What's New in z/OS

City of Bridges Edition

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IBM zEnterprise EC12 (zEC12) System Functions and Features

- Five hardware models
- **Hexa-core 5.5 GHz processor chips**
- **Up to 101 processors configurable as CPs, zAAPs, zIIPs, 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 IBM zEnterprise® 196 (z196) (32GB vs 16GB)
- **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 1000BASE-T)**

(z/OS® support in blue)

IBM zEnterprise® EC12 and BC12 Update
Tuesday 10:00

- **FICON Express8S**
- **24K subchannels for FICON® channels**
- **IBM zEnterprise Data Compression (zEDC) capability using zEDC Express**
- **RDMA (Remote Direct Memory Access) support for z/OS over Converged Enhanced Ethernet RoCE)**
- **Parallel Sysplex® InfiniBand® (PSIFB) Coupling Links**
- **High Performance FICON for IBM System z®**
- **CPU Measurement Facility**
- **CFCC Level 18 and 19 enhancements**
- **Transactional Execution Facility**
- **Runtime Instrumentation 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**
- Optional Non Raised Floor
- Optional water cooling and DC Power
- Optional overhead Power and I/O cabling
- zBX Model 003 support of:
  - IBM WebSphere® DataPower® Integration Appliance XI50 for zEnterprise
  - Select IBM BladeCenter® PS701 Express blades or IBM BladeCenter HX5 blades
- **Unified Resource Manager (zManager) enhancements**

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IBM zEnterprise BC12 (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
- 16 GB HSA separately managed
- 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 1000BASE-T)**

(z/OS support in blue + red)

Introducing the IBM zEnterprise BC12 and EC12 … Wednesday 9:30

- **FICON Express8S**
- **24K subchannels for FICON channels**
- **IBM zEnterprise Data Compression (zEDC) capability using zEDC Express**
- **RDMA (Remote Direct Memory Access) support for z/OS over Converged Enhanced Ethernet RoCE)**
- **Parallel Sysplex® InfiniBand® (PSIFB) Coupling Links**
- **High Performance FICON for System z**
- **CPU Measurement Facility**
- **CFCC Level 18 and 19 enhancements**
- **Transactional Execution Facility**
- **Runtime Instrumentation 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**
- Non-raised floor option available
- Overhead Cabling and DC Power Options
- zBX Model 003 support of:
  - IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise
  - Select IBM BladeCenter PS701 Express blades or IBM BladeCenter HX5 blades
- **zManager enhancements**

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IBM zEC12 (and zBC12)

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Flash Express Support

- **Available for z/OS V1.13 with…**
  - A zEC12 or zBC12 server with Flash Express
  - z/OS V1R13 RSM Enablement Offering web deliverable
    - http://www.ibm.com/systems/z/os/zos/downloads/
  - Dynamic Reconfiguration and optional PLPA/COMMON page data sets in enabling PTFs
  - …all these functions are included in z/OS V2.1
- **z/OS designed to use Flash Express for:**
  - Pageable large pages
  - Paging, when performance would be improved vs. disk-based paging
  - SVC and Standalone Dump
  - Speculative page-ins to help buffer workload spikes (such as market open)

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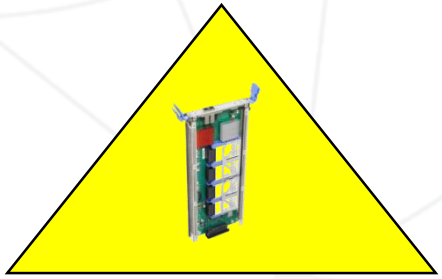
z/Architecture® Extensions

CF support for Flash Express*

- Requires z/OS V2.1 running on zEC12 or zBC12 servers with CFLEVEL 19
- Support Flash Express for certain Coupling Facility list structures
- Can allow keyed list structure data to be migrated to Flash Express memory
  - For example, when data consumers do not keep up with creators
  - Designed to migrate it back to real memory to be processed
- With WebSphere MQSeries® for z/OS Version 7 (5655-R36):
  - Can buffer enterprise messaging workload spikes
  - Provide support for storing very large amounts of data in shared queue structures
  - Potentially allow several hours' worth of data to be stored without causing interruptions in processing
- z/OS V2.1 RMF™ designed to provide measurement data and reporting capabilities for Flash Express on Coupling Facilities
- **Available with the PTF for APAR OA40747**
- CFSIZER also updated for Flash Express:
  - http://www.ibm.com/systems/support/z/cfsizer/



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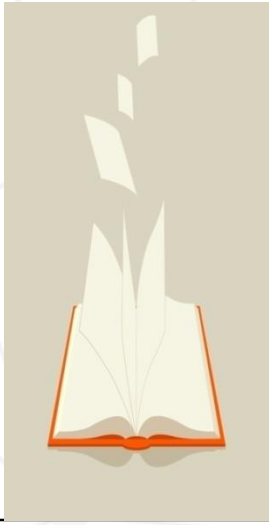
Large (1MB) Page Support

Scalability, Performance, and Productivity Benefits of Large Memory Friday 10:00

- **To use 1MB pages, you need…**
  - An IBM System z10® or later server
  - z/OS R12 or later, to use fixed large pages
  - z/OS V1R13 RSM Enablement Offering web deliverable to use pageable large pages on zEC12 and zBC12 servers
- **Current exploiters of fixed large pages:**
  - Java™ 6 SR1 and later, and its exploiters
    - Including WebSphere Application Server
  - z/OS R12 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) and up
- **Exploiters for *pageable* large pages:**
  - z/OS V1.13 and z/OS V2.1 Language Environment (with a runtime option)
  - 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 10 and DB2 11 with the PTF for APAR PM85944
  - IMS™ 12 (5635-A03) Common Queue Server, with the PTF for APAR PM66866



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IBM zEC12 and zBC12

- **2GB fixed page frames**
  - If 1 MB pages are good…
  - …sometimes 2 GB pages are better!
  - Exploited by IBM 31-bit SDK for z/OS, Java Technology Edition, V7.0.0 (5655-W43) and SDK IBM 64-bit SDK for z/OS, Java Technology Edition, V7.0.0 (5655-W44)
  - Used by DB2 11 for buffer pools
  - Available for other large structures, other users
  - Supported on z/OS V2.1 or on z/OS V1.13 with the RSM enablement web deliverable and the PTF for APAR OA40967
- **100-way support for a single image on zEC12 servers**
  - Support for processors 0-99
- **New channel load balancing algorithm**
  - zEC12 and zBC12 balancing based on CMR time

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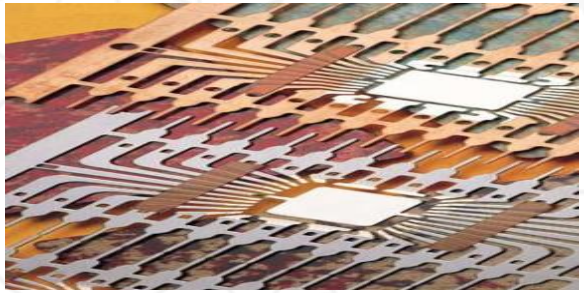
z/Architecture Extensions

- **Transactional Execution (a/k/a Transactional Memory)**
  - 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
    - Lock elision
  - 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*
- **Software directives to improve hardware performance**
  - Data usage intent improves cache management
  - Branch preload improves branch prediction effectiveness
  - Block prefetch moves data closer to processor earlier, reducing latency
- **Decimal format conversions**
  - Enable broader exploitation of Decimal Floating Point facility with COBOL

What's New in COBOL v5 Since GA Monday 11:15

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One Term, Two Functions

- **"Thin" interrupts for CFs**
  - CFCC polled for work to do, so all CF engines were 100% used
  - So, shared engine CFs had a very limited use case
    - A CF always used its entire PR/SM™ timeslice except in DYNDISP=YES mode
    - Not a great way to implement many/most production CFs
  - New CFCC design in CFLEVEL 19 on zEC12 and zBC12 servers along with XES/XCF changes designed to use a more interrupt-driven, hyrbrid approach
  - Should allow the use of shared engine coupling facilities in many production environments with acceptable performance
  - Intended to lower Parallel Sysplex entry costs by reducing the number of environments for which dedicated coupling facility (CF) engines are needed to achieve good performance
- **Also, new set of "thin" interrupts to be used by z/OS**
  - Designed to decrease response time on the average
  - Help reduce XCF and XES processing overhead and improve performance when processing asynchronous coupling facility operations and recognizing certain CF events
  - ➢ **Also available on z/OS V1.12 and V1.13 with the PTFs for APARs OA38734, OA38781, OA37186, & OA42682**

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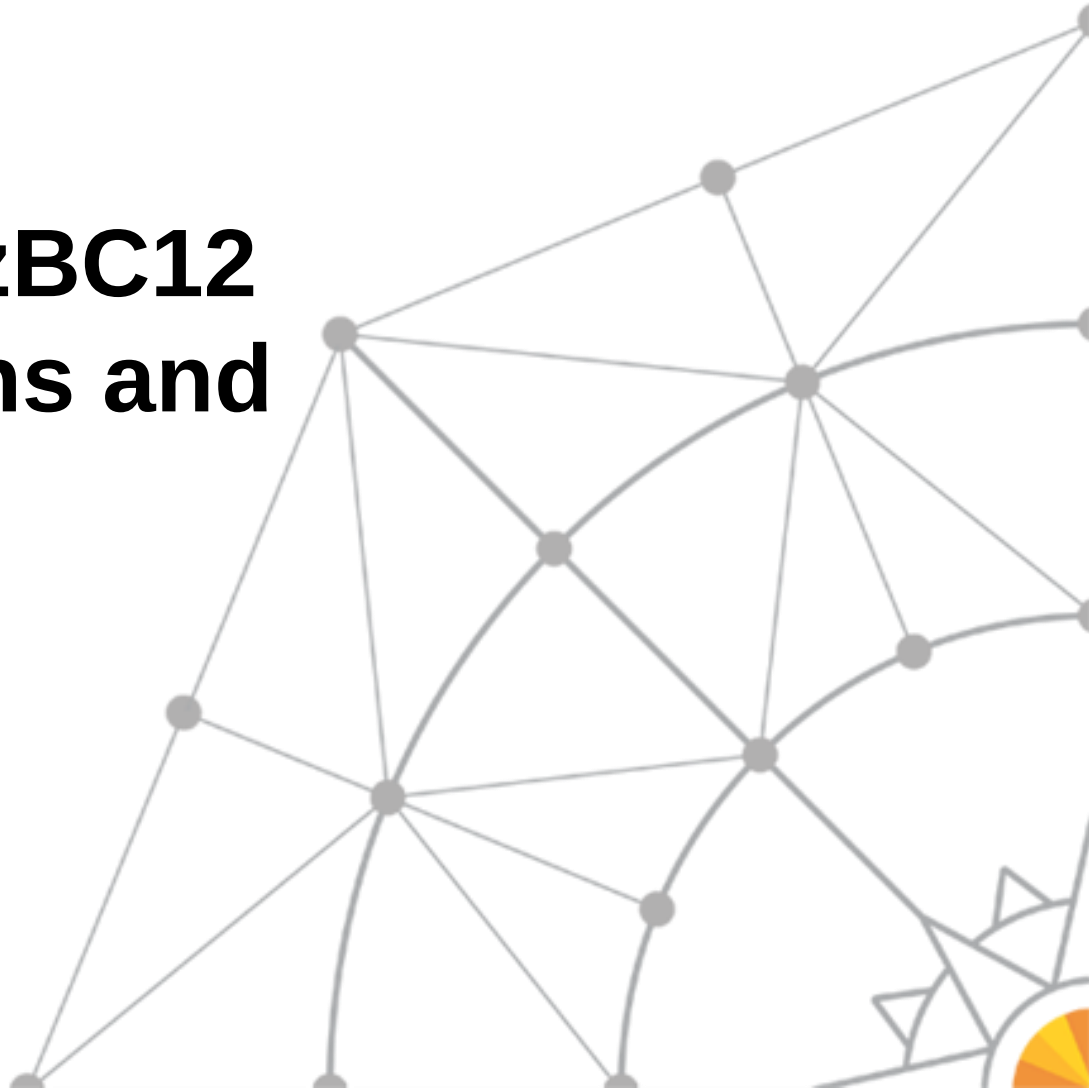
IBM zEC12 and zBC12 System Functions and Features



