RECEIVE command HOLDDATA reports, you can define SMPHRPT as a DUMMY data set. For example: `//SMPHRPT DD DUMMY`

In addition, the Bypassed HOLD Reason Report for the APPLY and ACCEPT commands now includes only bypassed HOLDDATA for SYSMODs that are successfully applied or accepted. No longer will bypassed HOLDDATA for SYSMODs that fail command processing appear in the report. This eliminates clutter and limits the report to only the HOLDDATA that must be reviewed or acted upon.

Finally, suppressed reasonids will be consolidated and reported only once per FMID in the APPLY and ACCEPT command HOLDDATA reports. Formerly reasonids were reported once per SYSMOD and that contributed to the clutter and the large output. Reasonids to be suppressed are defined in the SUPPHOLD subentry of the active OPTIONS entry.

**When change was introduced:** SMP/E for z/OS V3R5 (z/OS V1R10).

**Reference information:**

- *SMP/E Commands*
- *SMP/E Reference*

## BYPASS(HOLDSYS) message severity changes

**Description:** During APPLY and ACCEPT command processing, SMP/E writes messages to identify SYSTEM HOLD conditions that have been bypassed. In prior SMP/E releases, these messages had a severity of Warning and resulted in a minimum overall return code for the command of 4. With SMP/E V3R5, informational messages will be written for bypassed SYSTEM HOLD conditions instead of warning messages. This change to use informational messages will result in a minimum overall return code for the command of 0 rather than 4 when SYSMOD HOLDS are bypassed.

To change APPLY and ACCEPT command processing to write warning messages for bypassed SYSTEM HOLD conditions, use the new COMPAT(WARNBYPASS) execution parameter for program GIMSMP.

**When change was introduced:** SMP/E for z/OS V3R5 (z/OS V1R10).

**Reference information:**

- *SMP/E Commands*
- *SMP/E Reference*

## SMP/E dialog enhancements

**Description:** The SYSMOD Management dialog now allows you to bypass all SYSTEM HOLDS with one action. Formerly, to accomplish the same result, you were required to select each unique reason id.

In the Order Management dialog, when an ORDER entry is deleted from the global zone, the associated package directory within the SMPNTS is also deleted.

**When change was introduced:** SMP/E for z/OS V3R5 (z/OS V1R10).

**Reference information:** None.

## UNIX utility input

**Description:** SMP/E has been extended to allow definition side deck files residing as UNIX files to be easily included during link-edit operations. Specifically, relative UNIX file names will be allowed as utility input on INCLUDE statements defined in JCLIN link-edit steps, and SMP/E will instruct the binder to include those UNIX files during link-edit operations. Formerly only definition side deck files stored as members of a partitioned data set could be easily included during link-edit operations. This allows developers to easily utilize definition side deck files that reside in UNIX directories.

**When change was introduced:** SMP/E for z/OS V3R5 (z/OS V1R10).

**Reference information:**

- *SMP/E Commands*

## Support FTP client parameters

**Description:** SMP/E now allows user specified parameters to be passed to the FTP client program for SMP/E FTP operations during the RECEIVE command and the GIMGTPKG service routine. You can specify the new <FTPOPTIONS> tag in the CLIENT or SMPCLNT data set to identify any parameters that SMP/E should pass to the FTP client program. This is most useful when you need to override the FTP.DATA configuration file used by the FTP client program.

**When change was introduced:** SMP/E for z/OS V3R4 with PTF UO00558.

**Reference information:**

- *SMP/E Commands*

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## TSO/E new functions to consider

This topic describes new TSO/E functions in z/OS.

### TSO/E EAV R2 support

**Description:** Description: As of z/OS V1R10, 64K is the maximum amount of cylinders allowed for non-VSAM data sets. With z/OS V1R11, non-VSAM data sets in the EAS of an EAV volume can be greater than 64K cylinders. This requires support for TSO/E because unlike VSAM data sets, non-VSAM data sets are supported by many TSO/E functions. TSO/E EAV R2 support now allows users to use data sets that reside in the EAS without seeing ABENDs or incorrect calculations from TSO/E. Along with TSO/E EAV R2 support, a new operand for the ALLOCATE command and two new LISTDSI variables in REXX and CLIST have been added. The new operand for the ALLOCATE command specifies whether the data set can support extended attributes (format 8 and 9 DSCBs) or not, while the two new LISTDSI variables indicate whether a data set can reside in the EAS and whether the data set has extended attributes (format 8 and 9 DSCBs) respectively. Users can use them for data management. In addition, a new one-byte text unit called INMEATTR is defined to preserve extended attribute status for the TSO/E TRANSMIT and RECEIVE commands.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS TSO/E CLISTS*
- *z/OS TSO/E Customization*
- *z/OS TSO/E REXX Reference*
- *z/OS TSO/E Command Reference*

## TSO/E LOGONHERE support for VTAM unconditional reconnect

**Description:** TSO/E LOGONHERE support for VTAM unconditional reconnect now allows you to reconnect to your session even if no disconnection has been detected. By default in z/OS V1R11, LOGONHERE support is turned on. By specifying the reconnect option, you can easily switch from one computer to another or reestablish a session after a loss of connectivity (even with a new IP address).

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS TSO/E Command Reference*
- *z/OS TSO/E Customization*
- *z/OS TSO/E Messages*
- *z/OS MVS Initialization and Tuning Reference*

## TSO/E LOGON support for passwords over eight characters in length

**Description:** As of z/OS V1R9, the maximum length allowed for an authentication string (i.e. password) when used for access to TSO/E is eight characters. With z/OS V1R10, TSO/E full-screen LOGON mode will optionally support password phrases which can be up to 100 characters.

**When change was introduced:** z/OS V1R10.

**Reference information:** None.

## TSO/E LOGON support for APPL verification

**Description:** TSO/E LOGON will optionally support APPL verification, which allows security administrators to limit which systems a TSO/E user can access by permitting or denying them access to the APPL for that system.

**When change was introduced:** z/OS V1R10.

**Reference information:** None.

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## z/OS UNIX new functions to consider

This topic describes new z/OS UNIX functions in z/OS.

### Dynamically replacing the sysplex root file system with an alternate sysplex root file system

**Description:** If the current sysplex root file system becomes unavailable, it can be dynamically replaced with an alternate sysplex root file system.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS UNIX System Services Planning*

## Editing ASCII data using ISPF Edit

**Description:** Previously, it was difficult using the TSO/E command OEDIT to edit ASCII data. Now ASCII data can be edited using OEDIT, as long as the file is tagged as ASCII.

