

IBM Systems



z/OS V2.1 Overview

z/OS V2.1 became available on 30 September 2013.

Greg Daynes
*z/OS Installation and
Deployment Architect*



*Grateful acknowledgement for material by
John Eells, z/OS Technical Marketing.*

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Agenda

- **IBM zEC12 and zBC12 System Functions and Features**
- **Improving Usability and Skills**
- **Scalability and Performance**
- **Improving Availability**
- **Self Managing**
- **Integrating New Applications and Supporting Industry and Open Standards**
- **Enhancing Security**
- **Extending the Network**
- **IBM Statements of Direction**

Note: Due to time constraints, not all enhancements listed in the handout (.pdf file) will be discussed.

Agenda

- ➔ **IBM zEC12 and zBC12 System Functions and Features**
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IBM zEC12 System Functions and Features

Five hardware models
Hexa-core 5.5 GHz processor chips
Up to 101 processors configurable as CPs, zAAPs, zLIPs, IFLs, ICFs, or optional SAPs (up to 64-way on z/OS V1.10, 100-way on z/OS V1.11 and higher)
Second generation out of order design
Improvements to pre-fetch instructions
Improved processor cache design
Up to 3TB of Redundant Array of Independent Memory (RAIM) – same as z196
Twice the HSA versus z196 (32 GB vs 16 GB)
Decimal-Floating-Point Zoned-Conversion Facility
Flash Express (Storage Class Memory-SCM)
1 MB Pageable Large Pages
Dynamic reconfiguration support for Flash Express
2 GB Large Page Support
Optional PLPA, COMMON page data sets
Crypto Express4S cryptographic coprocessors and accelerators
New support for IBM Enterprise PKCS #11 (EP11) coprocessor
DUKPT for MAC and Data Encryption, Europay, Mastercard, and Visa (EMV) CCA enhancements
New and enhanced instructions
IBM zAware
OSA-Express4S and OSA-Express5S (GbE LX and SX, 10 GbE LR and SR, and <u>1000BASE-T</u>)



FICON Express8S
24K subchannels for FICON channels
IBM zEnterprise Data Compression (zEDC) capability using zEDC Express
Shared Memory Communications-Remote Direct Memory Access (SMC-R) - 10GbE RoCE Express
Parallel Sysplex InfiniBand (PSIFB) Coupling Links
High Performance FICON for System z
CPU Measurement Facility
CFCC Level 18 and 19 enhancements
Transactional Execution Facility
Exploitation of new hardware instructions – XL C/C++ ARCH(10) and TUNE(10)
CCA 4.4 and other enhancements: RKX Key Export Wrap, UDX Reduction/Simplification, additional EP11 algorithms, expanded EMV support, AP Configuration simplification, CTRACE Enhancements, KDS Key Utilization Stats
Optional Non Raised Floor
Optional water cooling and DC Power
Optional overhead Power and I/O cabling
zBX Model 003 support of: <ul style="list-style-type: none"> IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise Select IBM BladeCenter PS701 Express blades or IBM BladeCenter HX5 blades
zManager enhancements

(z/OS support in blue)

(GA2 support in red)

IBM zBC12 System Functions and Features

2 Models – H06, H13
Hexa-core 4.2 GHz processor chips
Up to 13 processors configurable as CPs, zAAPs, zIIPs, IFLs, ICFs, or optional SAPs
Second generation out of order design
Improvements to pre-fetch instructions
Improved processor cache design
Up to 496 GB RAIM
Twice the HSA versus z114 (16 GB vs 8 GB)
Up to 6 CPs at 26 capacity points
Decimal-Floating-Point Zoned-Conversion Facility
Flash Express (Storage Class Memory-SCM)
1 MB Pageable Large Pages
Dynamic reconfiguration support for Flash Express
2 GB Large Page Support
Optional PLPA, COMMON page data sets
Crypto Express4S cryptographic coprocessors and accelerators
New support for IBM Enterprise PKCS #11 (EP11) coprocessor
DUKPT for MAC and Data Encryption, Europay, Mastercard, and Visa (EMV) CCA enhancements
New and enhanced instructions
IBM zAware
OSA-Express4S and OSA-Express5S (GbE LX and SX, 10 GbE LR and SR, and <u>1000BASE-T</u>)



(z/OS support in blue + red)

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24K subchannels for FICON channels
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CCA 4.4 and other enhancements: RKX Key Export Wrap, UDX Reduction/Simplification, additional EP11 algorithms, expanded EMV support, AP Configuration simplification, CTRACE Enhancements, KDS Key Utilization Stats
Non-raised floor option available
Overhead Cabling and DC Power Options
zBX Model 003 support of: <ul style="list-style-type: none"> IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise Select IBM BladeCenter PS701 Express blades or IBM BladeCenter HX5 blades
zManager enhancements

IBM zEnterprise Data Compression

- New hardware feature and a corresponding z/OS priced feature
- Support for industry standard zlib compression
- SMF data written to log stream compression
 - On zEC12, zBC12 with the compression feature and z/OS V2.1 with the zEDC feature
 - New SMFPRMxx keywords, corresponding IFASMF DL support
 - Software-based decompression for z/OS V1.12 and V1.13 with the PTF for APAR OA41156
- BSAM/QSAM data compression
 - On zEC12, zBC12 with the compression feature
 - Planned for 1Q2014*
- DFSMSdss™ data compression
 - On zEC12, zBC12 with the compression feature
 - Planned for 3Q2014*
- Java and IBM Encryption Facility for z/OS support
 - On zEC12, zBC12 with the compression feature
 - Planned for future updates of IBM 31-bit and 64-bit SDK for z/OS Java Technology Edition, Version 7 (5655-W43 and 5655-W44)
 - Concurrent support for IBM Encryption Facility for z/OS (5655-P97) planned



IBM System z Batch Network Analyzer

- Helping determine if you have files that are candidates for zEDC: the IBM System z Batch Network Analyzer
 - A free, “as is” tool to analyze batch windows
 - Available to Customers, Business Partners and IBMers
 - Replaces the old BWATOOL
 - PC based, graphical and text reports
 - Including Gantt charts and support for Alternate Processors
- Available from NA Advanced Technical Support
 - <http://w3.ibm.com/support/techdocs/atmastr.nsf/WebIndex/PRS5126>
- New news...zBNA planned to help identify zEDC Compression Candidates
 - SMF postprocessing to identify jobs and data sets which are zEDC compression candidates across a specified time window, typically a batch window
 - Help estimate utilization of a zEDC feature and help size number of features needed
 - Generate a list of data sets by job which already do hardware compression and may be candidates for zEDC
 - Generate a list of data sets by job which may be zEDC candidates but are not in extended format
 - Target availability planned for 4Q 2013*

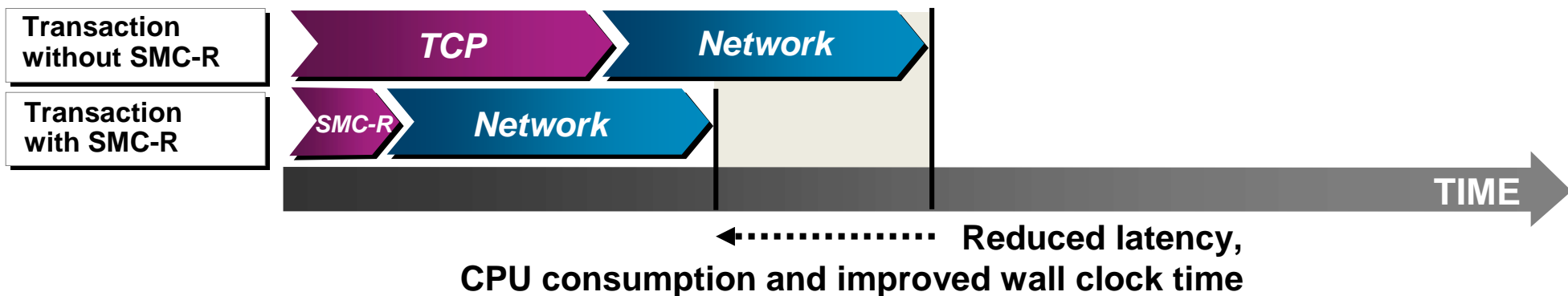


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RoCE Support for SMC-R

- Optimized Network Performance (leveraging RDMA technology)¹
- Transparent to (TCP socket based) application software
- Preserves existing network security model
- Resiliency (dynamic failover to redundant hardware)
- Transparent to Load Balancers
- Preserves existing IP topology and network administrative and operational model
- Support for z/OS to z/OS (same CEC or CEC to CEC) traffic patterns (TCP workloads)
- Requires z/OS V2.1 running on zEC12, zBC12 servers with the PCIe based RoCE Express feature



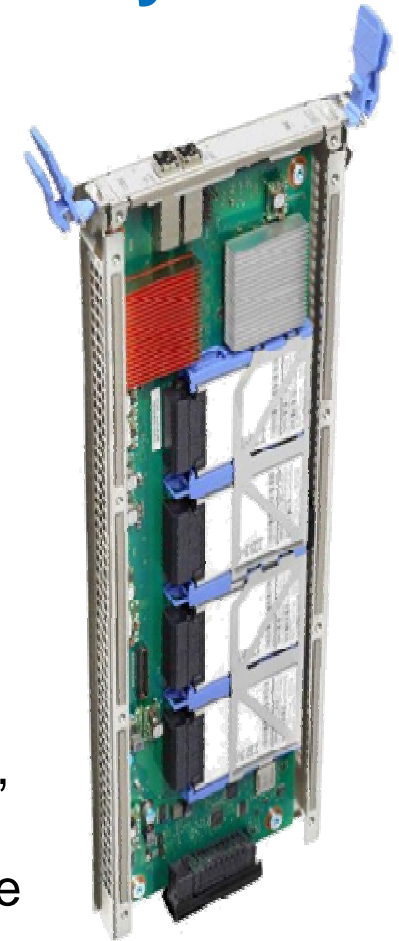
Network latency reduced up to **80%** for z/OS TCP/IP multi-tier OLTP workloads such as web based claims and payment systems *

¹Latency and CPU savings are based on workload type (latency focus for interactive workloads while CPU savings is on bulk traffic).

* Based on internal IBM benchmarks of modeled z/OS TCP sockets-based workloads with request/response traffic patterns using SMC-R vs TCP/IP. The actual throughput that any user will experience will vary.

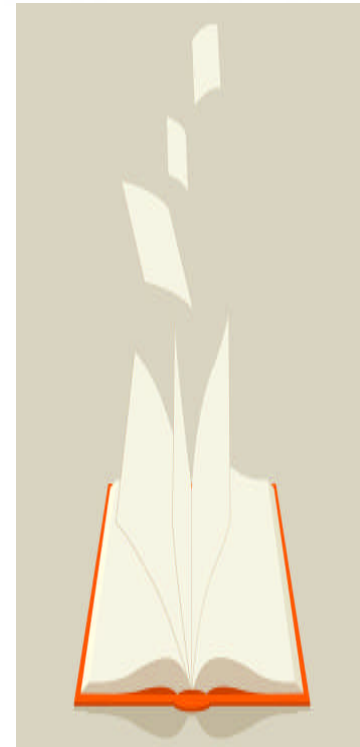
IBM zEC12 and zBC12 Flash Express is exploited by z/OS

- With z/OS V2.1, and with z/OS V1R13 RSM Enablement Offering Web deliverable, for:
 - Pagable Large Pages (1 MB)
 - Paging, when performance would be better than disk-based paging
 - SVC and Standalone Dump
- With z/OS V2.1, and with z/OS V1.13 PTFs for APAR OA40968 on the z/OS V1R13 RSM Web deliverable, for:
 - Storage Class Memory (SCM) Reconfiguration
 - For configuring SCM offline (CF SCM,OFF command)
 - Allowing for no PLPA and Common area page data sets
 - *NONE* on the PAGE= parameter in IEASYSxx
- With z/OS V2.1 running on zEC12 or zBC12 servers with CFLEVEL 19, CF support for Flash Express (planned for 1H2014)*
 - Certain Coupling Facility list structures, can allow keyed list structure data to be migrated to Flash Express memory.
 - WebSphere MQSeries® for z/OS Version 7 (5655-R36):
 - Can buffer enterprise messaging workload spikes
 - z/OS V2.1 RMF™ designed to provide measurement data and reporting capabilities for Flash Express on Coupling Facilities



z/OS Large (1MB) Pages...