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Three Ways to Compress (and Decompress) on z/OS

- **Software compression**
  - CPU-intensive
  - Much slower
  - Data can be inflated on anything supporting the same algorithm
- **Compression coprocessor-based instructions**
  - Dictionary-based compression, generic or tailored
  - Can be inflated on a System z processor
  - All compression consumes apparent CP cycles
    - Compression done on the coprocessor, but accounted for as CP busy time because the CP is unavailable until the coprocessor is done

- **New zEDC Express adapter for zEC12 and zBC12 and zEnterprise Data Compression (zEDC) for z/OS V2.1**
  - Compression work is offloaded to the card
  - Minimal CP cycles consumed
  - zlib-based, industry-standard deflate compression
  - Data can be inflated anywhere zlib processing is available

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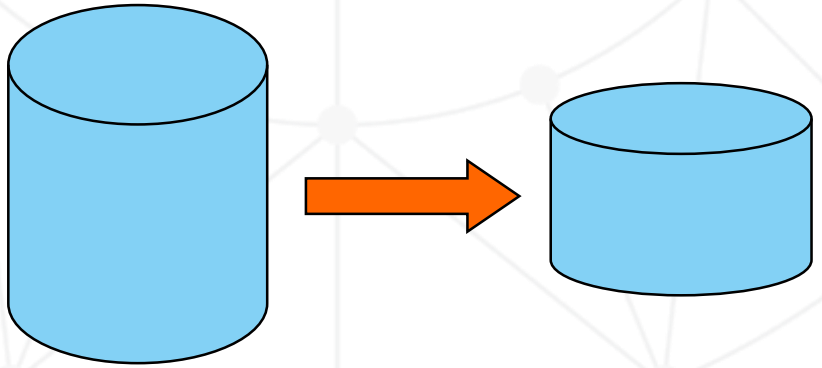
zEnterprise Data Compression

- Now available:
  - Card & z/OS feature
  - zBNA support
  - SMF and RMF support
  - Support for industry standard zlib compression
  - zlib library in z/OS V2.1
  - SMF data compression on z/OS V2.1
  - Software-based decompression support for SMF data on z/OS V1.12 and V1.13
  - Java support
  - IBM Encryption Facility support
  - Extended Format BSAM/QSAM support
  - WebSphere MQSeries support
  - IBM Sterling Connect:Direct support



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SMF Data Compression

- **For SMF data written to log streams**
  - We expect about a 4:1 compression ratio for SMF data
  - Designed to significantly increase SMF recording rates
  - Can specify that all SMF data or SMF data written to selected log streams be compressed
  - New SMFPRMxx COMPRESS keyword on LSNAME and DEFAULTLSNAME
  - New PERMFIX subparameter of COMPRESS to balance fix/unfix overhead with available real memory
- *Corresponding IFASMFDL support*
  - Automatic inflation on z/OS V2.1 with feature and Hardware support
  - SOFTINFLATE parameter for software-based decompression
    - For z/OS V1.12 & z/OS V1.13, with the PTF for APAR OA41156
    - Included in z/OS V2.1
    - Intended to be used when zEDC is not available

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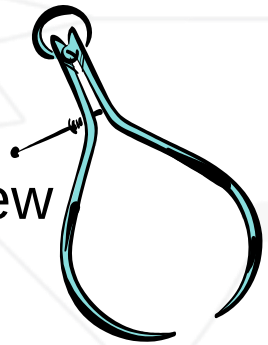
Measurements

- **SMF and RMF support**
  - SMF14 and SMF15 records show compression ratios
  - SMF14CDS has the size of the compressed-format data set
  - SMF14UDS is the uncompressed size
  - New SMF14CMPTYPEzEDC field
  - SMF 74 subtype 9 records created by RMF include new PCIe, zEDC Express data
  - RMF Monitor I PCIE Activity Report:
    - I/O queue and execution time
    - Compressed and uncompressed data transfer rates
    - Number of compression and decompression requests



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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, Microsoft Windows-based “as is” tool to analyze batch windows using SMF data
  - 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/atsmastr.nsf/WebIndex/PRS5126
- **zBNA can help identify zEDC Compression Candidates**
  - Identify zEDC compression candidates across specified time spans, like batch windows
  - 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 lists of data sets by job which might be zEDC candidates but are not in extended format
- **Initial support was December 2013—updates made in January and February 2014**

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More Compression Support

- **Extended Format BSAM and QSAM Compression**
  - ***New support for Compressed Format data sets now available with the PTF for APAR OA42195***
  - In addition to generic (DBBLIB) and tailored (supply a dictionary) compression
  - New COMPACTION option in DATACLAS definition
  - New values on COMPRESS parameter in IGDSMSxx
- **DFSMSdss™ data compression (Planned*)**
  - **Planned** for DUMP, COPY, and when DFSMSdss is used as the data mover by DFSMShsm™ for **3Q2014 with the PTF for APAR OA42243**
  - When a disk output data set is used

DFSMS™ Exploitation of z/OS zEnterprise Data Compression Monday 1:30	**Exploiting System z Innovation for Mainframe-based Managed File Transfer (MFT) with IBM Sterling Connect:Direct for z/OS Monday 1:30**	**System z Batch Network Analyzer (zBNA) Tool Hands-on Lab Thursday 4:15**	**z/OS zEnterprise Data Compression Usage and Configuration for DSS and HSM Wednesday 10:00**

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Compression Ratios and Performance*

- **Compression rates will vary with the data…**
  - But internal testing shows us ~4X compression for SMF data
  - At August 2013 SHARE, I said I expected (at least) ~2X compression for Extended Format BSAM/QSAM data, but we had not tested yet
- ***Test numbers are in!***
  - For BSAM/QSAM we see up to 4X compression for zEDC
    - That's as much as *2X better* than generic or tailored compression
  - Also, for BSAM/QSAM we see 80% or more CPU time reduction compared to tailored and generic compression
    - CPU cost for zEDC is ~0.1sec/GB in testing on a zEC12

* Based on projections and/or measurements completed in a controlled environment. Results may vary by customer based on individual workload, configuration and software levels.

- (Note: LZ compression is used in the tape controllers already)

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What You'll Need to Use zEDC

- **New Hardware and z/OS features:**
  - zEDC Express adapter for zEC12 and zBC12
  - zEnterprise Data Compression (zEDC) for z/OS V2.1
  - For software inflation of compressed SMF data, the PTF for APAR OA41156 on z/OS V1.12 and z/OS V1.13
  - For Extended Format BSAM/QSAM support, PTF for APAR OA42195
  - zlib on other platforms where you want to process compressed data
- **Other products:**
  - Java support in IBM 31-bit and 64-bit SDK for z/OS Java Technology Edition, Version 7 Release 1 (5655-W43 and 5655-W44) (IBM SDK 7 for z/OS Java)
  - IBM Encryption Facility for z/OS support with PTF UA72250

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RDMA over Converged Ethernet

- **RoCE Support for SMC-R**
  - Requires z/OS V2.1 running on zEC12, zBC12 servers with the RoCE Express feature
  - Shares memory between peer z/OS images
  - Read/write access to the same memory buffers without application changes
  - Designed to help increase transaction rates with low latency and reduced CPU cost
  - RMF support with new SMF74-9 records and PCIE Activity Report
  - Java support in IBM 31-bit and 64-bit SDK for z/OS Java Technology Edition, Version 7 (Java7R1, 5655-W43 and 5655-W44)

z/OS V2R1 Communications Server: Shared Memory Communications - RDMA (SMC-R), Parts 1 and 2
Tuesday 11:15 & 1:30

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z/OS V2.1

Designed for a smarter computing with designs for:

Improving Usability and Skills

New z/OSMF Workflow & Software Management, CPM improvements; HCD/HCM HMC-wide Activate; Health Checking, zDAC improvements, Generic Tracker, Delete member name masking, D PPT,…

Integrating new Applications and Supporting Industry and Open Standards

More Batch Modernization; ASCII support in more z/OS UNIX® System Services shell commands and utilities; IXCNOTE; More mutexes and shared condition variables in z/OS UNIX; Generalized Alignment Support in the Binder, Font element, TSO/E REXX™, Nested PIPI, Heap check zones, IEBCOPY enhancements …

Scalability & Performance

100-way SMP, 2 GB pages, pageable 1 MB pages, transactional memory support on zEC12, zBC12; RLS for Catalogs, zFS V5, Serial CF structure rebuild, EXCP support for zHPF, 8-character Job classes, PDSE V2, CFLEVELs 18 & 19, Parallel recall for batch …

Enhancing Security

LPAP access to crypto, ICSF & RRSF enhancements, SAF job class control, Certificate enhancements, z/OS UNIX timeouts; System SSL support for TLS 1.2 and NSA Suite B,…

Improving Availability

JES3 dynamic spool volume removal, Dynamic System Symbol updates, Flash Express support, RRS improvements, FORCE TCB, DCCF support for WTOR Auto-Reply, HMC 3270 console support, …

Self Managing Capabilities

DFSMShsm Storage Tiers, Better JES3 support for SMS-managed tape, SMS Management Class support for tape, zBX SMF performance records, DCM support for cascaded switches, z/OS UNIX Automount improvements, …

Extending the Network

RoCE support, Enhanced Fastpath sockets, SACK support, new FTP security exits, TCP Profile syntax check, Intrusion Detection improvements, DVIPA affinity, …

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z/OS Support Summary

Out of service

Lifecycle Extension withdrawal 2 years later

Service Withdrawal Dates

z/OS	z800/ z900	z890/ z990	z9® EC z9 BC	z10 EC™ z10 BC™	z196 z114	zBX	zEC12 zBC12	DS8000® DS6000®	TS1140 TS7700	End of Service	Coexists with z/OS...	Planned Ship Date[2]
R10	x	x	x	x	x	x	x[3]	x		9/11	R12	
R11	x	x	x	x	x	x	x	x	x	9/12	R13	
R12	x	x	x	x	x	x	x	x	x	9/14[2]	V2R1	
R13	x	x	x	x	x	x	x	x	x	9/16[2]	V2R2[2]	
V2R1			x	x	x	x	x	x	x	2H18[2]	V2R3[2]	
V2R2[2]										2H20[2]	V2R4[2]	2H15[2]