**When change was introduced:** z/OS V1R11.

**Reference information:** For more information about ISPF, refer to the ISPF documentation.

## Improved performance for dbx symbolic discovery and queries

**Description:** The **dbx** debugger can now load debug data on demand and to query symbol information from a module level mapping. Because all of the debug data files do not have to be loaded at startup, debugging of programs can start very quickly. Global module information is kept in a mapping and only a small working set of the debug data is loaded at any time. As a result, symbol queries during a debug session can occur more quickly and the storage requirement for the loaded debug data decreases dramatically.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS UNIX System Services Command Reference*
- *z/OS UNIX System Services Programming Tools*

## Remounting file systems without changing the mount mode

**Description:** File systems can now be remounted without changing the mount mode.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS UNIX System Services Command Reference*
- *z/OS UNIX System Services Programming: Assembler Callable Services Reference*
- *z/OS Using REXX and z/OS UNIX System Services*
- *z/OS XL C/C++ Run-Time Library Reference*

## Support for asynchronous I/O interface to the accept\_and\_recv (BPX1ANR) callable service

To improve performance for high-volume server applications such as web servers, an asynchronous I/O (BPX1AIO) interface to the accept\_and\_recv (BPX1ANR) callable service is provided.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS UNIX System Services File System Interface Reference*
- *z/OS UNIX System Services Programming: Assembler Callable Services Reference*

- *z/OS XL C/C++ Run-Time Library Reference*

## Tracing z/OS UNIX system calls made by user processes

**Description:** Previously, printf() calls or the like had to be used to trace application activity. Now users can trace application activity with the new user syscall trace capability. The user syscall trace can be activated at the start of the application or after an application is already running.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS UNIX System Services Command Reference*
- *z/OS UNIX System Services Programming: Assembler Callable Services Reference*
- *z/OS UNIX System Services User's Guide*
- *z/OS MVS System Messages, Vol 3 (ASB-BPX)*
- *z/OS MVS System Commands*
- *z/OS MVS Diagnosis: Tools and Service Aids*
- *z/OS XL C/C++ Run-Time Library Reference*

## Using automatically generated UIDs and GIDs instead of default OMVS segments

**Description:** Previously, if the BPX.DEFAULT.USER profile in the FACILITY class was defined, users that accessed z/OS UNIX services who did not have an OMVS user or group segment were assigned the default OMVS segments for the length of the user session. All users of the default OMVS segments shared the same UID and GID. As of z/OS V1R11, if BPX.UNIQUE.USER has been defined, users that access z/OS UNIX services who do not have an OMVS user or group segment are automatically assigned an OMVS segment with a unique UID and GID. The new OMVS segments are added to the user and group profiles in the RACF database. It is strongly suggested that unique UIDs and GIDs be automatically generated instead of assigning default OMVS segments.

**When change was introduced:** z/OS V1R11.

**Reference information:**

- *z/OS UNIX System Services Planning*
- *z/OS Migration*
- *z/OS Security Server RACF Security Administrator's Guide*

## ACL support for getfacl and setfacl requests from workstation clients

**Description:** A new VFS callable service, **v\_ioctl**, has been added to enable access control list (ACL) support for getfacl and setfacl requests from workstation clients.

**When change was introduced:** z/OS V1R10.

**Reference information:** For information about the v\_ioctl service, see *z/OS UNIX System Services File System Interface Reference*.

## Customized APPLID support

**Description:** When specifying a security profile, you can now create a customized application ID (APPLID). Previously, you could only specify the OMVSAPPL application ID.

**When change was introduced:** z/OS V1R10.

**Reference information:** For information about customized application IDs, see the section on controlling access to applications in *z/OS UNIX System Services Planning*.

## Load target executable programs into selected storage areas

**Description:** Authorized callers can direct the load of a target executable program in the z/OS UNIX file system into a storage of their choosing. The new **loadhfs** extended service loads an executable program by path name into the caller's process. This service provides all the functions of the **loadhfs** service and also allows authorized users to load an executable program into common storage.

**When change was introduced:** z/OS V1R10.

**Reference information:** For information about the loadhfs extended service, see *z/OS UNIX System Services Programming: Assembler Callable Services Reference*.

## Dynamic migration of the sysplex root from HFS to zFS

**Description:** In a shared file system configuration, installations can migrate the sysplex root file system from HFS to zFS without a sysplex-wide IPL.

**When change was introduced:** z/OS V1R10.

**Reference information:** For a description of the migration action, see *z/OS Migration*.

## New checks for IBM Health Checker for z/OS

**Description:** Two new checks are available for z/OS UNIX from IBM Health Checker for z/OS:

- The USS\_PARMLIB\_MOUNTS check verifies that file systems specified in BPXPRMxx were mounted successfully.
- The USS\_CLIENT\_MOUNTS check, in a shared file system configuration, checks whether each file system that can be locally accessed by a non-owning system cannot be accessed by sending an I/O request to the owner system.

**When change was introduced:** z/OS V1R10.

**Reference information:** The checks for z/OS UNIX System Services are documented in *z/OS UNIX System Services Planning* as well as in *IBM Health Checker for z/OS: User's Guide*.

## Submitting JCL from the shell

**Description:** Previously, users had to open a TSO session to submit JCL. Now you can use the submit command to submit JCL from the shell. It is also possible for shell scripts to submit JCL.

**When change was introduced:** z/OS V1R10.

**Reference information:** For information about the **submit** command, see *z/OS UNIX System Services Command Reference*. To see whether a migration action is needed, see *z/OS Migration*.

## Support for password phrases

**Description:** Password phrases are now supported. A password phrase is a character string made up of mixed-case letters, numbers, and special characters, including blanks, and is between 9 to 100 characters long. They can be used instead of the traditional 8-character password. Some callable services have been enabled to support password phrases.

**When change was introduced:** z/OS V1R10.

**Reference information:**

- *z/OS Security Server RACF Security Administrator's Guide*
- *z/OS UNIX System Services Command Reference*
- *z/OS UNIX System Services Planning*
- *z/OS UNIX System Services Programming: Assembler Callable Services Reference*
- *z/OS UNIX System Services User's Guide*



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## Chapter 2. z/OS elements and features

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### z/OS base elements

z/OS provides function equivalent to the following elements. For the version and release numbers of those elements that also exist as separately orderable products, see *z/OS Planning for Installation*, GA22-7504.

An additional set of integrated features is available on an optional basis, see “z/OS optional features” on page 122.

The following is a list of z/OS base elements:

- Alternate Library for REXX
- Base Control Program (BCP)
- BookManager READ
- Bulk Data Transfer (BDT)
- Common Information Model (CIM)
- Communications Server
- Cryptographic Services (includes ICSF, OCSF Base, PKI Services, and System SSL)
- DCE Base Services
- Distributed File Service
- DFSMSdfp™
- EREP
- ESCON Director Support
- FFST
- GDDM (includes PCLK and OS/2® Link)
- Hardware Configuration Definition (HCD)
- High Level Assembler (HLASM)
- IBM HTTP Server (includes IBM HTTP Server NA Secure)
- IBM Tivoli Directory Server for z/OS (IBM TDS for z/OS)
- ICKDSF
- Integrated Security Services (includes DCE Security Server, Enterprise Identity Mapping (EIM), Network Authentication Service, and Open Cryptographic Enhanced Plug-ins (OCEP))
- ISPF
- JES2
- Language Environment®
- Library Server
- Metal C Runtime Library
- MICR/OCR Support
- msys for Setup
- Network File System
- OSA Support Facility
- Run-Time Library Extensions
- SMP/E
- TIOC
- TSO/E
- z/OS UNIX® System Services
- 3270 PC File Transfer Program

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## z/OS optional features

Some optional features are not priced, but priced as well as unpriced features are included in z/OS integration-testing. All priced, host-based features are capable of being dynamically enabled or disabled. For the version and release levels of those features that also exist independently, see *z/OS Planning for Installation*, GA22-7504.