- Large (1MB) Page Support
 - Introduced in z/OS R10, and PTF for z/OS R9
 - Requires a IBM System z10® or later server
 - Implementation on z/OS R10-R12 fixes all large pages
- Pageable Large (1MB) Page Support
 - Provided in z/OS V2.1, and z/OS R13 with the z/OS V1R13 RSM Enablement Offering Web deliverable
 - **Requires IBM zEC12 or zBC12 servers with Flash Express**
 - Note: Minimum real memory for pageable large pages is 4GB
- Current exploiters of fixed large pages:
 - Java 6 SR1 and later, and its exploiters
 - Including WebSphere Application Server
 - z/OS R11 and later XL C/C++ programs using Language Environment®
 - The z/OS operating system, in z/OS R12 and up
 - IBM DB2® 10 for z/OS (5605-DB2)
- Exploiters for *pageable* large pages:
 - A maintenance roll-up of IBM 31-bit and 64-bit SDK7 for z/OS Java Technology Edition, Version 7 (5655-W43 and 5655-W44)
 - DB2 (planned*)
 - IMS™ Common Queue Server (planned for YE2013*)



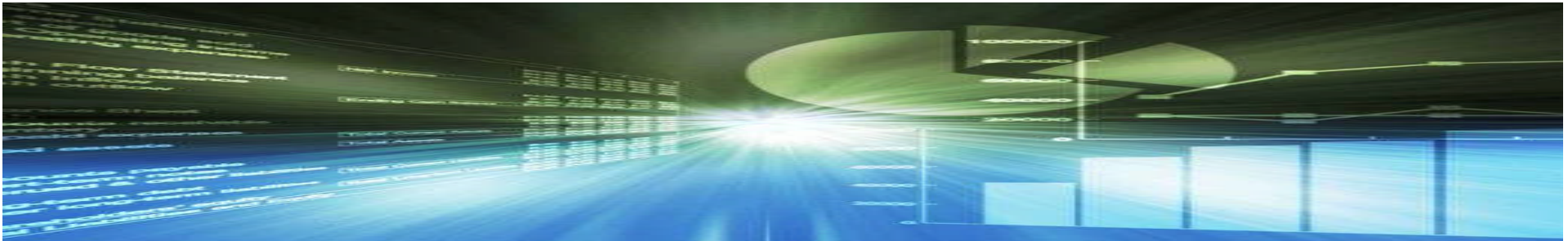
IBM zEC12 and zBC12 Functions and Features ...

- **2GB fixed page frames**
 - 1 MB pages are good...
 - ...sometimes 2 GB pages are better, for the same reasons (better TLB coverage)
 - Plans to exploit in DB2 buffer pools, and in Java*
 - Available for other large structures, other users
 - In z/OS V2.1, and in z/OS R13 RSM Web deliverable with the PTFs for APAR OA40967
 - Define with IEASYSxx LFAREA parameter
 - ***No dependency on Flash Express to use***
- **100-way support for a single image on zEC12 servers**
 - Support for processors 0-99. (z/OS V2.1 supports 256 CPs.)
- **CFCC Level 18 “writearound” support**
 - New z/OS function to allow batched updates to be written directly to disk without being cached in the CF by exploiters
- **CFCC Level 19 support**
 - Coupling thin interrupt support on z/OS R12 with PTFs, and higher
 - May make use of shared logical processors acceptable in more production coupling facilities
 - Resiliency improvements*



CF “writearound” support

- New z/OS function to allow batched updates to be written directly to disk without being cached in the CF, when requested by exploiter.
- Designed to keep cached online transaction data more current
- Expected to help improve performance during batch updates
- Requires:
 - IBM zEC12 or zBC12 server with CFLEVEL 18 or 19...
 - ...or IBM zEnterprise 196 (z196) server with CFLEVEL 17 and an MCL
 - Available back to z/OS R12 or z/OS R13
 - IBM DB2 11 for z/OS (5615-DB2)* with the PTF for APAR



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Architecture Extensions

• Transactional Execution Facility

- Software-defined sequence treated by hardware as atomic “transaction”

- TBEGIN
- Change memory location A
- Change memory location B
- ...
- Change memory location *n*
- TEND

“All or nothing”

No need for a lock

- Enables significantly more efficient software

- Highly-parallelized applications
- Speculative code generation
- Renders locks unnecessary

- Immediate exploitation by Java and initial development/test support for C/C++, HLASM in z/OS R13

- IBM 31-bit and 64-bit SDK7 for z/OS Java Technology Edition, Version 7 (5655-W43 and 5655-W44) with maintenance

- **Full C/C++ and z/OS support in V2.1;** plans for DB2, others*

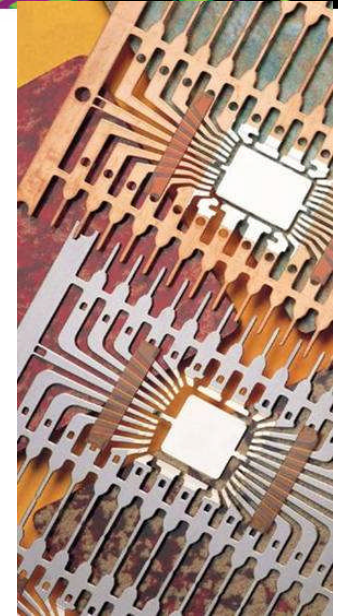
- IBM Enterprise COBOL for z/OS, V5.1 support with ARCH(10)

• Software directives to improve hardware performance

- Data usage intent improves cache management
- Branch pre-load improves branch prediction effectiveness
- Block prefetch moves data closer to processor earlier, reducing access latency

• Decimal format conversions

- Enable broader exploitation of Decimal Floating Point facility by COBOL programs



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ICSF Enhancements (HCR77A0, included in z/OS V2.1)

- **Support for Derived Unique Key Per Transaction (DUKPT) for message authentication code (MAC) and data encryption keys**
 - Intended to be compliant with the ANSI X9.24 part 1 Retail Financial Services Key Management standard
 - Intended for the symmetric key management used for financial services such as ATM transactions
- **Support for a new Cipher Text Translate CCA function designed to process sensitive data encrypted under one key**
- **Enhanced key wrapping to help ensure a key is not wrapped with a weaker key, to help you comply with industry cryptographic standards, including ANSI X9.24 Part 1 and PCI-HSM**
 - Requires enhanced CCA firmware in the Crypto Express coprocessor
- **New random number cache intended to improve application performance**
- **Support for new mode that configures Crypto Express4S coprocessors in Enterprise PKCS #11 mode**
 - RACF to support generation of ECC and RSA secure keys using Crypto Express4S
 - Corresponding PKCS #11 secure key support for PKI Services
 - System SSL to allow certificates with secure PKCS #11 ECC and RSA certificates to be used for some SSL/TLS handshakes and through its Certificate Management APIs
 - Designed to provide the cryptographic services and assurance needed to meet EU requirements for Qualified Digital Signatures
- **ICSF designed to improve I/O performance for the PKDS and PKCS #11 TKDS**
- **FIPS 140-2 setup simplification for ICSF**
- **Available now from: <http://www.ibm.com/systems/z/os/zos/downloads/> as “” Cryptographic Support for z/OS V1R12-R13” Web deliverable**

New ICSF Enhancements in the Cryptographic Support for z/OS V1R13-z/OS V2R1 web deliverable:

- **Support for emerging EMVCo (American Express, MasterCard, Visa) standards:**
 - CCA-based services for key management, generation transport, derivation
 - Requires a minimum level of CCA firmware in a CryptoExpress3 coprocessor, or a CryptoExpress4S coprocessor
- **Improved Remote Key Export service**
 - Requires a minimum level of CCA firmware in a CryptoExpress3 coprocessor, or a CryptoExpress4S coprocessor
- **Improved User Defined Extensions (UDX) support for Recover PIN from Offset, Symmetric Key Export with Data, and Authentication Parameter Generate**
 - Requires a minimum level of CCA firmware in a CryptoExpress3 coprocessor, or a CryptoExpress4S coprocessor
- **Support for AES MAC enhancements to Symmetric MAC Generate and Verify services, to allow keys longer than 128 bits for XCBC-MAC processing**
- **New CryptoExpress4S support with enhanced EP11 firmware with a minimum microcode level:**
 - Secure Key PKCS#11 support for D-H, ECC D-H, and RSA-PSS algorithms
 - Support for Enterprise PKCS#11 applications to change key compliance modes using Set Attribute Value
 - Support for ECC keys generated using Brainpool curves in FIPS mode
 - ICSF designed to improve I/O performance for the PKDS and PKCS #11 TKDS
- **A variety of performance, debug, and usability improvements**
- **Available now from: <http://www.ibm.com/systems/z/os/zos/downloads/>**

z/OS V2.1...

Improving Usability and Skills

z/OSMF Enhancements; zDAC improvements; HMC complex-wide Activate; SMP/E ISPF split screen; TSO/E logon failure messages; Generic Tracker; GDGs in chronological order; ISPF improvements; Catalog alias improvements; Correct incorrect SHAREOPTIONS for ACDS/COMMDS; Automatically start Health Checker; additional Health Checks; D PPT; IEBCOPY enhancements; Delete member masking; Recover VSAM data set with a NEWNAME ...

Integrating new Applications and Supporting Industry and Open Standards

Batch Modernization: Job Correlator, JES3 instream data in procedures, dynamic ENQ downgrade, JES2 symbol support in instream data, new long parameter support, Parallel recall for batch; 8-character Job classes; new SYSTEM and SYSAFF keywords; multivolume RLSE improvements; WebSphere Extended Deployment Compute Grid for z/OS, V8.0; Batch Run time environment – Java, PLI, COBOL interoperability; inclusion of the z/OS Font Collection; Infoprint Server improvements; Language environment support for check zones; TSO/E REXX enhancements; IXCNOTE interface for XCF; TMP support for SYSREXX; Unicode 6.0 support; support for Japanese Industry Standards; Generalized Alignment support in the Program Binder; ASCII support in more z/OS UNIX System Services shell commands and utilities; ...

Scalability & Performance

RLS for Catalogs; System Logger separation; EXCP support for zHPF; CF structure rebuild performance; PDSE V2; GDG support for PDSEs; BCPii Enhancements; zFS V5; JES2 additional spin data sets; 64-bit NFS Server; larger VSAM LDS's; VSAM RLS enhancements; DFSMSshm enhancements; DFSMSshm Migration Throughput Improvement, DFSORT improvements; WLM and RMF enhancements; z/OS UNIX enhancements ...



Enhancing Security

Security Portal; Certificate enhancements, RRSF enhancements; certificate processing improvements; SAF job class controls; z/OS UNIX timeout; ICSF enhancements, RACF Sensitive Resources Health Check improvements; System SSL TLS 1.2 support; System SSL NSA Suite B compliance; remote access to System z Crypto via LDAP...

Improving Availability

JES3 dynamic spool volume removal; Dynamic System Symbol updates; z/OS console support for HMC consoles; New operand on FORCE; DCCF support for WTOR Auto-Reply; RRS internal restart; modify VLF enhancements; Add/remove MCS Consoles dynamically; RPCBINDE/NFS re-registration; ...

Self Managing Capabilities

DFSMSshm Storage Tiers; OAM improvements; improved JES3 support for SMS-managed tape libraries; improved DFSMSrmm support for SMS-managed tape; DCM support for cascaded switches; CPM support for defined capacity ; RMF support for zBX activity; STP maximum time variance; System Logger threshold messages; SMF BUFSIZMAX for logstreams; z/OS UNIX Automount enhancements; VSAM DATACLAS additions; New ACS variable for EAS eligibility ...

Extending the Network

Resolver startup fault tolerance; support for QDIOACCEL with IPSEC; new FTP subcommands; FTP client security exit points; TCP Profile syntax check, Intrusion Detection improvements, DVIPA affinity, ...