Migrating to z/OS 2.1: Parts 1 & 2
Monday 3:00 & 4:15

1. Fee-based service extension available
2. All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
3. Fee-based service extension required for support, or for some features

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Improving Usability and Skills

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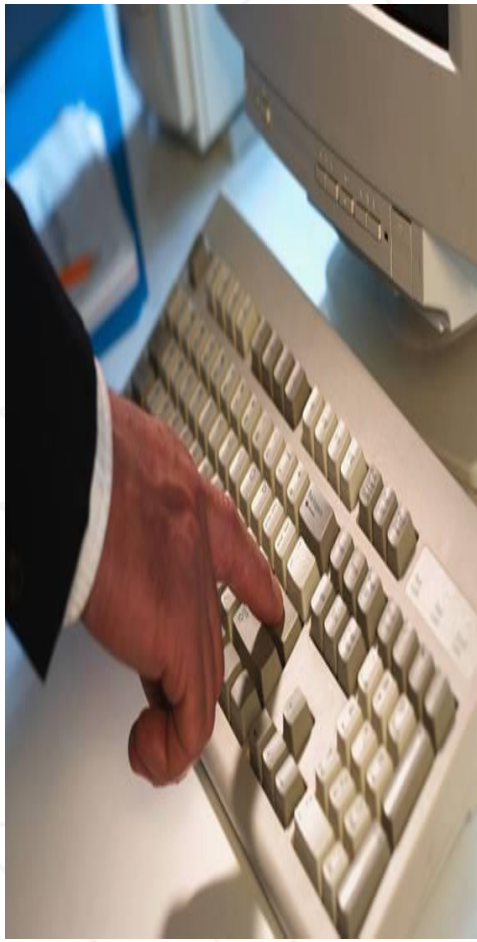
z/OSMF Improvements

- **New z/OSMF release with the new z/OS release**
- **New functions included in z/OSMF V2.1 and available for z/OSMF V1.13 designed to provide:**
  - More actions for software instances in Software Management
  - Linking between Workload Manager and Resource monitoring
  - Capacity Provisioning support for creating, editing, & activating configurations and policies
  - Usability enhancements for Incident log and Classic ISPF
  - Enhanced RESTful interface for submitting z/OS jobs from data sets and z/OS UNIX files; support for additional browsers; and, enhanced filtering for table displays
- ***Available for z/OSMF V1.13 with the PTFs for APARs PM73833, PM74502, PM74507, PM74508, PM74517, PM74518, and PM74519***



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z/OSMF improvements

- **z/OSMF V2.1 uses WAS with the Liberty profile**
  - Designed to simplify z/OSMF setup & cut memory footprint
  - Expected to start more quickly and use less CPU
- **New configuration workflow application**
  - Workflow definition metadata files define task lists to achieve a configuration goal:
    - Can be used to drive creation of JCL
    - REXX execs and shell scripts supported within generated batch jobs
  - UI designed to present tasks to appropriate people via a new “Notifications” function in order; for example, to:
    - System programmers
    - Security administrators
    - Storage administrators
  - Wizard-like task sequencing, with tasks presented to additional people as dependencies are met
  - First exploiter: z/OSMF itself!
  - And…there’s a z/OS V2.1 Migration workflow!: http://www.ibm.com/systems/z/os/zos/tools/downloads/index.html

z/OSMF 2.1 Implementation and Configuration Thursday 8:30

The New and Improved z/OSMF 2.1 Wednesday 1:30

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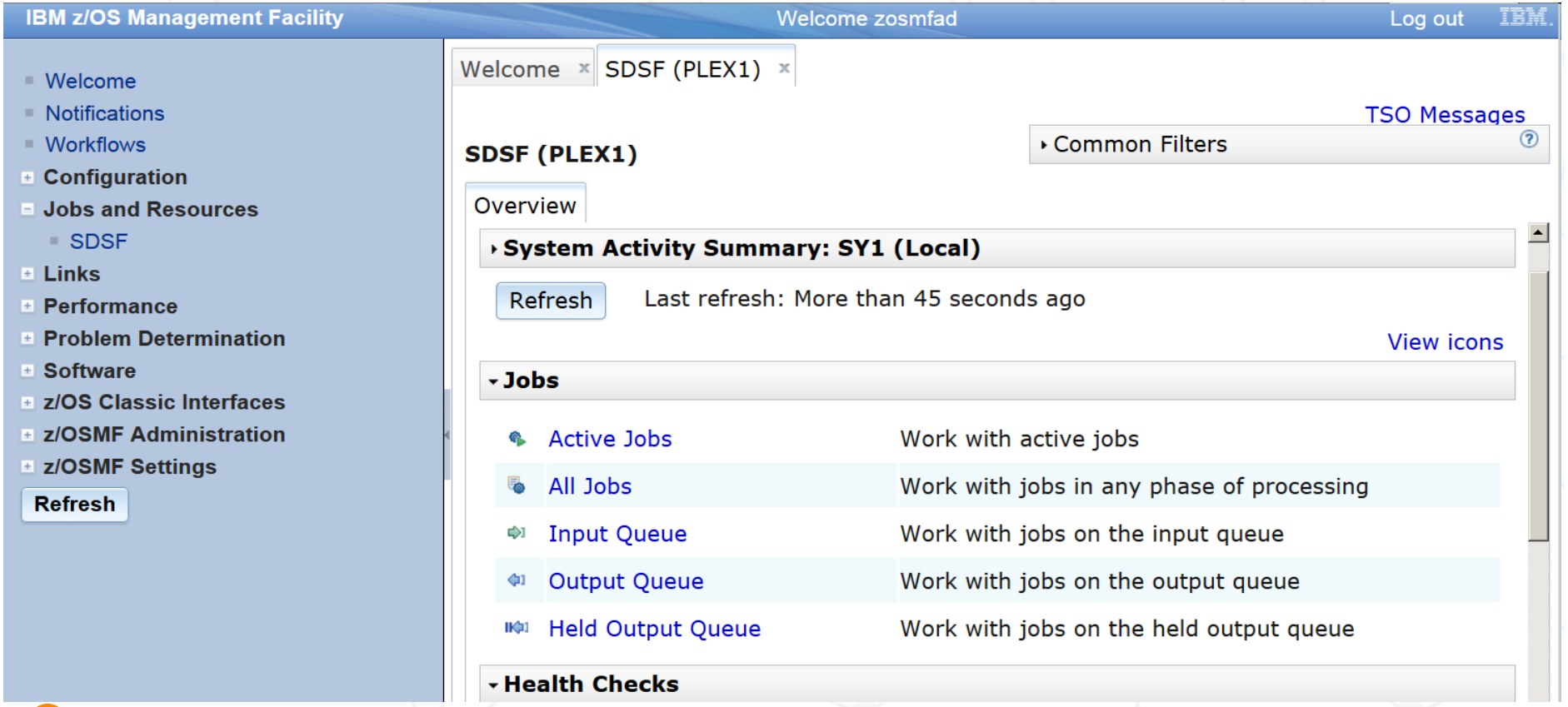
z/OSMF improvements

- New SDSF application for z/OSMF V2.1
  - Browser-based version of SDSF
  - Many of the same functions provided by ISPF- and TSO/E-based SDSF
  - ***Available with the PTF for APAR PM86303***



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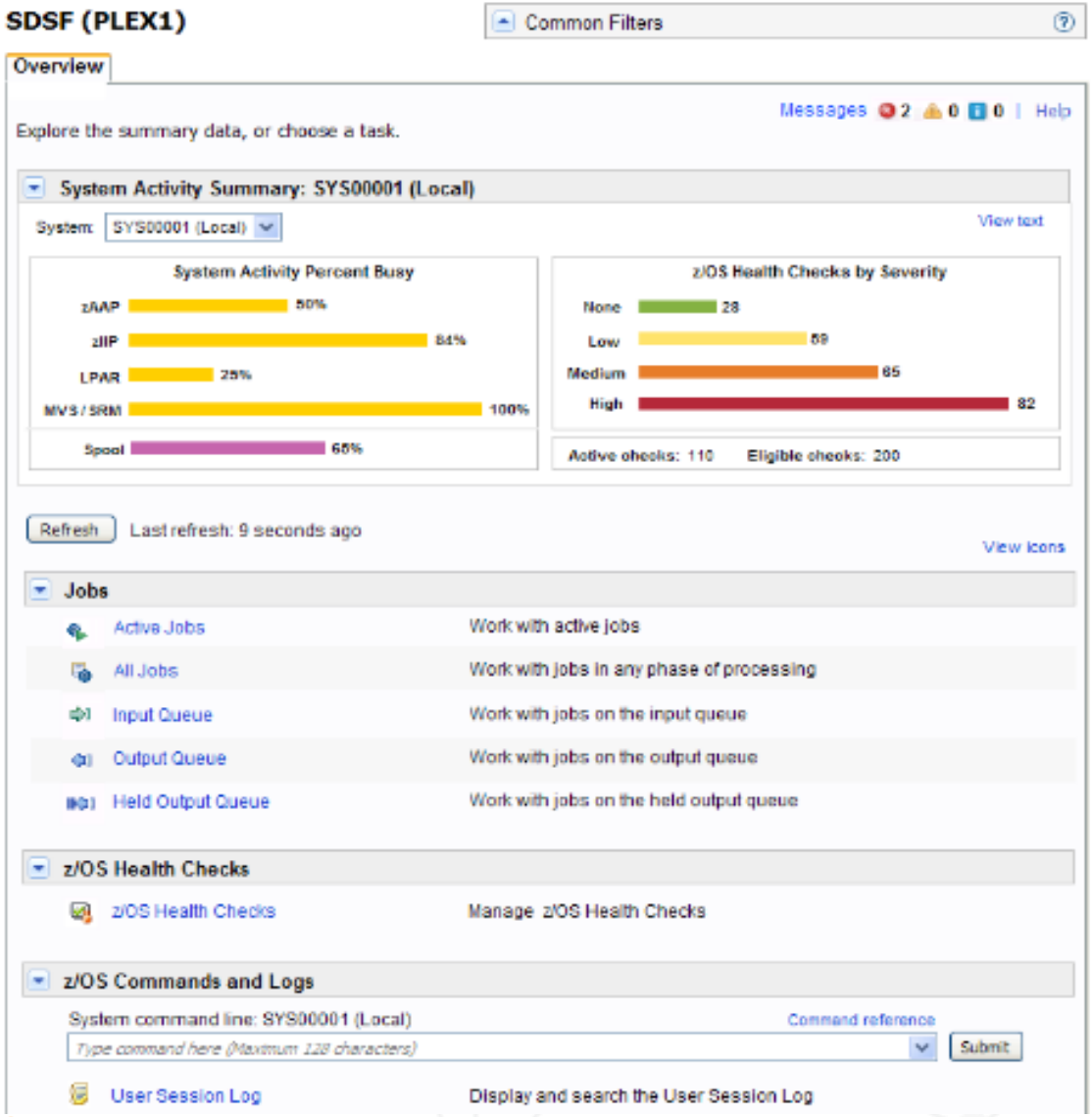
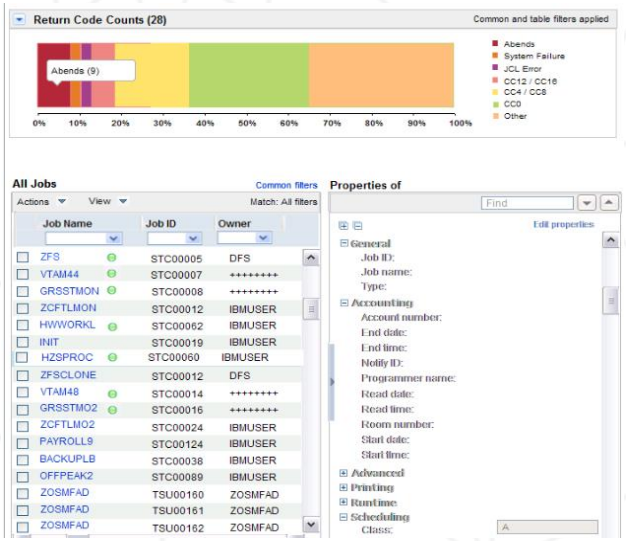
SDSF Overview