The following is a list of z/OS optional features:

- BookManager BUILD
- Bulk Data Transfer (BDT) File-to-File
- Bulk Data Transfer (BDT) SNA NJE
- C/C++ without Debug Tool
- Communications Server Security Level 3
- DFSMSdss™
- DFSMShsm™
- DFSMSrmm™
- DFSMStvs
- DFSORT
- GDDM-PGF
- GDDM-REXX
- High Level Assembler (HLASM) Toolkit
- Hardware Configuration Manager (HCM)
- Infoprint Server
- JES3
- RMF™
- SDSF
- Security Server (includes RACF®)
- z/OS Security Level 3 (includes OCSF Security Level 3, IBM Tivoli Directory Server for z/OS Security Level 3, Network Authentication Service Security Level 3, and System Secure Sockets Layer (SSL) Security Level 3)

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## Chapter 3. z/OS base elements descriptions

The following is a description of each base element in z/OS.

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### Alternate Library for REXX

Introduced in z/OS V1R9, the Alternate Library for REXX enables users who do not have the REXX on zSeries library installed to run compiled REXX programs. It contains a language processor that transforms the compiled programs and runs them with the REXX interpreter, which is shipped as part of the z/OS operating system.

Software developers are no longer required to distribute the Alternate Library for REXX with their compiled REXX programs. Customers who have the REXX on zSeries Library installed will gain the performance benefits of running compiled REXX while those customers who have the Alternate Library for REXX installed may still run the programs as interpreted.

By including the Alternate Library for REXX with z/OS, software developers gain the benefits of shipping compiled REXX programs without the source code:

- Maintenance of the program is simplified since the code can not be modified inadvertently
- Compiled programs can be shipped in load module format, simplifying packaging and installation
- The Alternate Library for REXX does not need to be shipped and installed with the software program
- Maintenance of the Alternate Library for REXX is handled by the z/OS system administrator

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### BCP (Base Control Program)

The backbone of the z/OS system is the MVS™ Basic Control Program with JES2 or JES3. These provide the essential services that make z/OS the system of choice when you need to process your workloads reliably, securely, with complete data integrity and without interruption.

**Unicode support:** The Unicode Standard is the universal character encoding standard used for representation of text for computer processing. This support also takes advantage, if present, of native z/Architecture® Unicode HW instructions for faster processing. The Unicode Standard provides the capacity to encode all of the characters used for the written languages of the world. z/OS support for Unicode implements these Unicode Version 3.0 standards: Character codepage and case conversion and normalization. This support also takes advantage, if present, of native z/Architecture Unicode HW instructions for faster processing.

**z/OS XML System Services:** z/OS XML System Services is a component of the BCP integrated in z/OS V1R8 and above and available in z/OS V1R7 as a PTF. It is a system level XML parser intended for use by system components, middleware, and applications that need a simple, efficient, non-validating XML parser. It provides a buffer-in, buffer-out processing model in which the document to parse is provided by the caller in one buffer, and the z/OS XML System Services parser creates a parsed record stream in another buffer, also provided by the caller. Arbitrarily large documents can be processed by replenishing the input buffer with more data and

re-using the output buffer or specifying a new one when it is filled. z/OS XML System Services can natively handle the following character set encodings: UTF-8, UTF-16 (big endian), EBCDIC-1047 and EBCDIC-037. z/OS XML System Services is invoked as a callable service and provides an assembler interface for callers to use. It is accessible from normal environments such as batch and z/OS Unix System Services, as well as from more esoteric environments such as SRB mode and cross-memory.

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## BookManager READ

BookManager READ allows you to use any online BookManager book that you can access. Using the BookManager panels, windows, and function keys, you can manage, display, and search online books quickly and easily.

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## BDT (Bulk Data Transfer)

Bulk Data Transfer (BDT) provides the base services that BDT File-to-File and BDT SNA NJE need to transfer data from one computer system to another.

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## Common Information Model (CIM)

The Common Information Model (CIM) is a standard data model for describing and accessing systems management data in heterogeneous environments. It allows system administrators or vendors to write applications (CIM monitoring clients) that measure system resources in a network with different operating systems and hardware. With z/OS CIM, it is possible to use the DMTF CIM open standard for systems management which is also implemented on further major server platforms (for example, Linux® on zSeries®, Linux on xSeries®, i5/OS®, or AIX®).

z/OS CIM implements the CIM server which is based on the OpenPegasus open source project. A CIM client invokes the CIM server which, in turn, collects z/OS data from the system and returns it to the calling client. To get the z/OS data, the CIM server invokes a CIM provider which retrieves the data from z/OS system resources.

The metrics obtained by this new API are common across server platforms so you can use it to create end-to-end monitoring applications.

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## Communications Server

**IP** IP (formerly known as IBM TCP/IP) is a set of industry standard protocols and applications that allow you to share data and computing resources with other computers, both IBM and non-IBM. By using IP commands at your workstation, you can perform tasks and communicate easily with a variety of other systems and workstations. IP allows you to perform tasks independent of the computer type. UNIX applications use IP. Some common uses of IP include: electronic mail, file transfer, remote logon, and the Internet.

**IP CICS® Sockets**

IP CICS Sockets (integrated into the base TCP/IP stack) provides the ability to use the generalized Application Programming Interface (API) and socket applications in COBOL, PL/I, and assembler.

**IP IMS™ Sockets**

IMS IP support (integrated into the base TCP/IP stack) allows the

development of peer-to-peer applications in which IMS and an IP-connected peer form a client/server relationship. Using this support, IMS can be either client or server.

This element consists of three parts:

- The Sockets Extended Application Programming Interface. Using this API, IMS message processing programs can communicate with remote IP-connected hosts using socket protocol.
- If IMS is acting as the server, the IMS Listener can be used to collect incoming transaction requests from remote IP-connected hosts and schedule IMS message processing programs to service these requests.
- The IBM Assist module provides support for the IMS application programmer who wishes to code IP client/server application programs using the IMS API. When used, this optional function intercepts IMS message queue calls and replaces them with socket calls.

**SNA** Formerly known as VTAM®, SNA is a network communication access method (Systems Network Architecture) and Advanced Peer-to-Peer Networking® (APPN). It provides the interface between application programs in a host processor and other resources in an SNA network, and links peer users of the network. It establishes and terminates sessions between users of the network, forwarding session data to and from each session partner.

In addition to establishing and terminating sessions, it activates and deactivates resources under its control, including application programs, Network Control Programs (NCPs) and the devices they control, and devices to which SNA is directly attached. SNA also maintains information on the network configuration, active sessions, and network conditions.

To help users control a network, SNA receives commands from an operator to perform network services. It keeps the operator informed about those services, as well as about network conditions, through operator messages.

**AnyNet®**

z/OS V1R8 Communications Server discontinued support of AnyNet. AnyNet consisted of two functions: SNA over IP, and Sockets over SNA. You can implement Enterprise Extender (EE) as the replacement for the SNA over IP function. There is no replacement for Sockets over SNA.

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## Cryptographic Services

Cryptographic Services provide cryptographic functions for data secrecy, data integrity, personal identification, digital signatures, and the management of cryptographic keys. It includes ICSF, PKI Services, OCSF, and System SSL.