Agenda

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Some of Many z/OSMF V2.1 Enhancements

- **z/OSMF uses WAS with the Liberty profile!**
 - Expected to start more quickly and use less CPU
- **New Configuration Workflow application**
 - Wizard-like task sequencing with task assignments and notifications.
 - First exploiter: z/OSMF itself!
- **Enhanced Software Management application:**
 - End of service dates for products, SMP/E structure verification, find out where software instances are installed, find out where service is installed....and lots more!
 - In z/OSMF V2.1, and also in z/OSMF R13 with the PTF for APAR PM73833
- **Capacity Provisioning application improvements**
 - Create and edit domain configurations and policies, among other enhancements!
 - In z/OSMF V2.1, and also in z/OSMF R13 with the PTF for APAR PM74519.

Use of the WebSphere Application Server Liberty profile

▪ z/OSMF Runs on smaller configurations

- Requires available CPU resource equivalent to a processor with a processor capacity index (PCI) of at least 45.

▪ z/OSMF Initializes faster

- z/OSMF startup time varies considerably depending upon many factors.
 - These include CPU resource, z/OSMF Server configuration, number of starting applications, type of applications, etc.
 - In the laboratory, we have observed z/OSMF startup time to be approximately 30 seconds in a zEC12 LPAR consisting of one dedicated CPU
 - o However, the time elongated to 8 minutes with a minimally configured system

▪ z/OSMF Uses less CPU

▪ z/OSMF Uses less memory

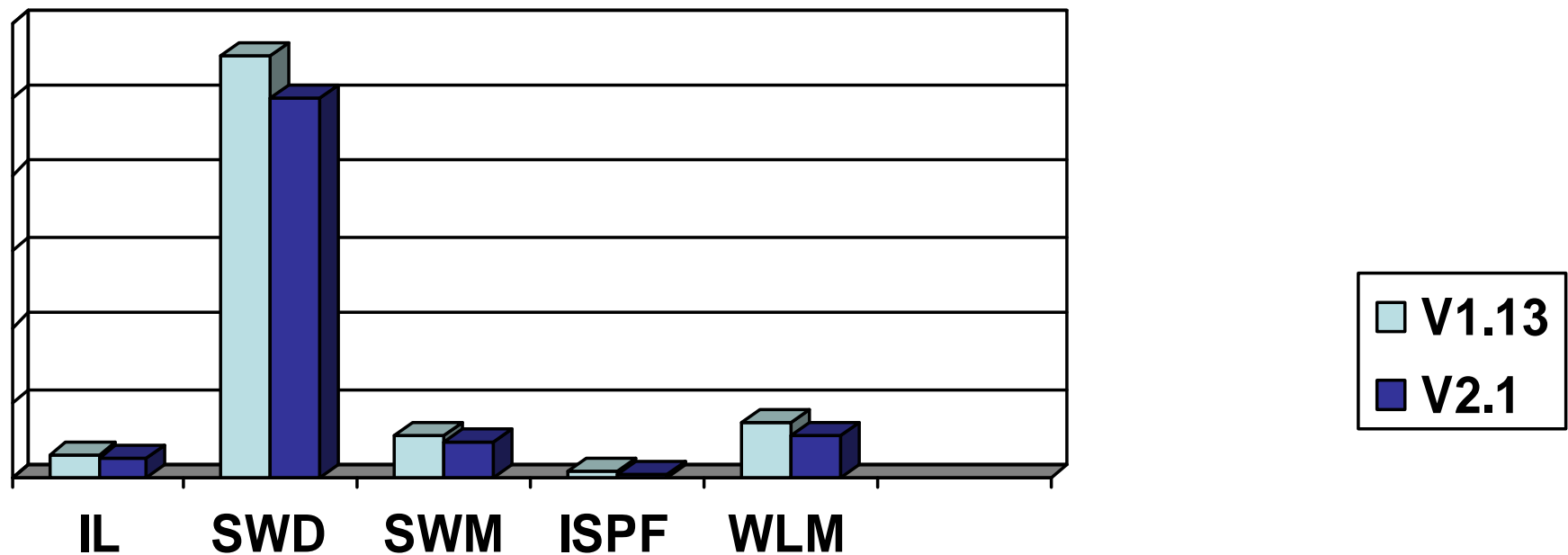
- Requires one gigabyte (1 GB) of central storage.
 - This amount is in addition to your existing storage allocation for other applications running in the same z/OS system.

▪ Installation of z/OSMF service is easier

- You no longer have to run a script (izusetup –service)

Use of the WebSphere Application Server Liberty profile

Chart 1 Resource Comparison¹



Legend:

IL – Incident Log

SWD – Software Deployment

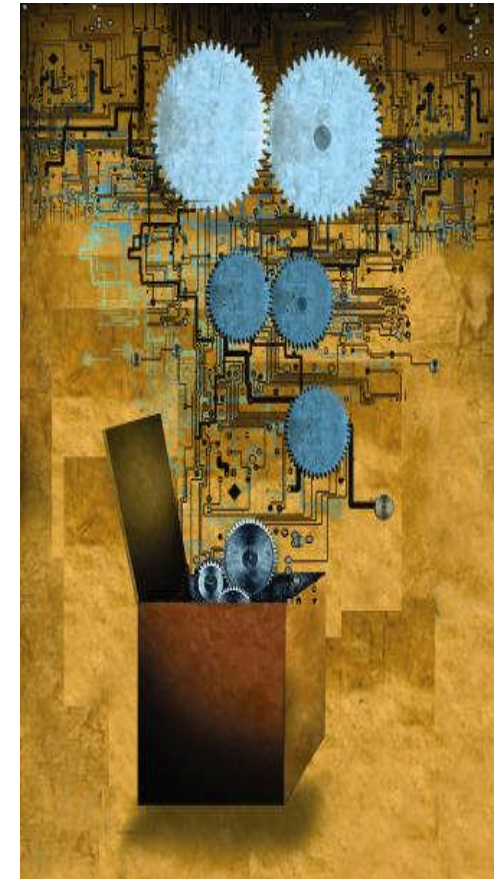
SWM – Software Management reports

CPU Time

1 - Based on laboratory results, your results may vary.

z/OS Discovery and Automatic Configuration (zDAC) Improvements

- **Originally introduced in z/OS R12 and z196:**
 - Designed to automatically perform a number of I/O configuration definition tasks for new and changed disk and tape controllers connected to a switch or director when attached to a FICON channel.
- **With z/OS V2.1, zDAC can do point-to-point discovery:**
 - zDAC now discovers switch-attached controllers
 - z/OS V2.1 zDAC also designed to discover directly-attached controllers and support mixed controller attachment (via switch and point-to-point)
 - Expected to make zDAC more useful for smaller configurations without switches
 - Better processing of device number and unit address constrained configurations
 - Improved discovery performance
- ...and lots more!



• HMC complex-wide IODF Activate

- Eliminate the need to activate I/O configuration changes one LPAR at a time!
- For all z/OS and z/VM LPARs managed in the same HMC complex
 - Same CEC, different CEC
 - Same Sysplex, different Sysplex
 - On IBM System z9[®] and later servers
 - For z/OS V1.12 (5694-A01), z/VM V5.4 (5741-A05), and later when initiated from a system running z/OS V2.1
- Driven from HCD or HCM

• Catalog parmlib member enhancements

- IGGCATxx parmlib member introduced in z/OS V1.13 supported most things you can specify on MODIFY CATALOG command keywords
- In z/OS V2.1, support is extended to support remaining F CATALOG keywords...
- ...and for some SYSCATxx and LOADxx parameters
- (We still need some data for early IPL processing to open parmlib!)

- **Multiple SMP/E logical screens in ISPF**

- z/OS V2.1 SMP/E designed to allow multiple logical screens
- One logical screen per CSI data set is allowed for update (many for read!)

A User Group Top Requirement!

- **“TSO/E LOGON” failure messages**

- z/OS V2.1 Allocation is designed to issue messages to the terminal
- Intended to make it easier to diagnose data set allocation failures like:
 - IKJ56455I EELLS LOGON IN PROGRESS AT 11:01:36 ON APRIL 30, 2012
 - **IEFA107I EELLS ISPFPROC SDBISPF0 DD01 - DATA SET EELLS.NO.SUCH.DATA.SET NOT FOUND**
 - IKJ56457I LOGON FAILED ALLOCATION UNSUCCESSFUL
 - IKJ56470I EELLS LOGGED OFF TSO AT 11:01:36 ON APRIL 30, 2012
 - IKJ56400A ENTER LOGON OR LOGOFF-

A User Group Top Requirement!

- **Generic Tracker**

- Replaces old Consoles CNZTRKR; providing a new and improved generic tracker!
- Removes many old tracker restrictions!
- Helps to determine whether functions are in use
- API available so you can call it from within a health check (for example)
- CNZTRKR calls will be automatically rerouted to new tracker
- Operator commands control and provide tracking information

- **Put GDGs in chronological order!**

- New GDGORDER JCL DD statement keyword to specify that you get the generation datasets oldest generation first to newest, or the reverse
- No need to sort or concatenate!
- System default remains newest-to-oldest

- **ISPF potpourri (a partial list of enhancements):**

- Edit support for an expandable command field (PF4, ZEXPAND)
- Edit HILITE command to highlight the invalid lowercase JCL characters
- Edit support for regular expressions in FIND and CHANGE commands
- Support for dynamically allocated data sets using XTIOs for EDIT, BROWSE, LMINIT, and LIBDEF
- Improved enhanced member list function
- ISPF directory list display for z/OS UNIX, UDLIST, DIRLIST to support a SRCHFOR function
- Support for multiple logical screens on ISPF entry, and multi-screen exit (=XALL) when ending ISPF
- Path name mask support in the z/OS UNIX Directory List Utility
- Support in OPT3.4 for a “free” line command for multivolume data sets
- Support in UDLIST lower-case path names



- **Catalog alias processing improvements:**

- Data set (NONVSAM) aliases in the master catalog that specify a different high-level qualifier for a data set will be searched for in the catalog “owning” the high-level qualifier
- Creation dates to be stored in alias entries and listed by IDCAMS
- Catalog connector alias entries to be kept when you temporarily delete a user catalog

- **SHAREOPTIONS correction for ACDS, COMMDS**

- In z/OS V1.13, health check for incorrect SHAREOPTIONS
- In z/OS V2.1 the system is designed to correct them automatically

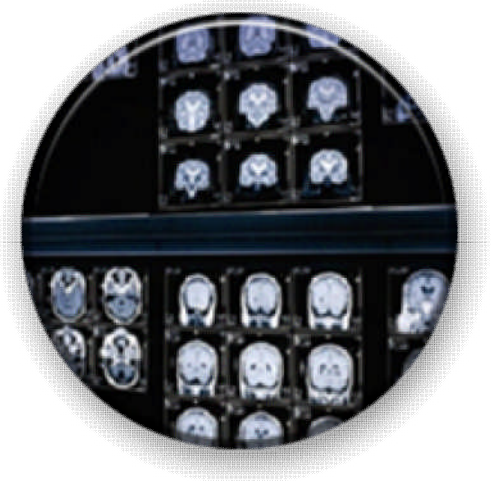


- **Automatic start for Health Checker address space**

- Health Checker to start at IPL time
- Parmlib support in a new HZSPRMxx member

- **More Health Checks**

- VLF cache object age
- RACF® check for database AIM Level 3
- RACF check for whether users without OMVS segments will have them automatically assigned
- RACF check for impending certificate expiration
- Improved RACF sensitive resource checking (more later...)
- Open/Close/EOV check for whether XTIOT is enabled
- Checks for branch tracing enabled, mode tracing, and long-running PER SLIPs that can cause high system overheads
- GRSRNLxx entries that can cause Catalog deadlocks





- **New DISPLAY PPT command, designed to:**
 - Display the currently-effective program properties table, the net from:
 - The IBM default in CSECT IEFSDPPT...
 - ...as modified by SCHEDxx during IPL...
 - ...and perhaps further modified by T SCH commands
- **“Improved IEF212I message”**
 - Really, it’s an *additional* message:
 - IEFA107I JOBNAME PROCNAME STEPNAME DDNAME - DATA SET NO.SUCH.DATA.SET NOT FOUND
 - (Instead of IEF212I ... DDNAME + 009)

A User Group Top Requirement!

A User Group Top Requirement!