Some of the graphical displays…

- Health Check summary on the right
- System activity for systems in the plex on the left
- Health Check details below



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z/OSMF improvements

- **New Software Management application function designed to show you:**
  - A list of SMP/E-installed software
  - Vendor product number, version, release, and modification level based on data from SMP/E entries
  - End of service dates for products based on vendor-supplied files
  - Where software instances are installed
  - Where PTFs are installed (and not installed)
  - Whether structures are consistent between SMP/E, data sets, and catalogs
  - …and, to drive key SMP/E reporting functions
  - *Available for z/OSMF V1.13 on z/OS V1.13 with the PTF for APAR PM73833*

z/OSMF Hands-On Labs - Choose Your Own III, III, & I:
Wednesday 10:00
Thursday 1:30
Friday 11:15

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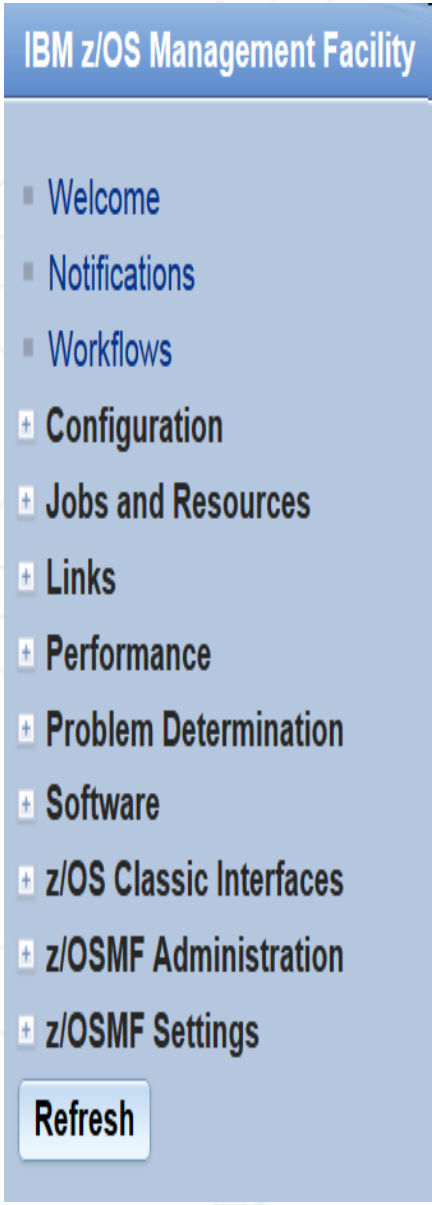
More z/OSMF improvements

- **More support for z/OSMF with the PTF for APAR PM98630:**
  - A new API to for importing applications into z/OSMF
  - Workflow improvements
  - Display recent historical performance information in the Resource Monitoring application and for exporting to a csv file
  - Add comments to WLM service definition actions
  - New Software Management functions:
    - Make it easier to add non-SMP/E-managed data sets to a software instance
    - Easier editing of mount points for the z/OS UNIX System Services file system
  - Use the Ctrl key on most PC keyboards as the Enter key in the ISPF task
  - Support in the REST Jobs API to hold and release jobs, and to work with jobs using a secondary JES2 subsystem
  - Two new z/OSMF REST services for viewing lists of data sets and z/OS UNIX files and directories
  - A new workflow designed to help you configure z/OSMF plug-ins quickly and easily



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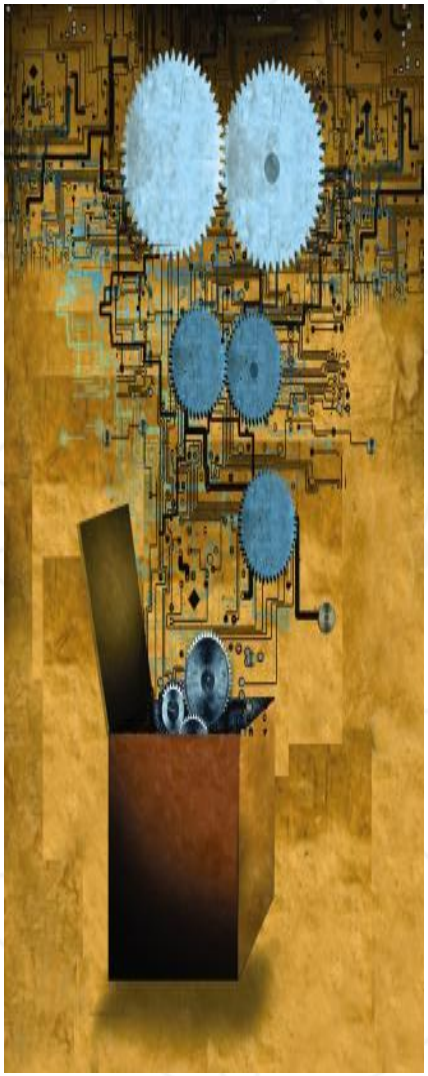
Improving Usability and Skills

zDAC improvements designed to support:

- 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
- Dynamic Channel Path Management (DCM) for FICON channels
- Better processing of device number and unit address constrained configurations
- Capability to specify switch and CHPID maps to guide path selection
- Improved discovery performance

(Reminder: zDAC requires a zEnterprise server)



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Improving Usability and Skills

HMC complex-wide IODF Activate

- Designed to support all z/OS and z/VM LPARs managed in the same HMC complex, or a subset
  - 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
- Initiate from HCD or HCM
- Intended to reduce the need to activate I/O configuration changes one LPAR at a time

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 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!)

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Improving Usability and Skills

Multiple SMP/E logical screens in ISPF

Top 39er!

- z/OS V2.1 SMP/E designed to allow multiple logical screens
- One logical screen allowed per SMP/E CSI & zone for read
- Only one logical screen may be used for an SMP/E CSI being updated

"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-

Top 39er!

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Improving Usability and Skills

PDSE Member-Level Recovery

- Keep multiple generations of each PDSE member
- Recover a prior version using ISPF edit or the DESERV API
- SMS DATACLAS, DESERV API support
- Specify maximum member generations at PDSE Version 2 allocation time
- System-wide maximum specification with a new MAXGENS_LIMIT keyword in IGDSMSxx

➢ Available now with the PTF for APAR OA42358

PDSE Version 2 Member Generations: Practical User Applications
Wednesday 8:30

Generic Tracker

- Goodbye, CNZTRKR; hello, generic tracker
- Call a simple interface (like CNZTRKR, but different) designed to help you determine whether functions are in use
- New API so you can call it from within a health check (for example)
- CNZTRKR calls designed to be automatically rerouted to new tracker
- Operator command to provide tracking information

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Improving Usability and Skills

- **GDGs in chronological order!**
  - New GDGORDER JCL DD statement keyword
  - Can specify that generations be returned from oldest to newest
  - No need to sort or concatenate!
  - System default remains newest-to-oldest

- **ISPF potpourri (a partial list of enhancements):**
  - Edit support for Unicode data
  - Edit support for an expandable command field
  - 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 XTIOTs for EDIT, BROWSE, LMINIT, and LIBDEF
  - Improved enhanced member list function
  - ISPF directory list display for z/OS UNIX, UDLIST, DIRLIST support for a SRCHFOR function
  - Support for multiple logical screens on ISPF entry, and multi-screen exit 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

ISPF Hidden Treasures and New Features - Parts 1 & 2 Wednesday 10:00 & 11:15

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Improving Usability and Skills

- Catalog alias processing improvements:
  - Data sets with (NONVSAM) aliases defined using SYMBOLICRELATE to 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

Top 39er!

- "Improved IEF212I message"
  - Really, it's a *new* message:
  - IEFA107I JOBNAME PROCNAME STEPNAME DDNAME - DATA SET NO.SUCH.DATA.SET NOT FOUND
  - (Instead of IEF212I … DDNAME + 009)
- 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

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Improving Usability and Skills

Automatic start for Health Checker address space

- Health Checker designed 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 (not new) RACF sensitive resource checking
- 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

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Improving Usability and Skills

- **SDSF enhancements:**
  - System symbol support on the Filter command
  - Sorting up to 10 display columns
  - Support for limiting displays to JESplex scope
  - Security access tracing
- **More Data Set Types supported for Problem Determination Upload Utility (PDUU):**
  - PDS and PDSE
  - RECFM U
- **Multiple concurrent logons in a Parallel Sysplex**
  - Supported for JES2 in z/OS V1.12
  - Now supported for JES3 in z/OS V2.1
- **SETSMF allowed without PROMPT at IPL time**
  - Makes dynamic changes easier

Top 39er!

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Scalability and Performance

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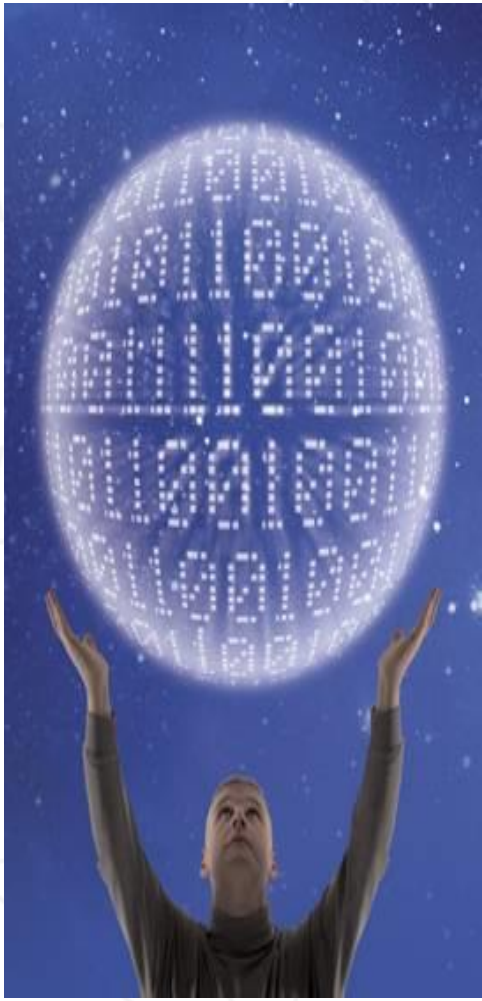
RLS for Catalogs