ICSF and PKI Services are provided through the combination of secure cryptographic hardware, the ICSF cryptographic API, and the ICSF administration interface. The cryptographic services support a wide variety of applications with high performance, security, and availability. ICSF supports the Common Cryptographic Architecture (CCA), as well as the DES algorithm, RSA public key cryptography, and the Digital Signature Standard.

Additional functions are:

- Trusted Key Entry—the key entry unit for master keys has been replaced by a secure channel version implemented on a workstation known as the Trusted Key Entry Workstation. The unit is an optional cost feature.
- Commercial Data Masking Facility supports privacy functions.
- Public Key API (PKA Support) provides additional formatting or message digest standards.

- Public Key Cryptography Standards #11 (PKCS #11)

Public Key Infrastructure Services (PKI Services) allows you to establish a PKI infrastructure and serve as a certificate authority for your internal and external users, issuing and administering digital certificates in accordance with your own organization's policies. You can use a PKI Services application to request and obtain certificates through their own Web browsers, while your authorized PKI administrators approve, modify, or reject these requests through their own Web browsers. The Web applications provided with PKI Services are customizable, and a programming exit is also included for advanced customization. The approval for certificate requests can be manual or automatic if additional authentication such as RACF user IDs, is provided. You can issue certificates for different purposes, such as virtual private network (VPN) devices, smart cards, and secure e-mail, through different types of templates. PKI Services supports Public Key Infrastructure for X.509 version 3 (PKIX) and Common Data Security Architecture (CDSA) cryptographic standards.

The OCSF Architecture consists of a set of layered security services and associated programming interfaces designed to furnish an integrated set of information and communication security capabilities. Each layer builds on the more fundamental services of the layer directly below it.

These layers start with fundamental components such as cryptographic algorithms, random numbers, and unique identification information in the lower layers, and build up to digital certificates, key management and recovery mechanisms, and secure transaction protocols in higher layers. The OCSF Architecture is intended to be the multiplatform security architecture that is both horizontally broad and vertically robust.

System SSL supports the SSL V2.0, SSL V3.0 and TLS (Transport Layer Security) V1.0 protocols. TLS V1.0 is the latest version of the secure sockets layer protocol.

z/OS provides a set of SSL C/C++ callable application programming interfaces that, when used with the z/OS Sockets APIs, provide the functions required for applications to establish this secure sockets communications.

In addition to providing the API interfaces to exploit the Secure Sockets Layer and Transport Layer Security protocols, System SSL is also providing a suite of Certificate Management APIs. These APIs give the capability to create/manage your own certificate databases, utilize certificates stored in key database and key rings for purpose other than SSL and to build/process PKCS #7 standard messages.

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## DCE (Distributed Computing Environment)

The DCE Services provides the strengths of a distributed computing environment:

- Transparency of data and logic
- Distributed, consistent directory service
- Security for both clients and servers integrated in execution path
- Scalability of distributed applications
- Interoperability and portability.

DCE Services supports the following:

- Remote Procedure Call (RPC) lets calls between programs running on different platforms appear as local procedure calls to the programmer.
- Directory Services allows resources to be found anywhere in an enterprise without the need to know local names.

- Security Services solves security problems common in a distributed environment by handling identification and certification of users, clients, servers, and systems.
- Distributed Time Services synchronizes clocks running on different nodes.

All components supported are based on the Open Software Foundation (OSF) DCE level 1.2.1. The DCE Base Services support clients and servers that run on IP and SNA networks.

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## Distributed File Service

The Distributed File Service provides DFS<sup>™</sup> support which is the Distributing Computing Environment (DCE) distributed file service component. As developed by the Open Group Open Systems Foundation (OSF), DCE and DFS join heterogeneous systems to provide secure read/write access to file data stored on the system or on another DCE system. DFS joins file systems on different systems into a single, global file system accessible by a large number of users. DFS file servers export file data for access by DFS clients running on the same or remote DCE system. DFS clients and servers communication uses DCE RPC protocols and DCE security. DFS provides a uniform file name space for users on heterogeneous systems; client caching for improved performance; transparent file locations to enable file data replication and movement between DCE systems which result in high availability and scalability. A DFS server on z/OS can export DCE LFS, HFS, Sequential, VSAM and PDS(E) data for access by DFS clients. HFS, Sequential, VSAM and PDS(E) data exported by a DFS server can be shared with local z/OS users and applications.

The Distributed File Service Server Message Block (SMB) support provides a server that makes Hierarchical File System (HFS) files and data sets available to SMB clients. (Server Message Block (SMB) is a protocol for remote file/print access used by Windows<sup>®</sup> clients. This protocol is also known as Common Internet File System.) The data sets supported include sequential data sets (on DASD), partitioned data sets (PDS), partitioned data sets extended (PDSE) and Virtual Storage Access Method (VSAM) data sets. The data set support is usually referred to as Record File System (RFS) support. The SMB protocol is supported through the use of TCP/IP on z/OS. This communication protocol allows clients to access shared directory paths and shared printers. Personal Computer (PC) clients on the network use the file and print sharing functions that are included in their operating systems. Supported SMB clients include Microsoft<sup>®</sup> Windows XP, Windows Vista, Windows Terminal Server, and Linux. At the same time, these files can be shared with local z/OS UNIX System Services applications and with DCE DFS clients. In addition, Windows SMB clients can make remote print requests to z/OS printers that are connected to Infoprint Server for z/OS.

The Distributed File Service zSeries File System (zFS) support provides a Physical File System (PFS) that can be used in addition to the Hierarchical File System (HFS). zFS file systems contain files and directories that can be accessed with the z/OS hierarchical file system file application programming interfaces. zFS file systems can be mounted into the z/OS UNIX hierarchy along with other local (or remote) file system types (for example, HFS, TFS, AUTOMNT, NFS, etc.). zFS generally provides improved performance over HFS.

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## DFSMSdftp

DFSMSdftp provides the foundation for:

**Storage management**

DFSMSdfp includes ISMF, an interactive facility that lets you define and maintain policies to manage your storage resources. These policies help to improve the use of storage devices, and to increase levels of service for user data, with minimal effort required from users. SMS manages these policies for the operating system. You can also use the NaviQuest tool under ISMF to help you migrate to SMS, maintain your SMS configuration, and perform many testing, implementation, and reporting tasks in batch.

**Tape mount management**

SMS provides a means for implementing tape mount management, a methodology for improving tape usage and reducing tape costs. This methodology involves intercepting selected tape data set allocations through the SMS automatic class selection (ACS) process, and redirecting them to a DASD buffer. Once on DASD, these data sets can be migrated to a single tape or small set of tapes, thereby reducing the overhead associated with multiple tape mounts.

**Data management**

DFSMSdfp helps you store and catalog information on DASD, optical, and tape resources, so that it can be quickly identified and retrieved from the system. You can use the catalog search interface, now part of DFSMSdfp, to access the catalog.

**Program management**

DFSMSdfp combines programs into executable modules, prepares them to run on the operating system, stores them in libraries, and reads them into storage for execution.

**Device management**

DFSMSdfp is involved in defining your input and output devices to the system, and in controlling the operation of those devices in the z/OS environment.