- **IEBCOPY improvements**

- **COPYGROUP for PDSs**

- As for PDSE, copy aliases along with specified members automatically
- PDS/PDS, PDSE/PDS, PDS/PDSE, PDSE/PDSE all work the same
- A superset of the existing COPYGRP function.
 - All aliases in a group will be copied with the member or neither the aliases nor the member in a group will be copied.
 - The EXCLUDE statement is not supported.
- Support for pattern matching
 - Using * and % in SELECT and EXCLUDE statements with COPYGROUP
 - If member name pattern masking is used, the member rename option will not be honored.
 - Member name pattern masking and member rename are mutually exclusive.

- **Delete member name masking**

- New IDCAMS function to delete specified members by pattern
- Asterisk is a wildcard, per cent sign is positional
- Double asterisk (**) still means delete all members in the PDS/PDSE.
- Examples:
 - DELETE SOME.DATA.SET(STUFF*)
 - ...to delete all members starting with "STUFF"
 - DELETE SOME.DATA.SET(STUFF%A)
 - ...to delete all members with STUFFxA, where x is any character

Recover VSAM data set with a NEWNAME

- **Provide support for renaming of a VSAM data set during recovery from dump.**
 - Existing optional parameter NEWNAME(newwsname) can now be specified for VSAM data sets when recovering with FROMDUMP
 - DFSMSDss RENAMEU and REPLACEU enhancements for this support
 - Physical data set COPY and RESTORE will be enhanced to support renaming of VSAM data sets when RENAMEUnconditional is specified.
 - Renaming of AIX will remain unsupported.
 - Physical data set RESTORE will be enhanced to support REPLACEUnconditional.
 - Caveat – Data set can only be cataloged under certain conditions



Agenda

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RLS for User and Volume Catalogs

- Addresses customer concerns related to catalog performance, usability, availability, and recovery.
- Replaces current BCS sharing and buffering protocols with more efficient functionality.
- RLS will provide record level locking, and 64 bit local/global buffer pools.
- Performance is expected to improve by eliminating contention on current catalog serialization (SYSIGGV2 resource), reduced i/o activity (via larger local/global buffering), and improved cross system buffer invalidation (via XES/XCF Cross Invalidation).
- Usability and availability are expected to improve since there is no longer a need to split catalogs in order to reduce contention and improve performance.
- Master catalog not RLS-eligible
 - But it's typically entirely cached in CAS if set up as recommended
- New Catalog MODIFY commands to switch access between RLS and non-RLS.
- New performance measurements at a catalog level.
 - Reduction in response time (up to 90% for direct random data set delete)
 - Reduction in CPU in most scenarios (up to 80%, could increase 15%)
- Catalog size should no longer be a factor in maintaining and managing user catalogs.
- Also improves integrity and availability with new sysplex wide commands to control access to individual usercatalogs within a parallel sysplex.



- **System Logger separation of CF-based and DASD-only logs**
 - In z/OS R9 processing could be separated into different tasks for test and production log streams
 - In z/OS V2.1, Logger will be designed to support separation of CF-based and DASD-only log stream processing as well
 - Intended to support higher rates of log stream offload data set allocations, reduce primary storage full conditions, and support higher overall concurrent log stream offload rates
 - Also available for z/OS V1.13 with the PTF for APAR OA38613
- **EXCP support for zHPF**
 - Designed to help improve I/O start rates and bandwidth on your existing hardware and fabric.
 - In addition to:
 - Media Manager (including VSAM, z/OS R11)
 - QSAM, BSAM, BPAM (z/OS R13)
 - EXCPVR (z/OS R13)



CF structure rebuild performance

- Currently, all CF structures are rebuilt in parallel
- Considerable contention can result, slowing the process overall and (especially) slowing the process for the most important structures
- New design to process structures serially, more or less
- Intent is much faster recovery for critical structures and faster overall rebuild time
- System structures to be prioritized by the system
- Other structures optionally prioritized by policy





- **PDSE Version 2**
 - Designed to improve read performance, reduce storage consumption
 - New PDSE member size limit over 125 times larger in most cases, and substantially larger than the maximum size of a PDS member
 - Intended to make it possible to provide additional scalability and usability benefits of using PDSEs in place of PDSs and make it feasible to use PDSEs instead of multiple large sequential data sets
 - Toleration support provided to z/OS R12 and R13.
 - Exploit with DSNTYPE= in JCL, and in IGDSMSxx
- **GDG Support for PDSEs**
 - In addition to sequential, direct, and PDS GDGs
- **BCPii GetBulk Support**
 - Get multiple attribute queries in one shot
 - Reduce the time required for such queries significantly
 - Support for multiple attribute requests for CPC, image, capacity record, activation profile, and image user groups
 - Supported for IBM System z9 and later servers
 - Expected to yield performance benefits most noticeable for interactive system management applications
- **BCPii supports a System REXX (SYSREXX) API.**



zFS Scaling

- **New zFS Version 5 format, designed to:**
 - Significantly improve performance for file systems with large directories by using a tree structure
 - Remove explicit limits on the number of names that can be stored in zFS directories, including the prior 65,535 subdirectory limit
 - Increase the maximum file system size from 4 TB to 16 TB
 - Support both zFS V4 and V5 directories in the same physical file system data set
 - *Exploit V5 after you do not expect to fallback to R13 or R12.*
 - Intended to allow you to migrate HFS file systems that contain directories with a large number of files to zFS with good performance
- **Conversion option controls to include:**
 - New option on IOEAGFMT to convert existing file systems
 - New IOEFSPRM parmlib parameter, CONVERTTOV5 ON|OFF, to convert directories on first access
 - New shell command operand to convert directories, zfsadm convert
 - Conversions designed to “fail safe,” leaving a usable file system if the conversion does not succeed



- **z/OS V2.1 JES2 and SDSF designed to support more spin data sets:**
 - Support for over 4 billion spin data sets (up to 4,294,967,296)
 - Up from 9,999,999
 - Intended to help improve availability for long-running address spaces
 - Allowing them to create more output data sets on spool before having to stop and restarting them.
 - Available back to R13 with the PTFs for APARs OA38944 and PM59496
- **64-bit NFS server, designed to support:**
 - Larger sequential data sets, PDS/PDSE members
 - Processing files as large as 4 TB, up from 800 MB
 - Improved application performance for random access
- **Non-SMS managed VSAM LDS's can be larger than 4GB!**
 - Another zFS restriction bites the dust.
- **VSAM RLS enhancements**
 - Directory-Only Caching, allowing you to optionally bypass CF caching when the cost is more than the benefit.
 - A number of RLS control blocks move from SMSVSAM data space to 64-bit storage (VSCR)
 - IDCAMS PRINT, REPRO, IMPORT, and EXPORT support on open VSAM data set using RLS.



- **DFSMSHsm Fast Replication Enhancements**

- Consistency Group Support
 - Designed to allow you to create consistent backups of DB2 log copy pools and recover them without performing conditional DB2 restarts
- Also:
 - Recover Data Sets to any volume
 - Recover Data Sets with a New Name
 - *Rename a data set on physical copy (very convenient for indirect cataloging for zFS!)*

- **DFSMSHsm designed to improve disk and tape performance**

- Increased multitasking level with a new SETSYS command
- Expected to be greatest when moving numerous small data sets
- Intended to reduce elapsed migration time required

- **DFSMSHsm to increase volume limit**

- From 40 to 254 tape volumes per data set
- Intended to allow you to migrate & back up larger data sets



DFSMSHsm Migration Throughput Improvement

- For each Data Movement Task, run multiple subtasks that overlap pre and post-processing with data movement.
- Migration subtasking can be enabled for Primary Space Management, On Demand Migration and Interval Migration.
- (SETSYS) MIGRATIONSUBTASKS(YES) enables the function and can only be specified on startup.
- The default number of subtasks is a *patchable* value which is initially set to 5.
 - Internal testing found this to be an ideal balance of throughput, CPU usage and memory consumption.
- Maximum allowed subtasks is 105

DFSORT™ Scaling improvements

- Blockset technique sorting support for programs running in 64-bit addressing mode
 - Intended to help relieve storage constraints
- Improved memory management
 - Better balance the memory requirements of multiple large concurrent sorts
 - New TUNE option to specify storage be obtained incrementally, and check on storage availability before allocating additional storage.
- Support for larger memory object work space, 64 GB to 1 TB
 - Allows you to sort more data in memory object work file





- **WLM improvements:**

- New types of classification groups and qualifier types you can use to define rules like SPM (subsystem parameter) more consistently
- Support for up to 3,000 application environments, an increase from the prior limit of 999

- **RMF enhancements:**

- RMF designed to offload some processing to zIIP processors in a Parallel Sysplex (when a zIIP is available)
- 1 MB page and Flash Express reporting enhancements
 - Also available on z/OS V1.13 with the RSM Enablement Offering web deliverable and the PTF for APAR OA38660
- Support for new interrupt delay time measurement on zEC12 and zBC12 systems, with SMF74-1 and SMF79-9 support
 - Also available on z/OS V1.12 and z/OS V1.13 with the PTF for APAR OA39993
- Global Mirror collision reporting in RMF Monitor I and SMF74-5 records
 - Also available on z/OS V1.12 and z/OS V1.13 with the PTF for APAR OA40376
- More information about CF links in Monitor I
 - Also available on z/OS V1.12 and z/OS V1.13 with the PTF for APAR OA37826



- **More mutexes and shared condition variables in z/OS UNIX**

- A mutex (mutual exclusion) is a UNIX serialization mechanism (roughly analogous to ENQ with SCOPE=SYSTEM)
- A condition variable can be associated with a mutex, and programs running in multiple threads can make decisions based on its value
- Current limit per memory segment is 64K-1 sum of mutexes and condition variables
- Current z/OS system limit for that sum is 128K
- Current limits will remain for unauthorized users
- New authorized limits are:
 - 16M-1 (x'FFFFFFF') sum of mutexes and condition variables per shared segment
 - 4G-1 (x'FFFFFFFF') sum system limit
- Authorization via UID(0) or READ (or higher) access to the SUPERUSER.SHMMCV.LIMIT resource in the UNIXPRIV class

- **More threads for z/OS UNIX**

- z/OS V2.1 UNIX System Services supports more threads on the system

- **More z/OS UNIX pipes**

- Support up to 15,360 pipes, up from the prior limit of 8,730



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• JES3 dynamic spool volume removal

- Identify jobs using a spool volume
- Dump those using the spool volume you want to remove
- Remove the spool volume without a JES3 complex-wide restart using hot start or *MODIFY,CONFIG
- Complements dynamic spool addition support in z/OS V1.13
- Removes the need to perform a JES3 complex-wide IPL to remove a spool volume

• Dynamic System Symbol updates

- Single system only
- Not fully compatible with IEASYMUP or SYMUPDTE
- New SETLOAD IEASYM keyword and IEASYMU2 program
 - IEASYMU2 is intended for temporary updates
 - Understand the considerations when using both!
- New ENF73 signal on symbol update

A User Group Top Requirement!

• z/OS Console support for HMC 3270 console

- For z/OS console, during and after IPL
- Intended to add another backup console
- Designed to allow small z/OS LPARs to run without OSA-ICC

A User Group Top Requirement!

- **New operand on FORCE to terminate a task**

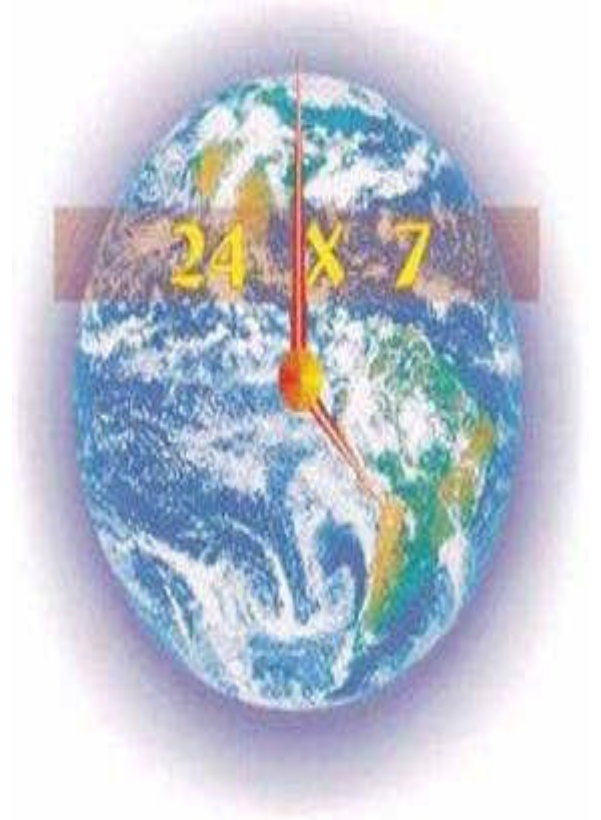
- FORCE jobname,TCB=address
 - New ASCBNOFT bit to exempt all tasks in an address space from force
- New MVS.FORCETCB.* SAF profiles in OPERCMDS class
- Replace CALLRTM usermod from Level 2

- **Disabled Consoles Communication Facility (DCCF) support for WTOR Auto-Reply**

- Support for branch-entered WTORs
- Intended to help prevent synchronous WTORs from causing SFM to partition out systems with outstanding replies

- **RRS internal restart**

- New optional internal RRS restart designed to quiesce RRS processing, clean up logs, and resume processing, without taking RRS down



• New MODIFY VLF Command

- Designed to allow you to specify COFVLFxx member
- Update VLF classes & associated major names
- Change MaxVirt and AlertAge for existing classes
- Designed to help avoid performance impacts by avoiding VLF restart

A User Group Top Requirement!