- R12 increased maximum catalog size and implemented CA Reclaim
- R13 increased the number of aliases per user catalog
- V2.1 designed to support record-level sharing for user and volume catalogs:
  - Expected to remove most size- and performance-related reasons for splitting user catalogs in a Parallel Sysplex
  - Most catalog contention likely to evaporate
  - Master catalog not RLS-eligible
    - But it's typically entirely cached in CAS if set up as recommended
  - IDCAMS DEFINE USERCATALOG and ALTER USERCATALOG support for enabling/disabling RLS
- Remaining reasons to split a catalog are availability-related:
  - "Too many eggs in one basket"
  - Availability (expected recovery time for this catalog exceeds the RTO)



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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 is 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

- In addition to:
  - Media Manager (including VSAM, z/OS R11)
  - QSAM, BSAM, BPAM (z/OS R13)
  - EXCPVR (z/OS R13)
- Also available on z/OS V1.12 and z/OS V1.13 with the PTF for APAR OA38185

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CF "writearound" support

- New z/OS function designed to allow batched updates to be written directly to disk without being cached in the CF
- Designed to keep cached online transaction data more current
- Expected to help improve performance during batch updates
- Requires, at a minimum:
  - IBM zEC12 or zBC12 server with CFLEVEL 18…
  - **…or** IBM zEnterprise 196 (z196) or zEnterprise 114 (z114) server with CFLEVEL 17 and an MCL
  - z/OS R12 or z/OS R13
  - IBM DB2 **11** for z/OS (5615-DB2) with the PTF for APAR OA37550

DB2 11 for z/OS Technical Overview Tuesday 10:00

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CF structure rebuild performance

- Before z/OS V2.1, all CF structures were rebuilt in parallel when duplexing is initiated
- 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

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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 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

PDSE Best Practices (revised for 2.1!) Monday 4:15

GDG Support for PDSEs

- In addition to sequential, direct, and PDS GDGs

BCPii GetBulk Support

How to Make the Most Out of BCPii Wednesday 10:00

- Get multiple attribute queries in one go
- 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

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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
- Intended to allow you to migrate HFS file systems that contain directories with a large number of files to zFS with good performance

Conversion options 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

zFS V5 Migration and Performance
Tuesday 4:15

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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
- Available on z/OS V1.13 with the PTFs for APARs OA38944 and PM59496
- Toleration support (only) on z/OS V1.12 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

RLS enhancements

- Directory-Only Caching, designed to allow you to optionally bypass CF caching
- A number of RLS control blocks move from SMSVSAM data space to 64-bit storage
- IDCAMS PRINT, REPRO, IMPORT, and EXPORT to access data sets in RLS mode

Leveraging VSAM RLS Best Practices
Tuesday 11:15

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DFSMShsm Fast Replication Enhancements

- Consistency Group Support
  - This can allow you to create consistent backups of DB2 log copy pools and clone DB2 systems without performing disruptive conditional DB2 restarts much of the time
- Also:
  - Recover Data Sets to any volume
  - Recover Data Sets with a New Name

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 support for increased tape volume limit

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

The Wonderful World of DFSMShsm SETSYS Commands Tuesday 4:15

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DFSORT™ Scaling improvements

- Blockset 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
- Support for larger memory object work space, 64 GB to 1 TB
  - Allows you to sort more data in memory object work file

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Bigger non-SMS-managed VSAM Linear Data Sets

- New design limit is over 45 TB
  - Old limit was 4 GB
  - zFS V5 supports up to 16 TB; should make it much easier to migrate from HFS to zFS without performance impacts

Extended Format Version 2

- New type of Extended Format data set
- DFSMSdss support for FlashCopy® when copying sequential, non-striped, multivolume EF V2 data sets
- IDCAMS REPRO support for CI mode processing of sequential, non-striped, multivolume EF V2 data sets

DFSMSdfp™ tape performance

- Suppress trailer label read operations when DISP=PASS is coded for consecutive files
- Expected to be noticeable for reading large numbers of consecutive tape files

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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 either hot start or *MODIFY,CONFIG
- Complements dynamic spool addition support in z/OS V1.13
- Designed to avoid JES3 complex-wide IPLs to remove spool volumes

Dynamic System Symbol updates

Top 39er!

- Single system only
- Not fully compatible with IEASYMUP or SYMUPDTE
- New SETLOAD IEASYM keyword
- New ENF73 signal on symbol update via SETLOAD IEASYM
- ***New news!*** New IEASYMU2 in LINKLIB via PTF for APAR OA42569
  - Intended for temporary updates
  - Make sure you understand the ins and outs!

z/OS Console support for HMC 3270 console

Top 39er!

- 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

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Improving Availability

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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 for access control
- Replace CALLRTM usermod from Level 2

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
- Also, new support to tell you the current destination of an outstanding DCCF WTOR

RRS internal restart

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

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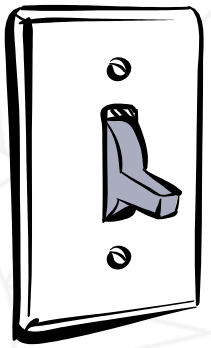
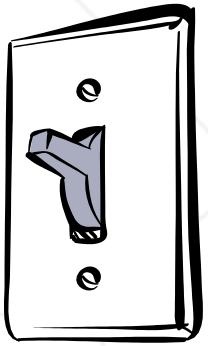
New functions for FICON switches

- Take components of switches supporting new SMI-S functions offline or bring them online
  - Also available on z/OS V1.12 and z/OS V1.13 with the PTFs for APARs OA38145 and OA38303
- Single Point of Failure (SPOF) detection improvements for switches supporting the Read Port Availability function
  - Designed to detect common points of failure for virtualized switches
  - Compatible with DCM for FICON
  - Also available on z/OS V1.12 and z/OS V1.13 with the PTF for OA40876





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New MODIFY VLF Command

- Designed to allow you to a 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

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

z/OS Little Enhancements: Many Small Potatoes Can Make a Big Meal Thursday 11:15

RPCBIND/NFS re-registration

- RPCBIND and NFS Servers designed to allow the NFS Server to reregister 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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Self-Managing Capabilities

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DFSMShsm Storage Tiers

- Designed for policy-based movement of SMS-managed data within L0
- Intended to 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 still work as they do now
- Intended to help you manage data residency to meet business goals and data management policies

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OAM Improvements designed to improve tape-related functions:

- 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 MDS 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

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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)

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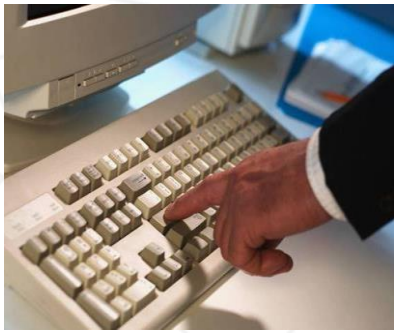
WLM improvements:

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

Workload Management (WLM) Update for z/OS 2.1 and 1.13 Monday 11:15

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
  - SMF74-1 and SMF79-9 support
  - z/OS V1.12 and V1.13 support with PTF for APAR OA39993
- Global Mirror collision reporting in RMF Monitor I and SMF74-5 records
  - z/OS V1.12 and V1.13 support with PTF for APAR OA40376
- More information about CF links in Monitor I
  - z/OS V1.12 and V1.13 support with PTF for APAR OA37826



RMF: The Latest and Greatest Monday 4:15

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- **CPM support for defined capacity and group capacity limit**
  - Designed to increase options for automated response to capacity shortages
  - Also, commands and reports for SAPs, IFLs, and ICFs
  - And, policy-based control for releasing OOCoD capacity

Understanding z/OSMF for the Performance Management Sysprog Tuesday 10:00

- **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 zEnterprise BladeCenter Extension (zBX) blades
    - Microsoft® Windows® 2008 Server running on zBX blades (new!)
  - Help support performance management, capacity planning activity across the Hybrid

- **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

Top 39er!

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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

- For primary storage use
- 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
  - Support for DSPSIZMAX to be used when SMF is initialized also available for z/OS V1.12 and V1.13 with the PTF for APAR OA35175
- z/OS V2.1 support for dynamic changes via SET SMF and SETSMF

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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)
  - Previously 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:

- System-Managed Buffering (SMB) record access bias
- ACB RMODE31 override

New ACS variable for EAS eligibility

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

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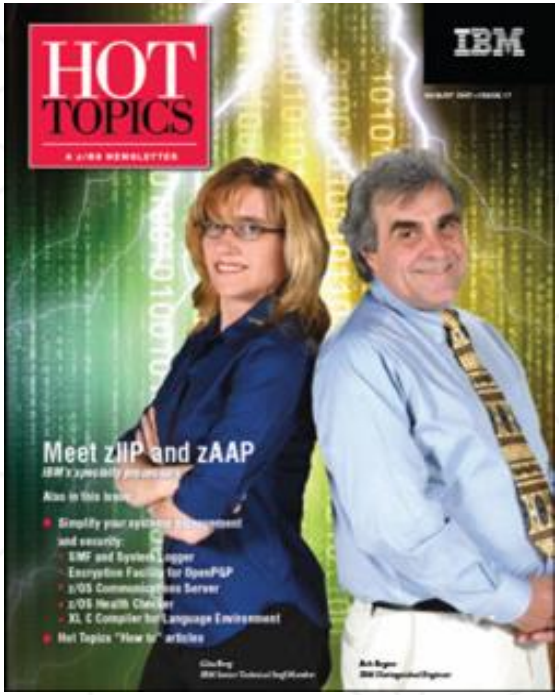
New I/O Fabric diagnostics

- D MATRIX support designed to display fabric health information
- Two new health checks to report on I/O rate discrepancies between channel paths and control unit response times

zAAP workloads on zIIP engines:

- zAAP-eligible work can run on a zIIP even when a zAAP is installed on the same server
- Intended only to help facilitate migration and testing of zAAP workloads on zIIPs
- Also available on z/OS V1.12 and V1.13 with the PTF for APAR OA38829
- Also, zIIP-to-CP ratio on zEC12/zBC12 now 2:1 (was 1:1) to assist in zAAP-to-zIIP migration



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Enhancing Security

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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.