**Distributed data access**

Distributed data access allows all authorized systems and users in a network to exploit the powerful features of system-managed storage, or automated storage management provided by DFSMS™. DFSMSdfp uses the Distributed FileManager (DFM) to support remote access of z/OS data and storage resources from workstations, personal computers, or any other system on a SNA LU 6.2 network.

The z/OS UNIX System Services (z/OS UNIX) file system works in conjunction with z/OS UNIX to provide a full UNIX environment within the z/OS system. z/OS becomes a full-feature UNIX client or server when coupled with the z/OS Network File System (z/OS NFS). With the z/OS UNIX file system, z/OS programs can directly access UNIX data. When the z/OS NFS client and z/OS UNIX are used together, z/OS can act as a client and access data from any remote system, including another z/OS or UNIX system that is connected using a TCP/IP network served by a Network File System server.

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## **Environmental Record Editing and Printing Program (EREP)**

The Environmental Record Editing and Printing Program (EREP) edits and prints reports for the records placed in the error recording data set (ERDS), helping IBM service representatives fix problems.

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## ESCON Director Support

When your installation uses ESCON directors, the ESCON Director Device Support feature enables reporting of ESCON director device errors to z/OS.

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## FFST/MVS (First Failure Support Technology/MVS)

FFST/MVS provides immediate notification and first failure data capture for software events. FFST/MVS also incorporates its own technology by including software probes in its own code. When one of these probes is triggered, FFST/MVS issues a symptom string that describes the event.

FFST/MVS provides the following services for IBM products:

- Customized dumps
- Symptom strings
- Symptom records
- Messages
- Network notification

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## GDDM (includes PCLK and OS/2 LINK)

GDDM provides presentation services and device-driving capability. GDDM has a powerful application-programming interface for creating, displaying, and storing vector graphics, images and alphanumerics. GDDM drives displays, printers and plotters, and includes several utilities for end users. GDDM's excellence as a graphics program and device driver is recognized worldwide, and as a result it is used extensively as a graphics enabler by other licensed programs, including other elements of z/OS, such as BookManager.

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## HCD (Hardware Configuration Definition)

HCD is used to define both the operating system configuration and the processor hardware configuration for a system. Because HCD validates data when it is defined rather than when a device is accessed, inconsistencies can be corrected right away and unplanned system outages resulting from inconsistent definitions avoided. The defined configuration can be used to POR/IPL or dynamically reconfigure your system.

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## HLASM (High Level Assembler)

High Level Assembler integrates almost all functions of past assemblers. It also provides extensions and improvements including:

- Many new and expanded cross reference facilities and diagnostics that enable substantial savings in time and in human and machine resources, and support integration of HLASM into tool and development environments.
- Numerous language enhancements that improve the speed and accuracy of application development and the quality and reliability of the resulting code.
- Assembly-time options extensions and enhancements that allow increased flexibility and precision in controlling the processes you use to manage application development.

HLASM helps to maximize the productivity of application programmers by relieving them of many tedious and unproductive tasks that can now be done by the assembler itself and helps organizations avoid the necessity for converting existing -- and working -- applications from Assembler Language to other languages.

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## IBM HTTP Server

The IBM HTTP Server provides for scaleable, high performance web-serving for critical e-business applications. It is exclusive to z/OS. This element was previously known as a base element of z/OS under the names Lotus® Domino® Go, the Internet Connection Secure Server (ICSS) and the Internet Connection Server (ICS).

Included in IBM HTTP Server is IBM HTTP Server North America (NA) Secure. With IBM HTTP Server, IBM HTTP Server NA Secure uses Secure Sockets Layer (SSL) to provide secure communications over an open communications network, such as the Internet. The HTTP server uses SSL to initiate a secure connection between the client and itself. The server then uses SSL to decrypt and encrypt all of the information in the client request and the server response.

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## IBM Tivoli Directory Server for z/OS (IBM TDS for z/OS)

The IBM Tivoli Directory Server for z/OS (IBM TDS for z/OS) provides secure access for applications and systems on the network to directory information held on z/OS using the Lightweight Directory Access Protocol (LDAP). This component consists of the LDAP server, LDAP client, and utilities.

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## ICKDSF (Device Support Facility)

ICKDSF enables you to perform functions needed for the installation and use of IBM DASD. You can also use it to perform service functions, error detection, and media maintenance.

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## Integrated Security Services

Integrated Security Services includes:

### DCE Security Server

DCE Security Server provides user and server authentication for applications using the client server communications technology. Through integration with RACF, DCE support allows RACF-authenticated z/OS users to access DCE-based resources and application servers without having to further authenticate themselves to DCE. In addition, DCE application servers can, if needed, convert a DCR-authenticated user identity into a RACF identity into an RACF identity and then access z/OS resources on behalf of that user, with full RACF access control.

### LDAP Server

LDAP Server has been removed from Integrated Security Services in z/OS V1R11 and is replaced by IBM Tivoli Directory Server for z/OS (IBM TDS). You will need to migrate to IBM TDS in a z/OS release prior to z/OS V1R11.

### Network Authentication Service

Network Authentication Service, based on Kerberos Version 5, provides Kerberos security services without requiring that you purchase or use a middleware product such as Distributed Computing Environment (DCE). These services include native Kerberos application programming interface (API) functions, as well as the Generic Security Service Application Programming Interface (GSS-API) functions defined in Internet RFC 2078, Generic Security Service Application Program Interface, Version 2 and Internet RFC 2744, Generic Security Service API Version 2: C-bindings. Network Authentication Service performs authentication as a trusted third-party authentication service by using conventional shared secret-key cryptography. Network Authentication Service provides a means of verifying

the identities of principals, without relying on authentication by the host operating system, without basing trust on host addresses, without requiring physical security of all the hosts on the network, and under the assumption that packets traveling along the network can be read, modified, and inserted at will.

#### **Open Cryptographic Enhanced Plug-ins (OCEP)**

OCEP provides an application interface for managing server certificates and help protect server private keys in a uniform and secure way. Applications complying with Common Data Security Architecture (CDSA) standard interfaces can use OCEP. Open Cryptographic Services Facility, a base z/OS element, provides these interfaces. Application developers and independent software vendors will find it easier to develop and port applications to the zSeries platform. It helps customers apply consistent security rules to e-business applications that use digital certificates and helps protect server private keys.

#### **IBM Firewall Technologies**

IBM Firewall Technologies was removed from the Integrated Security Services element in z/OS V1R8.

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## **ISPF**

ISPF provides facilities for all aspects of host-based software development.

- Programmers can use ISPF to develop and document batch and interactive programs.
- Data center administrators and system programmers can monitor and control program libraries, and communicate with MVS through TSO commands, CLISTs, or REXX EXECs.
- Terminal users can work with interactive applications called dialogs.
- Managers can prepare and print memos using ISPF Edit, BookMaster®, and the Hardcopy utility.

ISPF has four major components:

#### **Dialog Manager (DM)**

The Dialog Manager (DM) provides services to dialogs and end users. These include display, variable services, input and output, user and application profiles, table management, system interface services, and dialog testing and debugging aids.

#### **Program Development Facility (PDF)**

The Program Development Facility (PDF) provides services to assist dialog or application developers. These include Edit and Browse functions, a wide range of foreground and batch compilers, data set and catalog utilities, TSO or CMS command interfaces, and data set search and compare functions.