• Add/remove MCS consoles dynamically

- Support for adding/removing distributed mode MCS consoles
- SET CON designed to process a CONSOLxx member to add consoles
- SETCON designed to allow you to specify a console to be removed
- Intended to help improve availability by removing another reason for system and sysplex-wide IPLs

A User Group Top Requirement!

• RPCBIND/NFS re-registration

- RPCBIND and NFS Servers designed to allow the NFS Server to re-register with RPCBIND when RPCBIND is restarted
- Designed to help preserve existing connections
- Designed to allow new mounts when RPCBIND is restarted
- Intended to let you avoid an NFS Server restart to improve availability





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• DFMSHsm Storage Tiers

- Policy-based movement of SMS-managed data within L0
- Intended for existing storage class and storage group constructs
- Apply management class policies based on age and last reference to move the data from one class of device to another
 - For example, IBM System Storage[®] DS8700 and DS8800 SSD, HDD, SATA, or a mix
 - Can include Easy Tier devices
- ML1 and ML2 will work as they do now
- Intended to help you manage data residency to meet business goals and data management policies



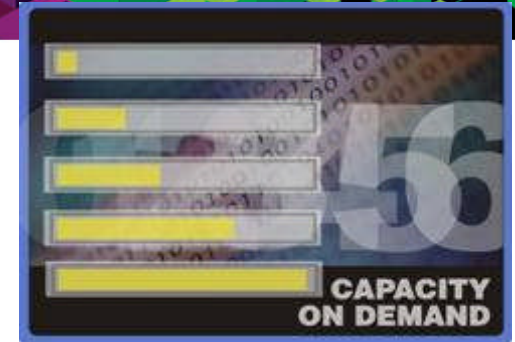
IBM System Storage

- **OAM Improvements designed to improve tape-related functions:**
 - Supporting larger block sizes for tape for better performance
 - Allow you to remove unneeded backup copies automatically
 - Enable OSREQ Store Sequence support on smaller object sizes
 - Enhance OAM interoperation with products such as IBM Tivoli® Automated Tape Allocation Manager for z/OS (ATAM, 5698-B15)
 - Enable you to tune tape library operations with a new SETTLIB option in CBROAMxx PARMLIB member
- **Improved JES3 support for SMS-managed tape libraries**
 - Better support the use of Main Device Scheduler for SMS-managed tape
 - New JES3_ALLOC_ASSIST=YES|NO parameter in DEVSUPxx
 - Inish deck changes for this support to define new esoteric names for clusters



- **Improved DFSMSrmm™ support for SMS-managed tape**
 - DFSMSrmm designed to support tape data set retention periods using SMS Management Classes
 - Intended to set resulting expiration dates automatically, and support expiration of tape data sets after a specified period of inactivity
 - Extend EXPDT-based retention management to allow it to be based on volume sets or first files
- **FICON® Dynamic Channel path Management support for cascaded switches**
 - Existing FICON DCM is extended to support cascaded switches
 - Attaching a controller to a switch through another switch to a channel
 - Support for FICON limit of 2-level cascading for DCM
 - (Channel, two switches, control unit)

- **CPM support for defined capacity and group capacity limit**
 - Designed to increase options for manual and automated responses to capacity shortages
- **RMF to provide SMF 104 Records for zBX Activity**
 - Basic performance metrics for:
 - Linux[®] on IBM System z[®]
 - Linux on IBM System x[®] running on zBX blades
 - AIX[®] running on zBX blades
 - Microsoft[®] Windows[®] 2008 Server running on zBX blades (new!)
 - Help support performance management, capacity planning activity across the Hybrid



• STP maximum time variance check

- z/OS V2.1 Timer Services designed to issue a message when using STP when unacceptable variance is detected between UTC and TOD clock
- Intended to help U.S. stock exchange members meet SEC rules for record timestamps for the Order Audit Trail System (OATS)



• System Logger threshold messages

- Specify that warning messages be issued based on thresholds for log stream primary storage consumption
- Intended to help you avoid storage full conditions that can lead to performance degradation and outages

• SMF BUFSIZMAX for log streams

- Designed to let you specify SMF log stream buffer sizes with a new DSPSIZMAX parameter in SMFPRMxx
 - Similar to BUFSIZMAX specification for SYS1.MAN data sets.
 - Support for DSPSIZMAX to be used when SMF is initialized also available back to R12 with the PTF for APAR OA35175
- z/OS V2.1 to support dynamic changes via SET SMF and SETSMF





- **z/OS UNIX Automount Improvements**

- Allow you to specify permission bits other than the defaults for file systems created automatically using an automount policy
- Extend the use of static system symbols to the master file (/etc/auto.master)
 - Currently supported for MapName files only
- Serialize automount appends across systems
- Set owning system to a file system parent when appropriate to avoid unmount failures during OMVS shutdown



- **VSAM DATACLAS additions designed to let you specify:**

- All System-Managed Buffering (SMB) record access bias values for VSAM data sets that can be specified in JCL in data classes
- ACB RMODE31 override SMS data class specifications.

- **New ACS variable for EAS eligibility**

- Intended to allow you to code ACS routines to route allocations appropriately





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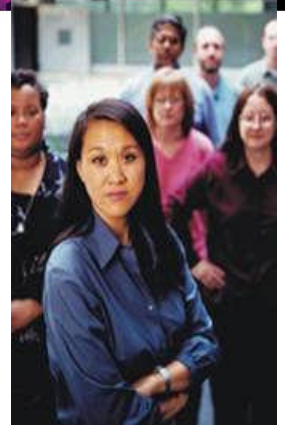
- **Batch Modernization:**

- **Job Correlator**

- Unique 64-byte value assigned to each job in a sysplex
- Intended to:
 - Provide a larger name space for jobs (adjunct to job name)
 - Help link jobs to output and other records
 - Provide a simple way for applications to determine the Job ID of a job that was just submitted
 - Available with the z/OSMF REST API

- **JES3 support for instream data in procedures**

- DDNAME DD * support in PROCs and INCLUDE groups
- Similar to support introduced in z/OS V1.13 JES2





- More Batch Modernization...

- Dynamic ENQ downgrade support in GRS, and JCL support:

- In a multistep job, change an *exclusive* ENQ to *shared* ENQ for a data set
 - After the last job step with DISP=OLD, MOD, or NEW has ended
- New JES2 Job Class parameter, DSENQSHR=AUTO | ALLOW | DISALLOW
 - ALLOW allows a downgrade when JCL has ALLOW
- New JOB statement parameter, DSENQSHR=ALLOW, to use with jobclass of ALLOW or AUTO. DSENQSHR=ALLOW, USEJCL, DISALLOW

USEJCL allows downgrade only when jobclass is AUTO

```
//GREAT      JOB (accounting), DSENQSHR=ALLOW
//STEP1      EXEC PGM=WHATEVER
//OLD        DD DSN=MY.DATA.SET, DISP=NEW
//STEP2      EXEC PGM=SOMEPGM
//STILLOLD   DD DSN=MY.DATA.SET, DISP=MOD
//STEP3      EXEC PGM=EXPCT806
//SHR4NOW    DD DSN=MY.DATA.SET, DISP=SHR
//STEP4      EXEC PGM=IDUNNO
//OLDAGAIN   DD DSN=MY.DATA.SET, DISP=OLD
//STEP5      EXEC PGM=NOCLUE
-----
//SHR4EVER   DD DSN=MY.DATA.SET, DISP=SHR
//STEP6      EXEC PGM=WHOKNOWS
//STILLSHR   DD DSN=MY.DATA.SET, DISP=SHR
```

Exclusive ENQ until last DISP=OLD, NEW, or MOD step done

Then, shared ENQ

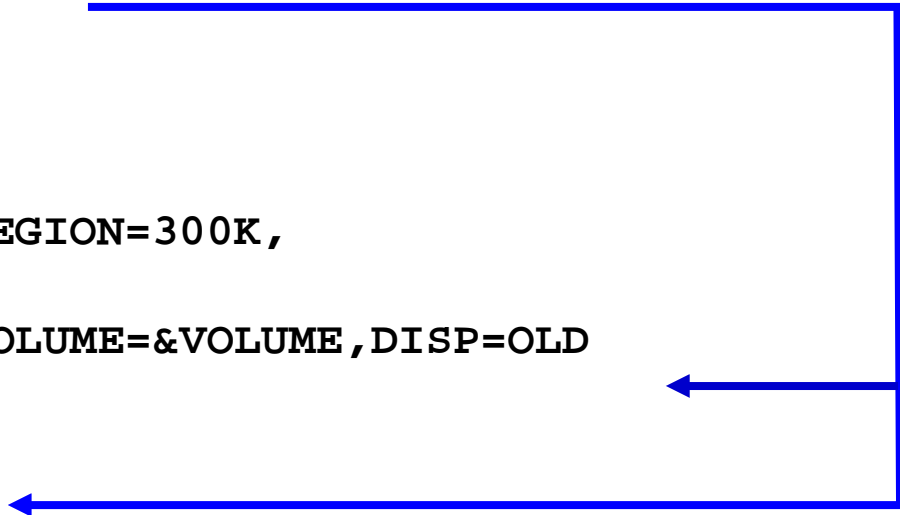


- **Still more Batch Modernization...**

- **JES2 symbols support for instream data and for submitted jobs**
 - New step-level EXPORT statement to list system and JCL symbols available to be resolved, and new callable service support for access to them
 - New SYMBOLS keyword for DD * and DD DATA to control substitution

Example:

```
// EXPORT SYMLIST=(DSNAME)
// SET DSNAME=MY.DATA.SET
// SET VOLSER=VOLUME
//*
//DELETEDS EXEC PGM=IDCAMS,REGION=300K,
//SYSPRINT DD SYSOUT=*
//DEVICE DD DSN=&DSNAME,VOLUME=&VOLUME,DISP=OLD
//SYSIN DD *,SYMBOLS=JCL
DELETE -
    &DSNAME. -
NONVSAM -
PURGE -
SCRATCH -
FILE(DEVICE)
/*
```



• Batch Modernization, continued...