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ICSF Enhancements included in z/OS V2.1 base

- 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 support for generation of ECC and RSA secure keys using Crypto Express4S
  - Corresponding PKCS #11 secure key support for PKI Services
  - System SSL designed 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/

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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/

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More Cryptographic Enhancements:

- CCA enhancement support for the zEC12, zBC12, z196, and z114 with an MCL when a Crypto Express4S (zEC12, zBC12) or Crypto Express3 (zEC12, zBC12, z196, z114) PCIe adapter is configured as a CCA coprocessor
  - Support for new PIN processing function defined by the German banking industry organization (DK) , including key management support for new AES key types, AES key derivation support, and several DK-specific PIN and administrative functions, with the PTF for APAR OA42246
  - Support for additional DK PIN processing functions, including Deterministic PIN Generate, Personal Account Number Translate, PIN Reference Value Card Number Update, PIN Reference MAC Generation, and the ability to Regenerate a new PIN reference value for a changed account number. Available with the PTF for APAR OA43906.
- CCA enhancements for Message Authentication Codes and new PKA Key Translate for the zEC12, zBC12, z196, and z114 servers with an MCL when a Crypto Express4S (zEC12, zBC12) or Crypto Express3 PCIe adapter is configured as a CCA coprocessor:
  - Support for MACs using AES-CMAC algorithm with the PTF for APAR OA43906.
- ICSF and CCA support to reduce the need for User Defined Extensions (UDXs). CCA is designed to support additional algorithms used to translate RSA CRT keys, so new UDXs do not need to be created for each ICSF or CCA level. Supported with the PTF for APAR OA43816.

z/OS Cryptographic Services - ICSF Best Practices
Thursday 8:30

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RRSF

- z/OS V1.13 introduced TCP/IP-based RRSF support for IPv4
- z/OS V2.1 designed to support 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 CRL processing ends

RACF/PKI Update Monday 1:30

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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:

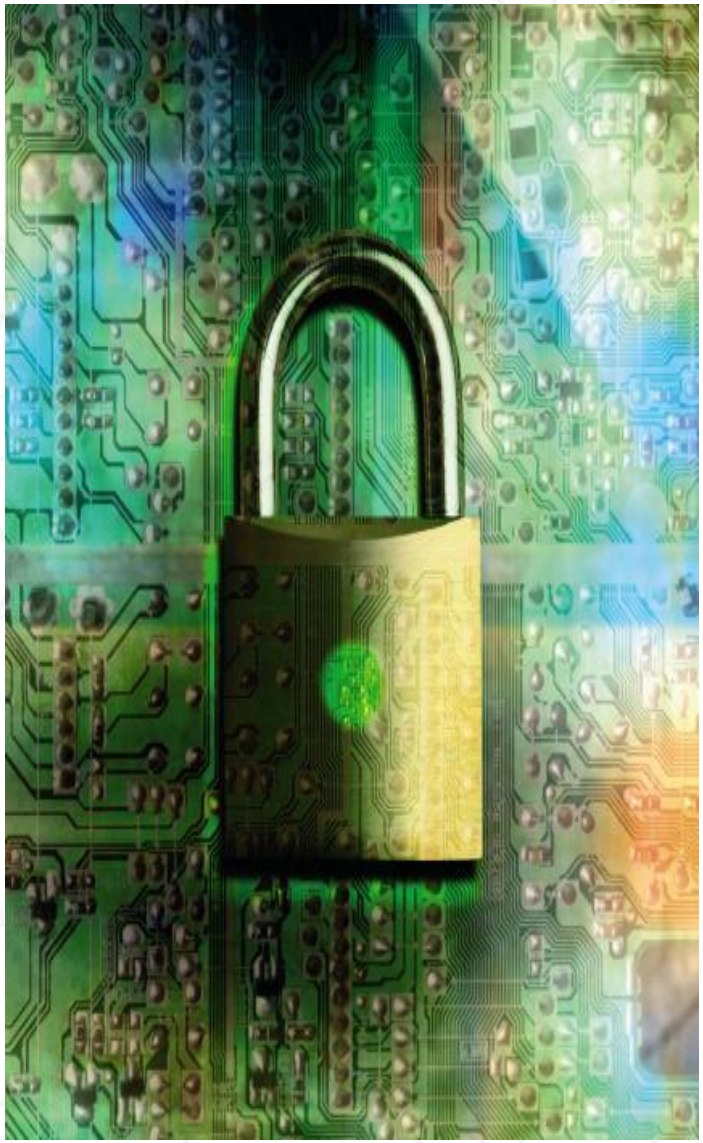
Top 39er†!

- New BPXPRMxx parameter
- Specify whether users who logged in using rlogin, telnet, 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

† Partial



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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
- IBM TDS (LDAP) support for NIST SP 800-131A and NSA Suite B

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- **Support for 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 specify that callers be isolated 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
  - IBM has contributed an OpenCryptoki (PKCS#11) remote cryptography provider to the open source community for Linux to make it easier to use
  - **One Linux distribution has now included it!**

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Integrating new Applications and Supporting Industry and Open Standards

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Batch Modernization:

- *"Interactive is 'manual.' Batch is 'automatic.'"*

  -Gary Puchkoff

- Job Correlator
  - Unique 64-byte value assigned to each job in a sysplex
  - Intended to:
    - Provide a larger name space for jobs (as an 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 z/OS V2.1 and the z/OSMF V2.1 REST API

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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
  - New JOB statement parameter, DSENQSHR=ALLOW, to use with ALLOW

```
//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

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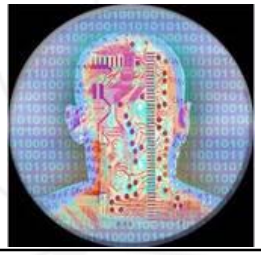
Even more Batch Modernization…

- JES2 symbols support for instream data and Submit
  - 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)
/*
```



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Still more Batch Modernization…