#### **Software Configuration and Library Manager (SCLM)**

The Software Configuration and Library Manager (SCLM) is a tool that automatically controls, maintains, and tracks all of the software components of the application throughout the development cycle.

#### **Client/Server component**

The Client/Server component provides users who have a workstation running Windows or UNIX with a Graphical User Interface to ISPF application panels.

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## JES2

JES2 accepts the submission of work for the BCP. Major JES2 functions and design features include:

- The interpretation of job control language (JCL) statements
- The disposition of output
- A single-system image
- The ability to run multiple copies of JES2 (poly-JES)
- JES2 WLM for Sysplex

JES2 differs from JES3 in two main processing areas:

- JES2 exercises independent control over its job processing functions. JES3 exercises centralized control. Each JES2 processor in a multi-processor environment controls its own job input, job scheduling, and job output processing.
- JES3 does pre-execution of job setup. JES2 does not do this.

---

## Language Environment

Language Environment provides common services and language-specific routines in a single run-time environment. It ensures consistent and predictable results for your language applications, independent of the language they are written in.

Language Environment is the prerequisite run-time environment for applications generated with the following IBM compiler products:

- z/OS XL C/C++
- OS/390 C/C++
- C/C++ for MVS/ESA™
- COBOL for OS/390 & VM
- COBOL for MVS & VM (formerly COBOL/370)
- Enterprise COBOL for z/OS
- Enterprise COBOL for z/OS and OS/390
- AD/Cycle® C/370™ Compiler
- Enterprise PL/I for z/OS
- Enterprise PL/I for z/OS and OS/390
- VisualAge® PL/I for OS/390
- PL/I for MVS & VM
- AD/Cycle PL/I for MVS & VM
- VisualAge for Java™, Enterprise Edition for OS/390
- VS FORTRAN and FORTRAN IV (in compatibility mode)

Language Environment supports the VS FORTRAN compiler's object/load module compatibility, which means FORTRAN load modules can be run under Language Environment and object code can be link-edited with Language Environment and run under it. Language Environment also provides a set of assembler macros for running assembler language routines.

Language Environment supports, but is not required for, an interactive debug tool for debugging applications in your native z/OS environment. The interactive IBM Debug Tool is available with the latest release of the PL/I compiler or this product can be ordered separately for use with the IBM XL C/C++, COBOL, and PL/I compilers on z/OS. For more information, see <http://www.ibm.com/software/awdtools/debugtool/>.

Some benefits are that you can:

- Mix old code with new code.

- Handle conditions, such as program checks or abends, in your COBOL programs without having to use assembler.
- Share common run-time services.
- Run applications that conform to the POSIX 1003.1 standard or the X/Open Single UNIX Specification, also known as UNIX 95 or XPG4.2.
- Access CICS and IMS transactions and data through a C, COBOL, or PL/I server from any client in your network.
- Perform interlanguage communication more efficiently.
- Manage storage dynamically for your C/C++, COBOL, and PL/I routines with a common storage manager.
- Access a rich set of math services.

---

## Library Server

Library Server enables customers to provide entire libraries of documents via the World Wide Web. Customers are able to serve BookManager books to HTML browsers connected to either the Internet or an intranet. The information is stored in a virtual library, which is composed of books, bookshelves, and collections.

---

## MICR/OCR

MICR/OCR provides the device support code for the following devices:

- 1287/1288 - IBM Optical reader and page reader respectively
- 3540 - IBM Disk device
- 3886 - IBM Optical Character reader
- 3890™ - IBM Magnetic Ink Reader
- 3895 - IBM Printer device

---

## msys for Operations

Managed System Infrastructure for Operations (msys for Operations) was removed in z/OS V1R8.

---

## msys for Setup

Six of the seven plugins were removed from the Managed System Infrastructure for Setup (msys for Setup) element in z/OS V1R8. The six plug-ins that were removed are:

- IP Services
- ISPF
- Language Environment
- Parallel Sysplex
- RMF
- z/OS UNIX

The only remaining plug-in, the DB2 V8 plug-in, is unaffected and remains available for enablement, setup, and configuration of DB2. Also remaining are the framework and DFSMS support.

---

## Metal C Runtime Library

The Metal C runtime library element, introduced in z/OS V1R9, provides a set of header files and functions for use with the XL C METAL compiler option.

The XL C METAL compiler option generates code that does not require access to the Language Environment support at run time. Instead, the METAL option provides C-language extensions that allow you to specify assembly statements that call system services directly. Using these language extensions, you can provide almost any assembly macro, and your own function prologs and epilogs, to be embedded in the generated HLASM source file. When you understand how the METAL-generated code uses MVS linkage conventions to interact with HLASM code, you can use this capability to write freestanding programs.

Before z/OS V1R9, all z/OS XL C compiler-generated code required Language Environment. In addition to depending on the C runtime library functions that are available only with Language Environment, the generated code depended on the establishment of an overall execution context, including the heap storage and dynamic storage areas. These dependencies prohibit you from using the XL C compiler to generate code that runs in an environment where Language Environment did not exist.

---

## Network File System (NFS)

NFS acts as a file server to workstations, personal computers, or other authorized systems in a IP network. It also provides an MVS client. It enables client users to remotely access MVS data sets or z/OS UNIX Services files from any system on an IP network that uses client software for the SUN Network File System protocol. The remote data sets or files are mounted from the mainframe to appear as local directories and files on the client system.

---

## Open Systems Adapter Support Facility (OSA/SF)

OSA/SF is an element that supports S/390® Open System Adapter (OSA-Express and OSA-2) hardware features to deliver connectivity via directly-attached local area clients using:

- Transmission Control Protocol/Internet Protocol (IP) network protocol
- Systems Network Architecture Application Peer-to-Peer Networking
- Internet Packet Exchange (IPX)

The OSA-2 features provide connection to Ethernet, Asynchronous Transfer Mode (ATM), Token Ring and Fiber Distributed Data Interface (FDDI) networks.

OSA-Express provides connection to Ethernet networks supporting Fast Ethernet (FENET), 1000Base-T Ethernet and Gigabit, as well as Token Ring and ATM.

OSA/SF provides a user-friendly interface for monitoring and controlling the OSA features. Beginning in z/OS V1R4, OSA/SF introduces support for a Java-based GUI interface, continues support for the OSA-2 features, and continues to provide the OS/2-based GUI.

---

## Run-Time Library Extensions

Run-Time Library Extensions delivers the following libraries and utilities to support existing programs:

### Common Debug Architecture (CDA) Libraries

Introduced in z/OS V1R5, CDA provides a consistent format for debug information on z/OS. The CDA Libraries provide a set of APIs to access this information.

### **c89 Utility**

This utility compiles, assembles, and binds z/OS UNIX System Services C/C++ and assembler applications.

### **UNIX System Laboratories (USL) Libraries**

The USL I/O Stream Library provides the standard input and output capabilities for C++. The USL Complex Mathematics Library provides the facilities to manipulate complex numbers and to perform standard mathematical operations

**Note:** The UNIX System Laboratories (USL) I/O Stream Library and Complex Mathematics Library are still supported on z/OS. Although support for these classes is not being removed at this time, it is recommended that you migrate to the Standard C++ iostream and complex classes. This is especially important if you are migrating other USL streaming classes to Standard C++ Library streaming classes, because combining USL and Standard C++ Library streams in one application is not recommended. For more information about the Standard C++ I/O Stream Library, see *Standard C++ Library Reference*.