- **New PARMDD EXEC keyword support longer parameter strings**
 - Mutually exclusive with PARM keyword
 - No other changes required for unauthorized programs
 - Authorized programs must be bound using LONGPARM or system will terminate the job at step initiation
 - Supports parameter lists from 1 to 32,760 bytes long

Example:

```
//NOTAREAL JOB (accounting info),MSGLEVEL=(1,1),CLASS=BATCHLOW,
// NOTIFY=&SYSUID
//*
//UNAUTH EXEC PGM=MYPGM,PARMDD=PARMS
//IN DD DISP=SHR,DSN=MY.DATA.SET
//OUT DD DISP=(,CATLOG),DSN=MY.NEW.DATA.SET, ...
//PRINT DD SYSOUT=*
//PARMS DD *
LONG PARAMETER LIST HERE IN THE DATA SET NAMED BY
PARMDD. NOTE THAT IT NEED NOT BE AN INSTREAM DATA
SET. A SEQUENTIAL DATA SET OR A MEMBER OF A PDS OR
PDSE WILL WORK AS WELL. AND, IF I COUNTED RIGHT,
THEN THIS VERY VERY LONG PARAMETER LIST IS NOW WELL
OVER 100 CHARACTERS IN LENGTH AND I CAN STOP TYPING!
/*
```





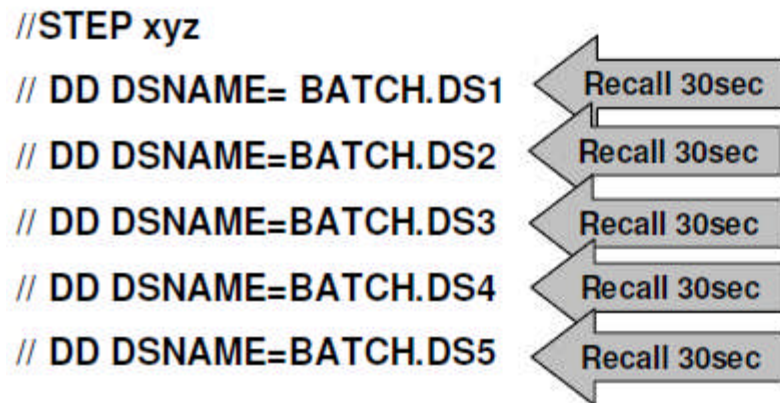
And Still More Batch Modernization:

• Batch Parallel Recall

- Allocation to determine whether data sets to be allocated have been migrated
- For DFSMSHsm-migrated data sets, Allocation will:
 - Issue recall requests during step initiation
 - Wait for all recalls to complete
 - Continue with Allocation processing needed to start the step
- New ALLOCxx keyword to enable, and SETALLOC support
 - BATCH_RCLMIGDS(SERIAL,PARALLEL)

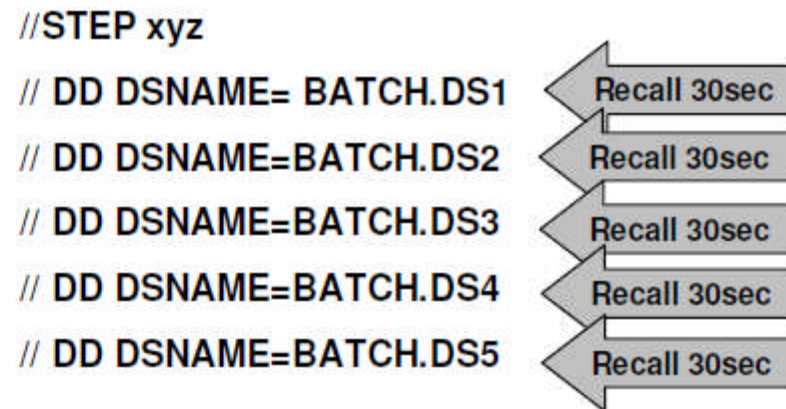


SERIAL



Elapsed Recall Time = 150 seconds

PARALLEL



Elapsed Recall Time = 30 seconds

And Still More Batch Modernization:

- **8-character Job classes**

- JOB statement to support 8-character alphanumeric job classes
- Expands maximum number of job classes for JES2
 - JES3 will continue to support a maximum of 255 job classes
 - No explicit limit for JES2
- JES3 supports 8-character job classes via JECL (//*MAIN CLASS=xxxx)
- JES3 to continue to override CLASS from the JOB statement when CLASS is coded on the /*MAIN statement

```
//NICE JOB CLASS=PAYROLL, ...
```



- **New SYSTEM and SYSAFF JOB JES-independent statement keywords**
 - Allow you to specify z/OS MVS system names, JES2 MAS member names, and JES3 MAIN names
 - New ALLOCxx keyword to enable, and SETALLOC support
- **Multivolume RLSE improvements**
 - To release unused space for SMS-managed multivolume data sets:
 - On the current volume
 - On all subsequent volumes
 - Via RLSE in JCL or equivalent DYNALLOC text unit



- **WebSphere Extended Deployment Compute Grid for z/OS, V8.0**

- New framework for single-threaded Java applications
- z/OS supports for xJCL constructs via keyword/value pairs to allocate files, specify checkpointing
- Intended to use commit interval management

- **Batch Run Time Environment: Java/PLI/COBOL interoperability**

- Similar to Java/COBOL interoperability in R13, to provide transactional integrity for DB2 between Java, COBOL, and PLI programs
- VSAM as an resource manager
- Provide TVS integrity among Java, COBOL, and PLI programs via RRS
- Requirements include:
 - IBM 31-bit SDK for z/OS, Java Technology Edition, V6.0.1
 - Enterprise PL/I Version 4 Release 2 (5655-W67)
 - DB2 V9 (5635-DB2) or DB2 10 (5605-DB2) with PTFs



• z/OS Font Collection

- New base element, which includes:
 - AFP Font Collection for S/390 (5648-B33) fonts
 - IBM Infoprint Fonts for z/OS V1.1 (5648-E76)
 - World Type fonts that are part of the InfoPrint Font Collection V3.1 available for other operating system platforms
 - Double-byte Asian fonts
 - Selected Object fonts
 - PSF Compatibility Font feature
- Intended to eliminate the need to include font products and features in z/OS orders and assure that fonts are always available on z/OS systems

• Infoprint Server Improvements

- Replace attributes in the aopd.conf file and AOP variables with information stored in the Printer Inventory
 - Designed to allow you to use Infoprint Server's ISPF application to perform most System Administrator and Printer Administrator tasks
- Support dynamic configuration changes for most options
- Add job accounting information to SMF Type 6 records
- Support using System Logger for the Common Message Log
 - Rather than files in the z/OS UNIX System Services file system
 - Intended to allow you to manage message log data without shutting down Infoprint Services without interruption





- **Language Environment support for check zones**

- New function to help expose memory overlays that cause heap damage
- HEAPZONES run-time option designed to allow you to specify that each storage area requested have a check zone appended
- Language Environment designed to detect a program storing data in a check zone
- Intended to help you find problems that might otherwise be more difficult to identify
- Designed to help you test application code—*new, changed, and existing!*

A User Group Top Requirement!

- **TSO/E REXX Enhancements**

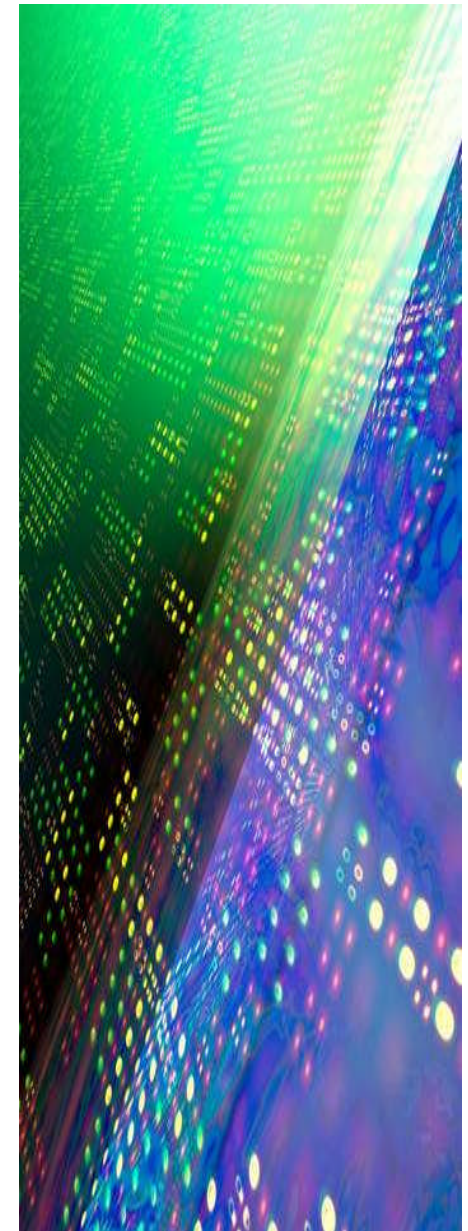
- Enhancements to EXECIO, LISTDSI, and STORAGE:
 - Retrieve information about data sets in EAS on EAVs
 - Also, PDSE, concatenated, multivolume, and tape data set support
 - Support I/O to undefined and spanned record format data sets
 - Improve the usability of EXECIO, LISTDSI

• New IXCNOTE interface for XCF

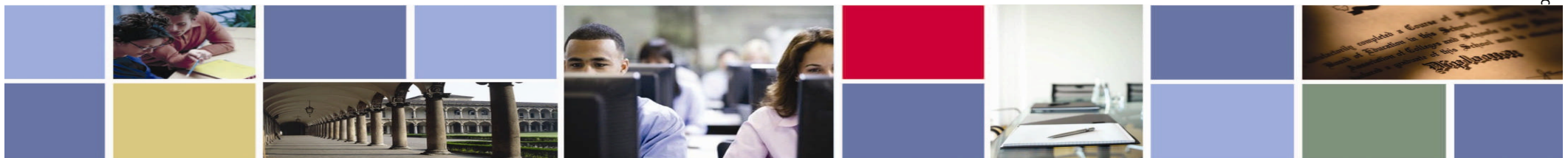
- Designed to support notes with up to 1024 bytes of application data
- Designed to allow applications to:
 - Create and delete "note pads"
 - Create, read, modify, or delete notes in note pads they are connected to
- XCF will be designed to create note pads in CF list structures
- New API intended to help improve Parallel Sysplex flexibility and usability for application programmers
- Available on z/OS V1.13 with the PTF for APAR OA38450

• TMP Support for SYSREXX™

- All functions of the CONSOLE host command environment
- Designed to support system and subsystem commands, and monitoring message traffic with an EMCS console



- **Unicode 6.0 Support in Case, Collation, and Normalization Services**
 - Designed to meet the Unicode 6.0 standard
- **Support for Japanese Industrial Standards (JIS)**
 - For Extended UNIX Code (EUC): JIS X 0201, JIS X 0208, and JIS X 0212
 - New support is designed to add three new CCSIDs: CCSID 17338, CCSID 21434, and CCSID 37818
 - These CCSIDs extend Japanese Unicode support to include 83 additional NEC characters
- **Generalized Alignment support in the Binder**
 - Support the boundary alignment from byte to 4K page alignment
 - As specified in object modules when building program objects & load modules
 - When COMPAT=CURR on z/OS V2.1 (or V2.1 is specified)



- **ASCII conversion support in more z/OS UNIX System Services shell commands and utilities**

- Already supported for:

chtag -- Change file tag information
find -- Find a file meeting specified criteria
iconv -- Convert characters from one code set to another
dd -- Convert and copy a file
cp -- Copy a file
mv -- Rename or move a file or directory
pax -- Interchange portable archives
ex -- Use the ex text editor
vi -- Use the display-oriented interactive text editor

- New support for:

cat -- Concatenate or display text files
cmp -- Compare two files
comm --
cut --
diff -- Compare two text files and show the differences
dircmp -- Compare directories
ed --
egrep -- Search a file for a specified pattern
expand --
fgrep -- Search a file for a specified pattern
file -- Determine file type
grep -- Search a file for a specified pattern
head -- Display the first part of a file
more -- Display files on a page-by-page basis
paste --
sed --
strings --
tail -- Display the last part of a file
unexpand --
unique --
wc -- Count newlines, words, and bytes





Agenda

- IBM zEC12 and zBC12 System Functions and Features
- Improving Usability and Skills
- Scalability and Performance
- Improving Availability
- Self Managing
- Integrating New Applications and Supporting Industry and Open Standards
- ➔ **Enhancing Security**
 - Extending the Network
 - IBM Statements of Direction

System z Security Portal

- Want to be notified about Security and Integrity APARs? Sign up!
 - IBM recommends that you promptly install security and integrity PTFs
 - SECINT PTFs are included in RSUs periodically
 - The System z Security Portal can help you stay more current with SECINT PTFs by providing SMP/E HOLDDATA you can use to identify these fixes before they are marked RSU
 - The System z Security Portal also provides associated Common Vulnerability Scoring System (CVSS) V2 ratings for new APARs*
 - To get this information you must register!
 - Because widespread specifics about a vulnerability could increase the likelihood that an attacker could successfully exploit it
 - In response to customer requests to maintain the confidentiality
 - Other requirements on the website
 - IBM recommends that you visit the System z Security Portal site at http://www.ibm.com/systems/z/advantages/security/integrity_zos.html to get the information you need to register
 - Questions can be directed to: syszsec@us.ibm.com

• Note: According to the Forum of Incident Response and Security Teams (FIRST), the Common Vulnerability Scoring System (CVSS) is an "industry open standard designed to convey vulnerability severity and help to determine urgency and priority of response." IBM PROVIDES THE CVSS SCORES "AS IS" WITHOUT WARRANTY OF ANY KIND, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. CUSTOMERS ARE RESPONSIBLE FOR ASSESSING THE IMPACT OF ANY ACTUAL OR POTENTIAL SECURITY VULNERABILITY IN THEIR SPECIFIC ENVIRONMENT. IBM DOES NOT PROVIDE A CVSS ENVIRONMENT SCORE. THE CVSS ENVIRONMENT SCORE IS CUSTOMER ENVIRONMENT SPECIFIC AND WILL IMPACT THE OVERALL CVSS SCORE. CUSTOMERS SHOULD EVALUATE THE IMPACT OF ANY ACTUAL OR POTENTIAL SECURITY VULNERABILITY IN THEIR SPECIFIC ENVIRONMENT.