- New PARMDD EXEC keyword support for 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, A MEMBER OF A PDS OR PDSE, OR Z/OS UNIX FILE 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!
/*
```


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Yet more Batch Modernization:

Batch Parallel Recall

- Allocation determines whether data sets to be allocated have been migrated
- For DFSMShsm-migrated data sets, Allocation is now designed to:
  - 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

8-character Job classes

- JOB statement support for 8-character alphanumeric job classes
- Expands maximum number of job classes for JES2
  - JES3 continues to support a maximum of 255 job classes
  - JES2 now supports a maximum of 512 job classes
- JES3 supports 8-character job classes via JECL (//*MAIN CLASS=xxxxxxxx)
- JES3 to continue to override CLASS from the JOB statement when CLASS is coded on the //*MAIN statement

//NICE JOB CLASS=PAYROLL, …

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Have I mentioned “Batch Modernization” today?

- **New JCL Constructs:**
  - SYSTEM and SYSAFF JOB 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
  - New JCLLIB PROCLIB statement for JES2
  - JES2 support for new MERGE and DDNAME keywords for the OUTPUT statement
- **Support for the use of system symbols in JCL**
  - For both JES2 and JES3
- **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

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IEBCOPY improvements designed to support:

Top 39er!

- COPYGROUP for PDSs
  - As for PDSE, copy aliases along with specified members automatically
  - PDS/PDS, PDSE/PDS, PDS/PDSE, PDSE/PDSE all to work the same
- Pattern matching
  - Using * and % in SELECT statements with COPYGROUP

Delete member name masking

- New IDCAMS function to delete specified members by pattern
- Asterisk is a wildcard, per cent sign is positional
- Examples:
  - DELETE SOME.DATA.SET(EELLS*)
    - …to delete all members starting with “EELLS”
  - DELETE SOME.DATA.SET(EELLS%A)
    - …to delete all members with EELLSxA, where x is any character

Multivolume RLSE improvements

- In z/OS V2.1, the system is designed 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

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- **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, now designed to provide transactional integrity for DB2 between Java, COBOL, and PLI programs
  - Support for VSAM as an resource manager
  - Intended to 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

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PSF for z/OS V4.5 Update
Wednesday 11:15

z/OS Font Collection

- New base element includes:
  - AFP Font Collection for S/390 (5648-B33)
  - IBM Infoprint® Fonts for z/OS V1.1 (5648-E76)
  - Compatibility Fonts feature of IBM Print Services Facility V4.4 for z/OS (5655-M32)
  - World Type fonts that are part of the InfoPrint Font Collection V3.1 available for other operating system platforms
  - Double-byte Asian fonts
- 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, designed to:

- 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

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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
- z/OS V2.1 designed to support these new authorized limits:
  - 16M-1 (x'FFFFFF') 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 for up to 15,360 pipes, up from the prior limit of 8,730

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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
- 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!*

Nested Pre-initialized Environments under a single task

- Allow you to call main routines in one pre-initialized environment from another
- Take advantage of multiple persistent pre-initialized environments to improve application performance

Heap Damage, Get Into the Zone! Friday 10:00

Language Environment Support for Blocked I/O

- Program access to blocked records should improve performance
- For read, write, and repositioning operations
- …in addition to existing record-level access

Look What I Found Under the Bar! Monday 1:30

Also:

- Commonly-available UNIX services added for z/OS UNIX file I/O
- New functions for converting multi-byte Unicode to wide character data

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TSO/E REXX Enhancements

Top 39er†!

- 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

z/OS V2.1 DFSORT designed to support:

- Alphanumeric tests for compare and parse
- More symbol support
- Support for up to 1,000 PARSE fields, up from the prior limit of 100
- Support for up to 50-character strings to be appended to VL records

VSAM

- Catalog Search Interface designed to return more information about buffers, indexes, maximum concurrent requests, number of tracks/volume, and more information about aliases defined using SYMBOLICRELATE
- SHOWCB designed to return allocated vs. used buffers for NSR and LSR

† Partial

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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™

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

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- **Unicode 6.0 Support in Case, Collation, and Normalization Services**
  - These services designed to meet the Unicode 6.0 standard
  - Also, z/OS Unicode support for the Hong Kong Supplementary Character Set (HKSCS-2008) for CCSID 1377 and 1375 with the PTF for APAR OA43021
- **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
  - Also, support added for the rupee currency symbol used by India
- **Generalized Alignment support in the Binder & Symbol Tracing**
  - Support for 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)
  - Also, new SYMTRACE option to provide more information about symbols

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z/OS V2.1 C/C++

- As usual, “keeping up with the Joneses” (new hardware function, that is):
  - ARCH(10) and TUNE(10) options for new zEC12, zBC12 functions such as:
    - Execution hint
    - Load and trap
    - Miscellaneous instruction extension
    - Transactional execution
  - Also available for prototype/test on z/OS V1.13 with the PTFs for APARs PM59592, PM59593, PM59589, and PM59595
  - **CPU-intensive performance tests showed 6% (31-bit) to 11% (64-bit) improvement***
- *Nine* new debug level options
- Support for additional features of the C11 standard
  - Including complex type creation, static assertions, the "does not return" function attribute, explicit conversion operators, strongly scoped enums, rvalue references, and the right angle brackets function
- Support for a named, non-"main" function to have the same setup as the main function, and for interprocedural analysis (IPA) performance enhancements for code with mixed (AMODEs)
- A new INCLUDE compiler option
- Designed to provide additional information for the debugger to use

* The performance improvements are based on internal IBM lab measurements. All benchmarks were built using the XPLINK, HGPR, O3, HOT, and IPA(LEVEL(2) with PDF compiler options. The benchmarks compiled with the V1R13 compiler were built using the ARCH(9) TUNE(9) options; the benchmarks compiled with the V2R1 compiler used ARCH(10) TUNE(10). Performance results for specific applications will vary,

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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

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Networking

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Enhanced fast path socket support

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

z/OS V2R1 Communications Server Technical Update, Parts 1 & 2
Monday 10:00 & 11:15

z/OS V2R1 Communications Server Performance Update
Wednesday 10:00

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

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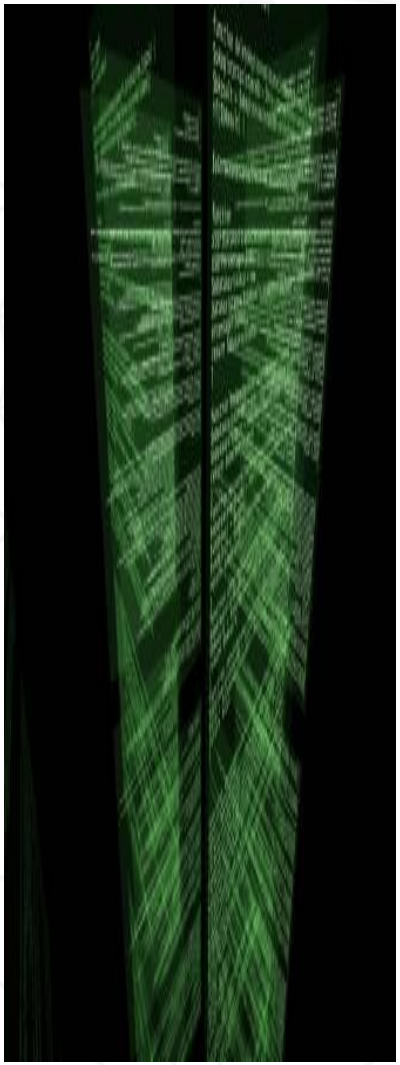
- **Resolver startup file fault tolerance**
  - Resolver designed to start when setup file errors are detected
  - Intended to allow TCP/IP stacks and other dependent applications to start
- **Support for QDIOACCEL with IPSEC**
  - QDIOACCELERATOR designed to improve performance by allowing packets to be directly routed between HiperSockets™ and OSA QDIO connections
  - New function designed to provide that support with IPSEC enabled
- **New FTP subcommands**
  - MVSPut and MVSGet designed to simplify the transfer of sequential and partitioned (PDS and PDSE) data set between z/OS systems



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- **FTP client security exit points**
  - Two new exits: command user exit and reply user exit
  - Intended to be used to implement security policy
- **New command designed 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

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Two other things to highlight:

- **Product ServerPac**
  - Most products now available without a “base product” (such as z/OS, IMS, CICS, DB2)

- **Standalone DFSMSdss no longer requires a labeled volume for full-volume RESTORE**
  - DR procedures can be simplified a bit if you don’t mind using NVFY
  - My apologies to all for forgetting to include this in the announcement for z/OS V1.13!

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A Peek Ahead…

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New for SHARE in Steel City…a look at z/OS FUTUREs

- This material is preliminary
- Work is in progress but not all designs are approved (or even finished!)
- Some of what follows will change!
  - Some things might never appear, or appear (possibly much!) later
  - Some things will be implemented differently as we go through Development
  - And of course, some things will probably be added

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Scalability and Performance*

- **New HyperWrite Function with TPC-R/GDPS HyperSwap® planned**
  - Substantially better DB2 log write performance expected
    - Acceleration of DB2 Log Writes when Metro Mirror is in use
    - Local response reduced up to 61% in prototype testing (final numbers TBD)
      - * Based on projections and/or measurements completed in a controlled environment. Results may vary by customer based on individual workload, configuration and software levels.
    - Less-than-local response benefit percentage varies with distance
    - Planned to require:
      - HyperWrite function in z/OS 2.1, with the PTF for APAR OA45662
      - DB2 10 or DB2 11
      - IBM DS8870 Storage Subsystem with an MCL
    - Planned for year end 2014*

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z/OS V2.2 & Futures*

A smarter operating system with designs intended for*:

Usability and Skills
z/OSMF setup workflow, Updates to WLM, RMF, Incident Log, Software Management, WebISPF applications; New z/OSMF External Applications API; z/OSMF single sign-on, DJC and Deadline Scheduling for JES2, System Symbol enhancements…

Application Development and Support for Industry and Open Standards
New RESTful data set and file APIs, Parallel Batch Scheduling, Improved JES3 symbols and JCL support, Persistent File Handles for z/OS UNIX File Systems, …

Scalability & Performance
AMODE64 File System Services, Index-Level Locking for RLS, NFSv4 RPCSEC_GCC Delegation, Even More Jobs for JES2 …

Enhancing Security
Signed SMF records, FAST and PKINIT (RFCs 6113 and 4556) support in Kerberos, RRSF Dynamic Node Reassignment, PKI RFC 6277 Support, SSL Support for FTP Data/Control (RFC 4217), System SSL RFC 2560 OCSP Support, …

Improving Availability
Private Area Virtual Storage Tracking in PFA, Dynamic TDS (LDAP) Compatibility Upgrades, Dynamic JES2 Checkpoint Tuning & Expansion, SMF records for GRS monitoring …

Self Managing Capabilities
DFSMShsm Storage Tiers Extensions, WLM support for IRD weight changes while soft-capped, Health-Based Workload Routing, RMF support for GRS Statistics and improved zFS Monitoring, Generic Tracker Improvements, …

Extending the Network
64-bit TCP/IP Stack, RoCE Improvements, DVIPA Limit, CICS Sockets, TCP/IP Configuration, NIST SP800-131a, TLS Session Reuse, Resolver Improvements, …

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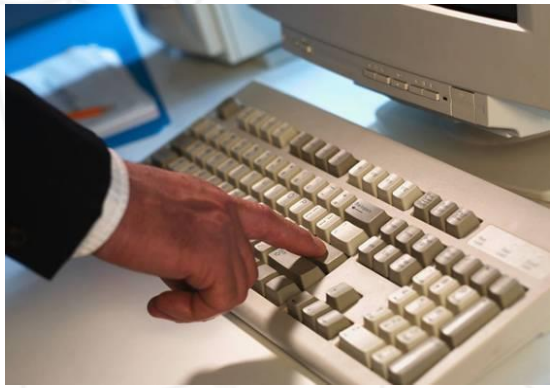
Usability & Skills: z/OSMF Improvements*

- **z/OSMF planned to be a base element of z/OS**
  - No need to order separately

- **z/OSMF single sign-on support designed to allow you to:**
  - Sign on to one z/OSMF
  - Perform administration for any system in any local or remote Parallel Sysplex that has a system running z/OSMF, connectivity, and shared DASD



- **z/OSMF workflow infrastructure**
  - Designed to allow a workflow to call another workflow
- **z/OSMF setup**
  - Enhanced workflow for z/OSMF setup planned
- **New External Applications API**
  - Designed to provide a new way to hook in an application so it shows up persistently in the z/OSMF navigation tree
  - Intended to allow an application owner to supply a properties file, and the user import to the application