**Note:** As of z/OS V1R5, all application development using the C/C++ IBM Open Class Library (Application Support Class and Collection Class Libraries) is not supported. As of z/OS V1R9, the execution of applications using the C/C++ IBM Open Class Library is not supported. For additional information, see *Standard C++ Library Reference*.

---

## **SMP/E**

SMP/E is a tool for installing and maintaining software, and for managing the inventory of software that has been installed. SMP/E provides a consistent and reliable method for installing and upgrading the software in a z/OS system.

---

## **Time Sharing Option/Extensions (TSO/E)**

TSO Extensions is a base interactive interface that provides non-DP professionals, end users, system and application programmers, and administrators with an extensive set of commands, services, facilities and programming languages to do productive work on z/OS, and helps to ease systems management. TSO/E is an integral part of z/OS, and serves as a platform for other elements, such as BookManager READ/MVS, HCD, and ISPF.

---

## **Terminal Input Output Controller (TIOC)**

TIOC is the interface between TSO and VTAM. It allows TSO to communicate with the terminal hardware.

---

## **z/OS UNIX System Services (X/Open UNIX 95 functions)**

### **z/OS UNIX System Services Application Services (Shell, Utilities, and Debugger)**

Shell and Utilities provides the standard command interface familiar to interactive UNIX users. z/OS includes all of the commands and utilities specified in the X/Open Company's Single UNIX Specification, also known as UNIX 95 or XPG4.2. This feature will allow your UNIX programmers and other users to interact with z/OS as a UNIX system without necessarily having to learn the z/OS command language or other interactive interfaces.

The z/OS UNIX Services Debugger provides a set of commands that allow a C language program to be debugged interactively. The command set is familiar to many UNIX users.

#### **z/OS UNIX System Services Kernel**

These services add the world of open UNIX-based computing to the z/OS operating system. With Language Environment, they support industry standards for C programming, shell and utilities, client/server applications, and the majority of the standards for thread management and the X/Open Single UNIX Specification. Application developers and interactive users using these interfaces can exploit the capabilities of z/OS without having to understand z/OS itself. The combination of open computing and z/OS allows the transparent exchange of data, easy portability of applications, cross-network management of data and applications, and the exploitation of traditional MVS system strengths in an open environment.

---

## **3270 PC File Transfer Program**

This program transfers files from the host to the workstation for off-line data manipulation or transfers local data for storage on the host.

---

## Chapter 4. z/OS optional features descriptions

The following is a description of each optional feature in z/OS.

---

### BookManager BUILD

BookManager BUILD lets you create your own online books from files marked up with:

- GML (Generalized Markup Language) Starter Set
- IBM Publishing Systems BookMaster

Instead of preparing the files for a printer, BookManager BUILD takes the files and produces a single file that contains the text and artwork for an online book.

Books built with BookManager BUILD can be read with any of the BookManager READ or BookServer products, such as:

- BookManager READ/MVS, which is part of the z/OS base
- BookManager READ/VM
- BookManager READ/2
- BookManager READ/6000
- BookManager READ for Windows
- BookManager READ/DOS
- BookManager BookServer

---

### Bulk Data Transfer (BDT) File-to-File

The BDT File-to-File element allows users at one z/OS system in a SNA network to copy data sets to or from another z/OS system in the network.

---

### Bulk Data Transfer (BDT) SNA NJE

The BDT JES3 SNA NJE element allows users with the JES3 element to transmit jobs, output (SYSOUT), commands, and messages from one computer system to another within a SNA network.

---

### C/C++ without Debug Tool

This language-centered XL C/C++ application development environment on the z/OS platform includes a C compiler, a C++ compiler, and C/C++ application development utilities. This feature exploits the C/C++ run-time environment and library of run-time services available with the Language Environment and Run-Time Library Extensions elements of z/OS.

---

### Communications Server Security Level 3

This feature provides authentication and security services in an IP network environment. It provides support for packet filtering, tunnels, and network address translation (NAT), which enables secure communication over private and public networks. It uses the DES algorithm and it includes SSL triple DES (TDES), SNMPv3 56-bit, and IPsec TDES.

---

## DFSMS Features (DFSMSdss, DFSMShsm, DFSMSrmm, and DFSMStvs)

There are four DFSMS features:

### **DFSMSdss**

DFSMSdss is a DASD data and space management tool. DFSMSdss can be used to copy and move data sets between volumes; dump and restore data sets, entire volumes, or tracks; convert data sets and volumes to and from SMS management; compress partitioned data sets; release unused space in data sets; and consolidate free space and data sets on volumes.

### **DFSMShsm**

DFSMShsm is a DASD storage management and productivity tool for managing low-activity and inactive data. It improves DASD use by automatically managing space and data availability in a storage hierarchy. Working with SMS, DFSMShsm performs space management and availability management of data sets as directed by their management class attributes.

### **DFSMSrmm**

DFSMSrmm allows you to manage your removable media as one enterprise-wide library across systems. DFSMSrmm manages your installation's tape volumes and the data sets on those volumes. DFSMSrmm manages all tape media, such as cartridge system tapes and 3420 reels, as well as other removable media you define to it. For example, DFSMSrmm can record the shelf location for optical disks and track their vital record status; it does not manage the objects on optical disks.

### **DFSMStvs**

DFSMS Transactional VSAM Services, an optional feature, enables running batch jobs concurrently with CICS online transactions to allow updates to the shared VSAM data sets. Multiple batch jobs and online transactions can be run against the same VSAM data sets. DFSMStvs ensures data integrity for concurrent batch updates while CICS provides it for online updates.

---

## DFSORT

DFSORT is IBM's high performance sort, merge, copy, analysis and reporting product for z/OS. This high-speed, flexible data processing tool provides fast and efficient sorting, merging, copying, reporting and analysis of business information, as well as versatile data manipulation at the record, field and bit level.

DFSORT is designed to optimize the efficiency and speed with which operations are completed through synergy with processor, device, and system features (for example, memory objects, hiperspace, data space, striping, compression, extended addressing, DASD and tape device architecture, processor memory, processor cache, and so on) and other products (for example, The SAS System\*\*, COBOL, PL/I, IDCAMS BLDINDEX, and so on).

DFSORT includes the high-performance ICEGENER facility, the versatile ICETOOL utility, multiple output and reporting capability with the powerful OUTFIL feature, the time-saving ability to use Symbols for fields and constants in DFSORT and ICETOOL statements, and much more.

For more information on DFSORT, visit the DFSORT Web site at:  
<http://www.ibm.com/storage/dfsor/>

---

## GDDM-PGF

GDDM-PGF (Presentation Graphics Facility), a set of programs for creating presentation material in a variety of styles, provides:

### **Interactive Chart Utility**

The Interactive Chart Utility (ICU), an easy-to-use end-user program for creating business charts.

### **Vector Symbol Editor**

The (VSE), a means of creating and modifying symbols for use with the ICU or other GDDM functions.