• IBM DOES NOT PROVIDE A CVSS ENVIRONMENT SCORE. THE CVSS ENVIRONMENT SCORE IS CUSTOMER ENVIRONMENT SPECIFIC AND WILL IMPACT THE OVERALL CVSS SCORE. CUSTOMERS SHOULD EVALUATE THE IMPACT OF ANY ACTUAL OR POTENTIAL SECURITY VULNERABILITY AND CAN CALCULATE A CVSS ENVIRONMENT SCORE.



• RRSF

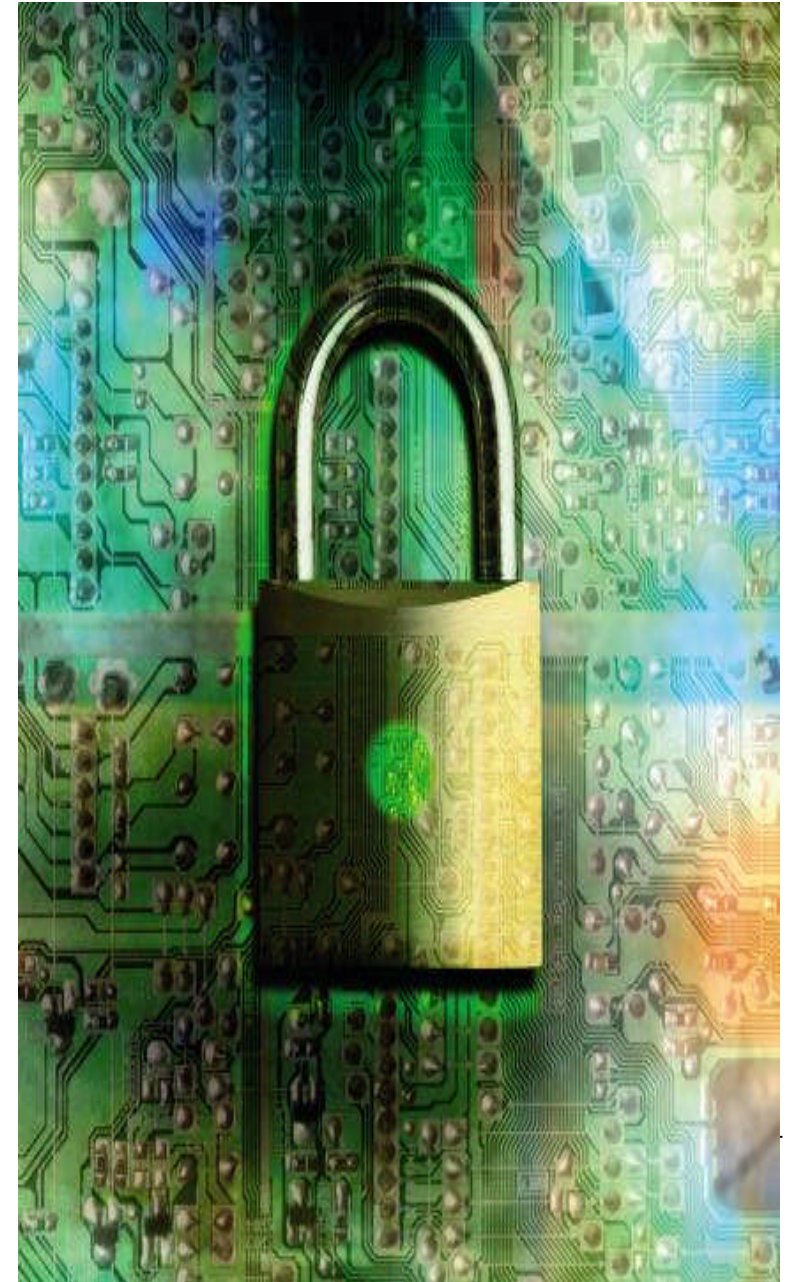
- z/OS V1.13 introduced TCP/IP-based RRSF support for IPv4
- z/OS V2.1 support for IPv6...
- ...and for using elliptic curve cryptography (ECC)-based certificates for establishing the AT-TLS sessions
- Intended to allow use of stronger encryption algorithms with RRSF

• Certificate processing improvements:

- Health check on impending certificate expiration
- System SSL validation according to RFC 5280, RFC 3280, or RFC 2459
- Support for Extended Validation (EV) X.509 digital certificates in PKI Services
- Improved displays for RACF certificates, certificate chains, and key rings
- RACF to enhance certificate request processing for certificates issued by external Certificate Authorities to help ensure private keys associated with the fulfilled certificates are not inadvertently deleted.
- Optional PKI Services message when Certificate Revocation List (CRL) processing ends



- **SAF job class controls**
 - Support for both JES2 and JES3
 - Intended to allow you to supplant exits with new profiles in the JESJOBS class
- **z/OS UNIX timeout support:**
 - New BPXPRMxx parameter
 - Specify whether users who logged in using rlogin, telnet, ftp, or the TSO OMVS command should be logged off after a period of inactivity
 - Intended to help you improve system security
- **RACF Sensitive Resources Health Check**
 - Checks additional FACILITY class resources for:
 - Active APF list
 - Active link list
 - Active LPA lists
 - Access to system dump data
 - Access to certain z/OS UNIX System Services functions.
 - Intended to help identify potential security exposures

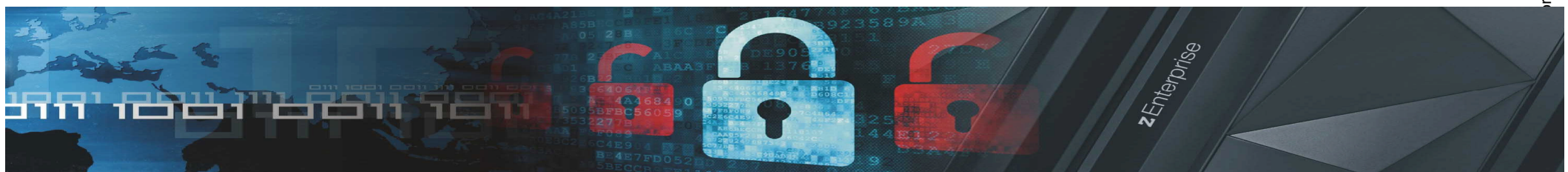


- **System SSL TLS 1.2 Support**

- Support for higher-strength cryptographic ciphers defined in RFCs 5246, 5288, and 5289, including SHA-256 and SHA-384 hashing
- Support for ciphers using symmetric AES-GCM during TLS handshakes and application payload exchanges
- Also available on z/OS V1.13 with the PTF for APAR OA39422

- **System SSL NSA Suite B compliance**

- Support for Suite B Cryptography based on RFC 5430, an implementation of TLS V1.2
- Designed to meet the United States government cryptographic algorithm policy for national security applications



• Remote access to System z Crypto via LDAP

- Think of this as *Crypto-As-A-Service*
- Store and manage key material inside the boundaries of the System z Hardware Security Module in the crypto card
- Enable System z secure key crypto via LDAP extended operations provided by z/OS ITDS
- Can isolate callers to specified cryptographic domains by label
- Designed to route crypto operations and data to an LPAR designated to process secure key operations
- Intend to enhanced ICTX plug-in to provide native SDBM and SASL bind authentication, and 64-bit support





Agenda

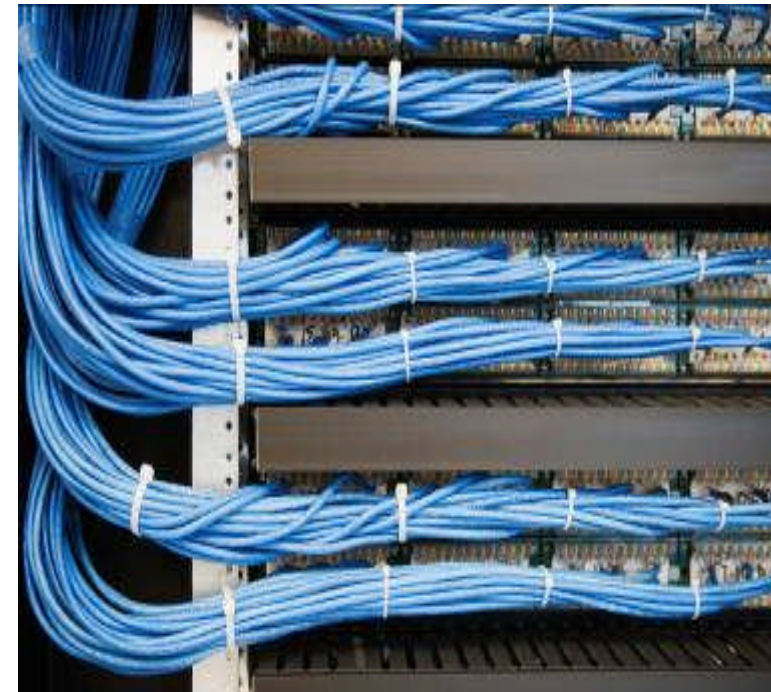
- IBM zEC12 and zBC12 System Functions and Features
- Improving Usability and Skills
- Scalability and Performance
- Improving Availability
- Self Managing
- Integrating New Applications and Supporting Industry and Open Standards
- Enhancing Security
- ➔ **▪ Extending the Network**
- IBM Statements of Direction

- **Enhanced fast path socket support**

- Fast path sockets-like performance
- For all sockets using socket APIs
- Designed to reduce CPU consumption, particularly for interactive workloads

- **SACK support**

- Selective ACKnowledgements and packet retransmissions
- As described by RFCs 2018 and 3517
- Intended to reduce packet retransmissions when multiple packets are missed in a window





- **Resolver startup file fault tolerance**

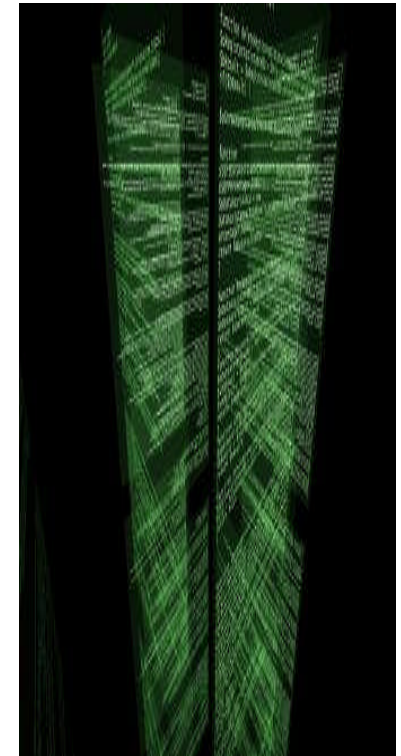
- Resolver designed to start when setup file errors are detected
- Intended to allow TCP/IP stacks and other dependent applications to start

- **Support for QDIOACCEL with IPSEC**

- QDIOACCELERATOR designed to improve performance by allowing packets to be directly routed between HiperSockets and OSA QDIO connections
- New function designed to provide the support with IPSEC enabled

- **New FTP subcommands**

- MVSPut and MVSGet designed to simplify the transfer of sequential and partitioned (PDS and PDSE) data sets between z/OS systems



- **FTP client security exit points**

- Two new exits, a command user exit and a reply user exit
- Intended to be used to implement customer security policy

- **New command to verify TCP profile syntax**

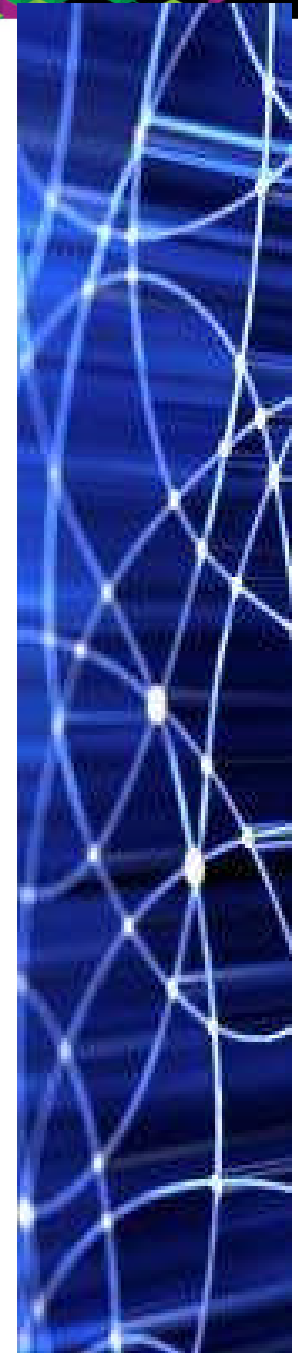
- V TCPIP,,SYNTAXcheck,dsname
- Can run on any system at the same level

- **Intrusion Detection:**

- Enhanced IDS IP fragment attack detection
- Limit defensive filter logging to avoid log overruns

- **DVIPA affinity**

- Preferentially associate a DVIPA with the original application





Agenda

- IBM zEC12 and zBC12 System Functions and Features
- Improving Usability and Skills
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- Self Managing
- Integrating New Applications and Supporting Industry and Open Standards
- Enhancing Security
- Extending the Network

IBM Statements of Direction

IBM will NOT remove support for unsecured FTP connections October 1, 2013 as originally planned.

- Current methods are remain available:
 - Regular FTP
 - FTPS (FTP using SSL)
 - Download Director (unaffected, and will remain available)

- IBM servers used for System z software downloads:
 - deliverycb-bld.dhe.ibm.com
 - deliverycb-mul.dhe.ibm.com
- IBM recommends you use the Connectivity Test website in advance:

https://www14.software.ibm.com/webapp/iwm/web/preLogin.do?lang=en_US&source=cbct





New news

- z/OS V1.13 is the last release to support the Microsoft Windows based Capacity Provisioning Control Center (CPCC)
 - IBM intends to enhance the z/OSMF-based Capacity Provisioning application
- z/OS V2.1 is planned to be the last release to include Version 1 of the Standards Based Linux Instrumentation for Manageability (SBLIM) CIM client for Java
 - Version 2 of the SBLIM client, which is designed to be a JSR48-compliant implementation, is included in z/OS V1.13 and planned to be included in z/OS V2.1
 - IBM recommends that users of SBLIM Version 1 convert to Version 2
- z/OS V1.13 is the last release to provide support for Integrated Call Level Interface (ICLI)
 - Use DRDA instead

*Statements regarding IBM future direction and intent are subject to change or withdrawal, and represent goals and objectives only.



New news

- The Cryptographic Support for z/OS V1R12-R13 web deliverable is the last level of ICSF to support IBM eServer™ zSeries® 800 and 900 (z800, z900) servers*
 - Future levels of ICSF require an IBM eServer zSeries 890 and 990 (z890, z990) or later server
 - Important! This is the same level of ICSF incorporated in z/OS V2.1, but z/OS V2.1 itself requires an IBM System z9 EC, IBM System z9 BC, or later server
- z/OS V2.1 is planned to be the last release to include the IBM HTTP Server Powered by Domino® (IHS powered by Domino)*
 - IBM recommends you use the IBM HTTP Server Powered by Apache, which is available in z/OS Ported Tools
 - IBM plans to provide documentation help with migration to IBM HTTP Server Powered by Apache
- z/OS V2.1 is planned to be the last release to support the z/OS BookManager® Build optional feature*

*Statements regarding IBM future direction and intent are subject to change or withdrawal, and represent goals and objectives only.

Reminders:

- z/OS V1.13 is the last release to support multi-file system zFS aggregates, including zFS clones
 - Support for the zfsadm clone command and mount support for zFS file system data sets containing a cloned (.bak) file system is removed in z/OS V2.1.
 - IBM recommends that you use copy functions such as pax and DFSMSdss™ to back up z/OS UNIX file systems to separate file systems
 - Support for zFS compatibility mode aggregates will remain
- z/OS V1.13 is the last release to support BPX.DEFAULT.USER
 - IBM recommends that you either use the BPX.UNIQUE.USER support that was introduced in z/OS V1.11, or assign unique UIDs to users who need them and assign GIDs for their groups
- z/OS V1.13 is the last release to provide the z/OS Capacity Provisioning support that utilizes the System z API for communication with the Support Element (SE) or Hardware Management Console (HMC)
 - This protocol is based on IP network connection using SNMP
 - IBM recommends configuring the Capacity Provisioning Manager for communication via the z/OS BCP Internal Interface (BCPii) protocol. The SE and HMC support for the System z API remains, and is not affected by this withdrawal of support
- z/OS V1.13 is the last release in which the BIND 9.2.0 function will be available
 - If you use the z/OS BIND 9.2.0 function as a caching-only name server, use the resolver function, which became generally available in z/OS V1.11, to cache Domain Name Server (DNS) responses
 - If you use the z/OS BIND 9.2.0 function as a primary or secondary authoritative name server, investigate using BIND on Linux for System z or BIND on an IBM blade in an IBM zEnterprise BladeCenter Extension (zBX)

Reminders:

- **z/OS V1.13 is the final release for which the IBM Configuration Assistant for z/OS Communications Server tool that runs on Microsoft Windows will be provided by IBM**
 - Currently an as-is, nonwarranted web download
 - Use the supported z/OSMF Configuration Assistant application instead
- **z/OS V1.13 is the last release to support a staged migration for JES2 and JES3. z/OS V2.1 and higher require you to migrate to all elements of z/OS at the same time, including JES2, JES3, or both.**
- **z/OS V1.13 is the last release to support changing the default Language Environment runtime options settings using SMP/E-installable USERMODs. IBM recommends using the CEEPRMxx PARMLIB member to set these options.**
- **With the introduction of the SAF mode authorization in z/OSMF 1.13, IBM withdraws support for Repository mode authorization in z/OSMF V2.1. Both modes are supported on z/OSMF V1.13 to allow customers time to migrate to the new authorization mode.**

Reminders:

- z/OS V2.1 supports these System z server models and later server models:
 - IBM System z9 Enterprise Class and IBM System z9 Business Class
 - IBM System z10 Enterprise Class and IBM System z10 Business Class
 - IBM zEnterprise 196 (z196) and IBM zEnterprise 114 (z114)
- z/OS Version 2 supports these DASD control units, or later ones:
 - 3990 Model 3 or 3990 Model 6
 - 9393
 - 2105
 - 2107
 - 2421, 2422, 2423, or 2424



Handy Resources

Additional Information

- z/OS Home Page
<http://www-03.ibm.com/systems/z/os/zos/>
- z/OS V2.1 PDF files for download
<http://www-03.ibm.com/systems/z/os/zos/bkserv/v2r1pdf/>
- z/OS V2.1 Introduction and Release Guide (GA32-0887)
<http://publibz.boulder.ibm.com/epubs/pdf/e0z3a100.pdf>
- IBM z/OS V2.1 (US) Announcement Letter (213-292 dated July 23, 2013)
<http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ca&infotype=an&supplier=897&letternum=ENUS213-292>
- IBM System z
<http://www.ibm.com/systems/z/>
- IBM Resource Link
<https://app-06.www.ibm.com/servers/resourcelink/hom03010.nsf>
- IBM Redbooks – How-To Books (also Redpieces)
<http://www.redbooks.ibm.com/>

z/OS Support Summary

Release	z900/ z800 WdfM	z990/ z890 WdfM	z9 EC z9 BC WdfM	z10 EC z10 BC WdfM	z196 CPC	z11 4 CP C	z196/ z114 w/zB X	zEC12	zBC1 2	End of Service e	Extended Defect Support ¹
z/OS V1.7 ²	X	X	X	X	X					9/08 ¹	9/10 ¹
z/OS V1.8 ²	X	X	X	X	X	X				9/09 ¹	9/11 ¹
z/OS V1.9 ²	X	X	X	X	X	X				9/10 ¹	9/12 ^{1*}
z/OS V1.10	X	X	X	X	X	X	X	X	X	9/11 ¹	9/13 ^{1*}
z/OS V1.11	X	X	X	X	X	X	X	X	X	9/12 ¹	9/14 ^{1*}
z/OS V1.12	X	X	X	X	X	X	X	X	X	9/14 [*]	9/16 ^{3*}
z/OS V1.13	X	X	X	X	X	X	X	X	X	9/16 [*]	9/19 ^{3*}
z/OS V2.1			X	X	X	X	X	X	X	9/18 [*]	9/21 ^{3*}

- 1 The IBM Lifecycle Extension for z/OS provides the ability for customers to purchase extended defect support for that release of z/OS for up to 24 months after the z/OS release's end of service date
- 2 See IBM GTS services for additional fee-based extended service
- 3 Optional extended service is planned to be offered
 - Planned. All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.

WdfM – Server has been withdrawn from Marketing

Legend

Out of Lifecycle Extension for z/OS support²

Defect support provided with Lifecycle Extension for z/OS

Generally supported

- IBM Systems-related services
- IBM Systems Training
- IBM Systems events
- Executive Briefing Centers
- Design Centers
- High Availability Center of Competency
- Benchmark Centers
- Lab Services and Training
- IBM Solution Central Services
- IBM Worldwide Banking Center of Excellence
- Service Center Locations
- IBM Platform Test
 - Servers
- Product Testing & Engineering Design Services
- Services for Svstems

IBM Systems > IBM Systems-related services > IBM Platform Test >
IBM Platform Test - Servers

[IBM i](#) | [System p](#) | [System z](#)
[Overview](#) | [Mission](#) | [Hints & Tips](#) | [Library](#) | [Samples](#)

Welcome to System z Platform Test, also known as Integration Test. Our organization consists of various teams, including:

- ↓ [z/OS Platform Evaluation Test \(zPET\)](#)
- ↓ [Linux Virtual Servers Platform Evaluation Test](#)
- ↓ [Consolidated Service Test \(CST\)](#)
- ↓ [Other z/OS test strategies and testing environments](#)

New! Recently we released a new edition of our test report which describes our experiences testing on z/OS V1R13. This new edition, titled *z/OS V1R13.0 System z Platform Test Report for z/OS and Linux Virtual Servers*, is located in our [Test Report Library](#).

z/OS Platform Evaluation Test (zPET)

We are a team of z/OS testers and system programmers who run a [Parallel Sysplex](#) on which we perform the final verification of a [z/OS](#) release before it becomes generally available to customers. As we do our testing, we gather our experiences, hints, tips, and recommendations and we publish them as the **System z Platform Test Report for z/OS and Linux Virtual Servers**, formerly known as the *z/OS Parallel Sysplex Test Report*. You can find our test reports in our [Test Report Library](#).

We publish a new test report with each new release of z/OS and provide a refreshed edition in between z/OS releases.

We also publish a Parallel Sysplex recovery book, *z/OS System z Parallel Sysplex Recovery (GA22-7286-01)*. This book describes our

We're here to help

Want to work with System z Integration Test? We're here to help.

[→ Contact now](#)

Some resources:

- Test experience reports about HW, OS, middleware
- Hints & Tips
- Samples

Handy links to:

- [z/OS Platform Evaluation Test](#)
- [Linux Virtual Servers Platform Evaluation Test](#)
- [Consolidated Service Test \(CST\)](#)
- [Other z/OS test strategies and testing environments](#)
- URL:
<http://www.ibm.com/systems/services/platformtest/servers/systemz.html>



The Future Runs on System z



Optimize your z/OS environment