### **An application programming interface**

An application programming interface that enables programs to call either the ICU or a set of presentation-graphics routines for chart creation.

### **Online Presentation Services (OPS)**

GDDM-PGF now incorporates an enhanced presentation-producing capability, Online Presentation Services (OPS). GDDM-OPS provides a command interface, which is simple and easy to use, yet which is also powerful enough to allow the very concise creation of high-quality presentations. These can then be used from displays (perhaps using the built-in automatic scrolling feature), or can be saved for printing or plotting.

Typical applications of GDDM-OPS are:

- Public presentations using a video monitor or projector
- Educational sessions for private or public display
- Scrollable interactive presentations of business charts
- Production of high-quality foils.

---

## GDDM-REXX

GDDM-REXX/MVS is a productivity tool that enables programmers to prototype GDDM applications and to create small routines and utility programs quickly and easily.

---

## HCM (Hardware Configuration Manager)

HCM is a PWS-based client/server interface to z/OS Hardware Configuration Definition (HCD). It combines the logical and physical aspects of z/OS hardware configuration management. In addition to defining the logical connections (accomplished via HCD), you can also manage the physical aspects of your configuration. For example, you can effectively manage the flexibility offered by the ESCON infrastructure.

All updates are done with HCM's intuitive graphical user interface, and all changes are written into the IODF and fully validated for accuracy and completeness by HCD, avoiding unplanned system outages that are due to incorrect definitions.

---

## High Level Assembler Toolkit

This toolkit provides a powerful set of capabilities to improve application development, debugging, and recovery.

The Toolkit provides six components:

- A disassembler which converts binary machine language to assembler language source statements.

- A flexible source-code analysis and cross-referencing tool to help determine variable and macro usage, analyze high-level control flows, and locate specific uses of arbitrary strings of characters in single or multiple modules.
- A workstation-based program analysis tool that displays control-flow graphs and source-code views within single programs or across entire application modules.
- A powerful and sophisticated low-level symbolic debugger for applications written in assembler and other compiled languages. It handles programs using 24, 31, and 64-bit addressing. (It does not support debugging privileged or supervisor-state code.)
- A rich set of macro instructions that implement a complete menu of the most widely used structured-programming constructs (IF/ELSE/ELSEIF, DO/ITERATE/ASMLEAVE, CASE, SEARCH, SELECT/WHEN/OTHRWISE, etc.). These macros simplify and clarify coding, and help eliminate errors in writing additional labels and branch instructions.
- A versatile file searching and comparison tool (*SuperC*) that scans or compares single file or groups of files with an extensive set of selection and rejection criteria.

---

## Infoprint Server

Infoprint Server consists of several components that support printing on a z/OS system:

### **Print Interface**

This component accepts print requests from z/OS UNIX System Services and from remote systems in your IP network. It allocates output data sets on the JES2 or JES3 spool for printing on local or remote printers.

### **IP PrintWay™**

This component transmits output data sets from the JES2 or JES3 spool to remote printers in an IP network or SNA network.

### **NetSpool™**

This component intercepts print output from VTAM applications and allocates output data sets on the JES2 or JES3 spool for printing on local or remote printers.

### **Infoprint Central**

This component is a Web-based application that lets help desk operators and other authorized users or job submitters work with print jobs (output data sets) on the JES spool, printers controlled by IP PrintWay extended mode or PSF, and NetSpool logical units. It also lets operators see system status and printer definitions.

### **Windows Client**

This component contains the Infoprint Port Monitor for Windows, which transmits documents and job attributes to Infoprint Server.

---

## JES3

You might choose to enable JES3 as an alternative to the base JES2 element. It also accepts the submission of work for the BCP. Major JES3 functions and design features include:

- The interpretation of job control language (JCL) statements
- The disposition of output
- A single system image
- Workload balancing
- Deadline scheduling
- Dependent job control
- Control flexibility

JES3 differs from JES2 in two main processing areas:

- JES3 exercises centralized control over its job processing functions. JES2 exercises independent control. With JES3, a single, global processor controls job, device, and workflow for all processors in a multi-processor environment.
- JES3 does pre-execution of job setup. JES2 does not do this.

---

## RMF (Resource Measurement Facility)

RMF is the window on z/OS resource usage. It gathers information at sysplex, single-system or address-space level, and provides reports at any system in a sysplex. The user can choose between reports about activities and delays, and can focus on storage, I/O or processor data. A wide range of options allows selection of the relevant information, including the attainment of Workload Manager goals.

The RMF monitors present snap-shot and short-term reports real-time in ISPF dialogs with on-line help, and you can have the results printed if you wish. The RMF Postprocessor provides long-term reports for detailed analysis of historical data gathered by RMF. These reports can be printed or displayed.

In addition to host-based reporting functions in RMF, there are other components available that offer reporting capabilities at the workstation. The RMF PM Java Edition provides an interface between the workstation and the z/OS sysplex through a TCP/IP connection that gives you the flexibility to create unique scenarios to monitor the performance of your sysplex. The Spreadsheet Reporter, running on your Windows workstation, gives you the ability to extract reports from RMF Postprocessor output to convert them into a common spreadsheet format and allows your spreadsheet application to use the RMF data. This function enables you to integrate RMF data into your business process. It also means you can easily produce presentation graphics which illustrate performance analysis results.

---

## SDSF (System Display and Search Facility)

SDSF provides you with information to monitor, manage and control your z/OS system. SDSF provides an easy and efficient way to control job processing (hold, release, cancel and purge jobs) and to control devices (such as printers, lines and initiators). It allows you to monitor jobs while they are running and browse output without printing it. You can also browse the system log, including the sysplex-wide operations log. SDSF provides sort, filter, arrange, search, and print functions to help you locate and organize information. Single-character commands eliminate the need to learn and remember complex system commands. You can easily change characteristics of an object, such as a job or node, by typing over a displayed value. An optional action bar and pop-up windows make it easy to find and use SDSF functions. You can establish security for SDSF using SDSF's own security parameters, or with IBM's standard interface, SAF (System Authorization Facility).

SDSF provides complete online help and an interactive tutorial. In addition, ISPF users can view online documentation directly from SDSF, using the BookManager Read/MVS product.

---

## Security Server

The Security Server includes:

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

RACF provides a strong security base that enables the Security Server element of z/OS to incorporate additional components that aid in securing

your system as you make your business data and applications accessible by your intranet, extranets, or the Internet.

---

## **z/OS Security Level 3**

z/OS Security Level 3 includes IBM Tivoli Directory Server for z/OS Security Level 3 (new in z/OS V1R8; replaces LDAP Security Level 3), Network Authentication Service Security Level 3, OCSF Security Level 3, and System Secure Sockets Layer (SSL) Security Level 3.

---

## Appendix. Accessibility

Accessibility features help a user who has physical disabilities, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen-readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

---

### Using assistive technologies

Assistive technology products, such as screen-readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.

---

### Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Vol I* for information about accessing TSO/E and ISPF interfaces, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to handle their functions.



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**Introduction and Release Guide**  
**Version 1 Release 11**

**Publication No. GA22-7502-17**

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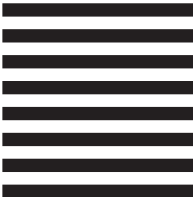
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