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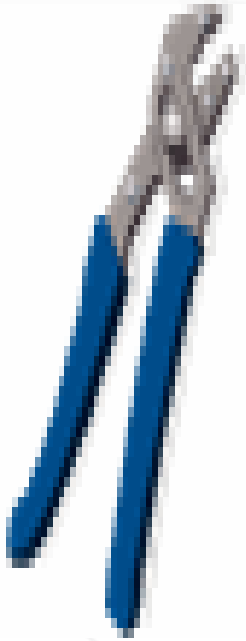
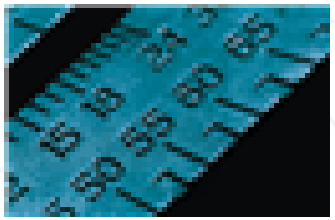
Usability & Skills: z/OSMF Applications Improvements*



- **Incident Log improvements planned:**
  - Add search capability for similar APARs from an incident
  - Add a button for creating a PMR and attaching the relevant data
  - View and manage problems for multiple sysplexes from an aggregated view
  - SFTP support for sending diagnostic data to vendors
- **Software Management designs for:**
  - Corrective and preventive service installation dialog
  - Removing the requirement for SMP/E zone for software instance definition
  - Performing export and import operations for a software instance



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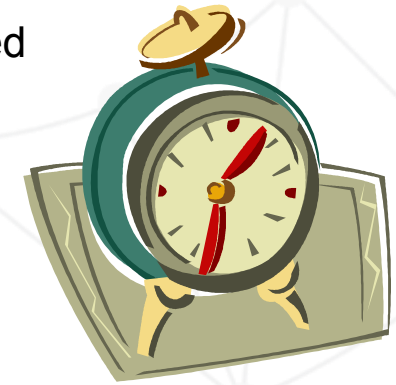
Usability & Skills: z/OS Improvements*

- **Dependent Job Control for JES2**
  - Similar conceptually to //*NET for JES3 but implemented quite differently
  - Designed to allow you to specify that sets of jobs run in particular ways
    - No job (except the first) runs until other jobs it depends on have run
    - Support for parallel execution (with available INITs) so that multiple jobs can start once a dependent job has finished
  - Intended for ad hoc sets of jobs that do not need formal production control
- **Deadline Scheduling for JES2**
  - Similar to some of the JES3 //*MAIN DEADLINE= function but planned to be implemented a bit more intuitively (“STARTBY” vs. “DEADLINE”)
    - Submit jobs at a low priority…
    - …have the priority increase when the specified time is reached
  - As above, intended for ad hoc job scheduling
    - Jobs can tend to run at quiet, less-expensive times of day



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Usability & Skills: z/OS Improvements*

JES2 Dynamic Checkpoint Tuning

- JES2 checkpoints defined in a multi-access spool (MAS) configuration must be tuned for hold and dormancy times on the MASDEF statement
- You can pick good values…
- …but it's hard to pick ones that are good all the time
- z/OS V2.2 JES2 will be designed to tune them automatically

JES2 Step-Level Completion Codes

- In addition to existing support for job-level information
- Summary-oriented information can make it much faster to interpret job output
- New machine-readable JES2 EVENTLOG data set
- Optional SMF30 support

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Usability & Skills: z/OS Improvements*

- **Planned SMP/E ZOMEMERGE enhancements:**
  - New ZONEMERGE CHECK function
  - Better processing of CIFREQ entries during ZONEMERGE
- **System Symbol enhancements, designed to support:**
  - Longer system symbols
  - Symbol values longer than the corresponding symbol names
- **EU Ordering Rules for Unicode and HKSCS conversions support planned:**
  - Common collation sequence across the EU
    - (e.g., how do you sort “a,” “ã,” “à,” “á,” “æ,” “ä,” and “ą”?)
  - Also, 4-byte HKSCS-2008 conversions

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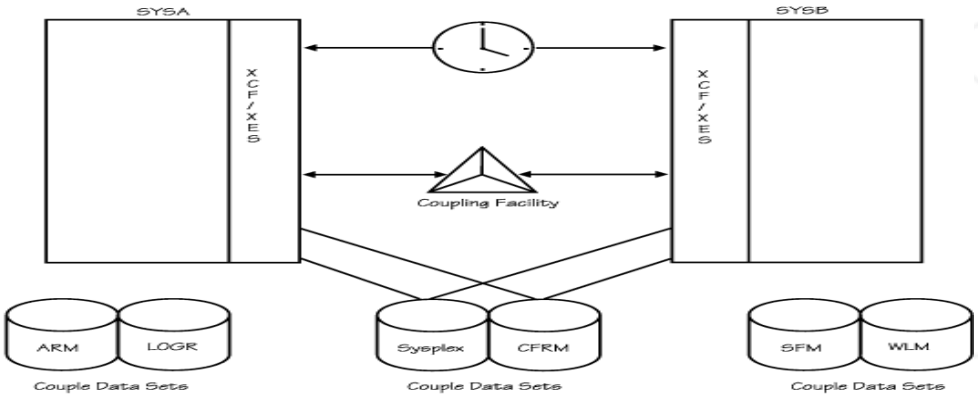
Usability & Skills: z/OS Improvements*

XES/XCF TCLASS Elimination

- Transport Classes must be manually defined today
- Many things to consider; there is most of a chapter about this in *z/OS MVS Setting Up a Sysplex*
- Performance and availability depend on getting it right
- It's a moving target, so must be monitored and tweaked
- z/OS V2.2 will be designed to dynamically define and tune transport
- All that's left is to define the groups and links
- Much simpler!



Support for More GDG Generations planned

- New GDGE data set type with support for up to 1,000 generations
  - More than a year's worth at last!

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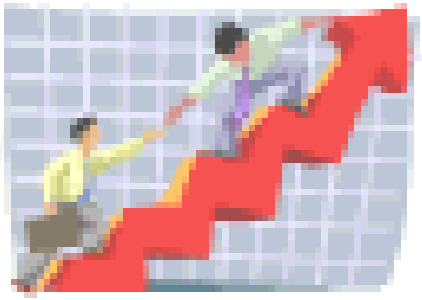
Scalability and Performance*

CA-Level Locking for RLS

- Today an entire data set's index is locked for a number of operations
  - Such as CI splits, CI reclaims, spanned-record processing
- z/OS V2.2 planned to be designed to lock the index at the CA level
- For all KSDS and RRDS (including AIXes and Catalogs)
- CA split and reclaim still need the data set level lock
- Expected to improve performance and make much larger data sets practical with high update activity

Support for more jobs with JES2 planned:



- Up to 1,000,000 jobs
- More JQEs, BERTs

Multisystem DFSMShsm Fast Replication Tape processing

- New support planned to allow FRBACKUP processing to be distributed across a Parallel Sysplex

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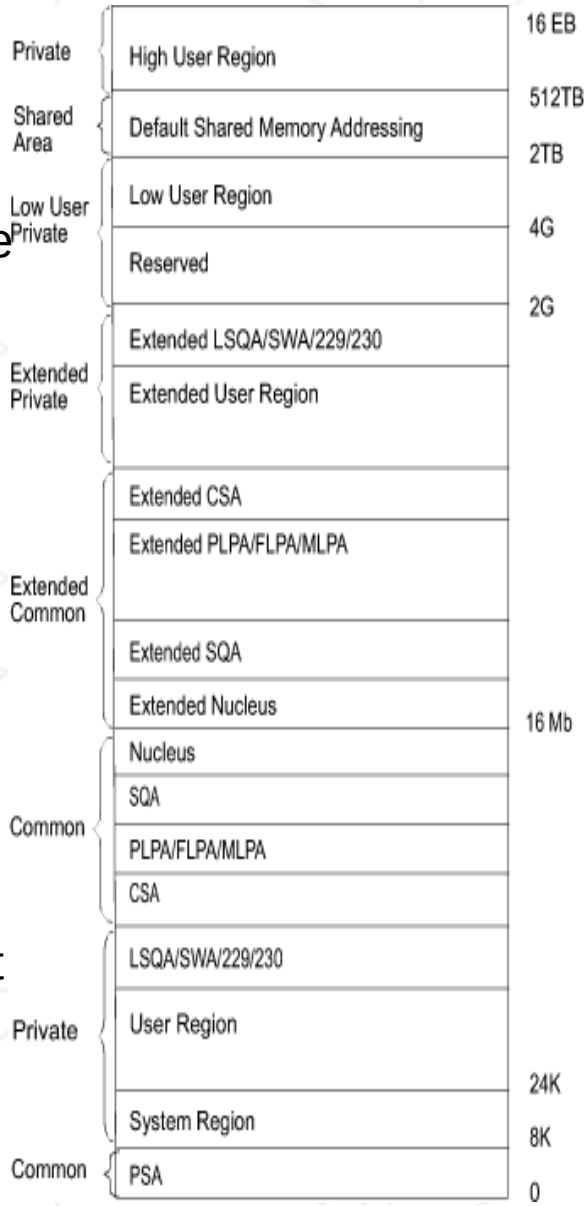
Scalability and Performance*

- **AMODE64 File System Services**
  - z/OS UNIX file system services planned to be callable in AMODE64
  - Eliminate need for 64-bit programs to reset mode to AMODE31 for file system operations
  - Removing the need to set mode should help improve performance
- **64-bit NFS Client Support planned**
  - In support of the item above
  - Note: 64-bit NFS Server was in z/OS V2.1
- **Support for more temporary DD names**
  - Old supported limit was 64K-1 (real implemented limit was ~78K)
  - New limit planned to be 99999 (SYS00001-SYS99999)



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Extending Availability*

- **Private Area Virtual Storage Tracking in PFA**
  - New function designed to track data based on new fields in VSM's LDA
- **Support for dynamic TDS (LDAP) Compatibility Upgrades planned**
  - New "transition mode" designed for LDAP server
  - TM intended to allow higher compatibility level and new back ends to be specified
  - Support for directing LDAP requests to the TM server
  - Designed to allow new specifications to be effective for the Parallel Sysplex once other LDAP servers in the 'plex have been shut down
  - Subsequently restarted servers will be designed to use the new specifications
  - Restart the original TM server to complete the process
- **Dynamic JES2 Checkpoint Expansion**
  - Assuming enough space, designed to allow you to increase Checkpoint size without a cold start
- **New SMF records for GRS monitoring planned**
  - SMF87-1, SMF87-2 for GQSCAN & ENQ/DEQ diagnostic information
    - Extends the function from OA42221 (GQSCAN support) to add ENQ/DEQ

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Extending Availability*

- **JES3 DSI Change**
  - *Not* Dynamic System Interchange; that "other" DSI": Data Set Integrity
  - In "recent" releases before z/OS V2.2, PPTNDSI must be set in IEFSDPPT (and not overridden by specifying DSI in SCHEDxx)
    - Default PPT entry for IATINTK remains:
      - C9C1 E3C9 D5E3 D240 ED10 (byte 8 bit 5 is PPTNDSI)
  - This causes JES3 to use S99NORES ("don't ENQ") for its allocations
  - z/OS V2.2 planned to support specifying DSI for JES3 in SCHEDxx
  - Default PPT still planned to contain PPTNDSI for JES3 for now

- **Better Subsystem Interface (SSI) Initialization Processing planned:**
  - SSCVT entry no longer intended to be built when initialization routines (INITRTNs) are not found
  - Support for a new command to delete a subsystem planned:
    - SETSSI DELETE,SUBNAME=ssss,FORCE
    - (There will be some restrictions!)

- **Dynamic Exit support for O/C/EOV**
  - Support for the Tape Installation Exits planned: Volume Mount, File Start, File Validate, File End and Label Anomaly

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Self-Managing Capabilities*

- **Health-Based Workload Routing**
  - WLM infrastructure to improve "anti-storm drain" will be designed to support:
    - Health value tracking
    - A query API, including ASID-level support, for retrieving health weight values
    - Health weight adjustment based on "finger-pointing" (i.e., "that's not working right" in addition to "I'm not working right")
    - Function-specific health weight values
- **RMF support for GRS Statistics and improved zFS Monitoring**
  - Serialization Delay report added in R13
  - SMF72.5 records include new detail added in V2.1
  - RMF Monitor III support planned for V2.2:
    - Numbers of QScan requests and requests for QNAME and RNAME or ENQTOKEN
    - Number of resources returned
    - Request times
- **Guaranteed Space* ("*Some Conditions Apply")**
  - Based on a new DATACLAS parameter, this will be designed to allow "guaranteed" space to be reduced by up to a specified percentage
    - So the space specified becomes a "strong suggestion"
  - Default is that Guaranteed Space remains "guaranteed" (assuming it succeeds)

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Self-Managing Capabilities*

- **DFSMShsm Storage Tiers Extensions planned, designed to support:**
  - Command-initiated transitions for tier demotion within L0 for storage admins:
    - MIGRATE VOLUME|STORAGEGROUP support for new MIGRATIONONLY and TRANSITIONONLY keywords
    - MIGRATE DATASETNAME support for new TRANSITION keyword
  - A corresponding user-level HMIGRATE command, ARCHMIG service
  - MIGRATE STORAGEGROUP
  - *Lateral* transitions with MIGRATE STORAGEGROUP MOVE
- **Start/Stop Support for Infoprint Server Daemons planned:**
  - Will be designed to change the daemons to started tasks
  - Much better integration with typical recovery tools (MPF, SA, ARM, SFM, NetView, etc.) expected
- **Generic Tracker Improvements**
  - GTZTRACK planned to create SMF records
  - New SMF record type
  - Expected to allow you to split GTZTRACK records into a dedicated log stream and run IFASMFDL later to retrieve all tracked program events after some period of time (e.g., to find migration actions)
  - REXX interface also planned

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Enhancing Security*

SMF record signing planned

- Idea is to make SMF a fully-trusted repository of audit data by making it much more tamper-evident
- Designed to be available for SMF data written to System Logger
- Planned to use both CPACF symmetric algorithm for hashing to support needed data rates and CEXnC card for signatures
- Groups of records planned to be signed
- Each group intended to have a new SMF2 trailer record with the signature
- IFASMFDP support planned for verifying the signatures
  - To verify signatures:
    1. Unload using IFASMFDL
    2. Process the SMF data with IFASMFDP
- We plan to document the SMF2 record format, so anyone can do signature verification

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Enhancing Security*

- **PKINIT (RFC 4556) support planned**
  - Certificate-based authentication for Kerberos
- **RRSF Improvements**
  - Operator command-based dynamic movement of the primary RRSF node planned
  - Intended to allow system automation tooling to move the primary node to another system (and presumably move it back later!)
- **Separate OPERCMDS profiles for display/change aspects of F CATALOG**
  - Designed to support a new MVS.MODIFY.STC.CATALOG.CATALOG.SECURE profile
  - Will be intended to restrict access to the two different flavors of F CATALOG
    - READ access intended to allow display commands
    - UDPATE intended to allows changes to Catalog behavior

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Enhancing Security*

- **System SSL RFC 2560 OCSP Support**
  - Will be designed to:
    - Add OCSP support to System SSL
    - Expand SSL Support for FTP Data/Control (RFC 4217)
- **SAF interface to RACDCERT and the R_datalib service planned**
  - Will be designed for key ring and certificate management enablement
- **RACF password encryption algorithm change (we did a prior Statement of Direction):**
  - Planned to allow you to transition from 56-bit single DES to AES
  - Rollback planned to z/OS V1.13
  - Will be in the PTFs for APARs OA43998 (SAF) & OA43999 (RACF), when available

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Enhancing Security*

- **More RACF Sensitive Resource Health Checks planned, for:**
  - ICSF
  - RACF password encryption technique
  - Password controls
  - RRSF work data sets
  - More z/OS UNIX System Services resources

- **Read-Only AUDITOR support will be designed to provide:**
  - A new RAUDITOR attribute intended to be a “look but don’t touch” setting
  - Designed to preclude changes to RACF audit events; otherwise, the same as AUDITOR

- **Console auto-logoff support planned:**
  - Designed to allow you to specify a timeout for consoles
  - Intended to be similar to timeouts for TSO/E and z/OS UNIX users
  - Automatically logging off unattended consoles is intended to help you improve security

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Application Development and Support for Industry and Open Standards*

- **Persistent File Handles for NFS access to z/OS UNIX files**
  - New support will be designed to persist z/OS UNIX file handles accessed via NFS across a server restart
  - Also planned to support symlinks for z/OS UNIX files
- **Support for 64-bit shared large (1 MB) Pages**
  - Designed to allow you to specify that the system should try to back shared memory objects above the bar using 1M pages
- **New and improved symbol support in JES3**
  - Instream substitution, longer symbols, and ENF78 support planned
- **Improved batch support in JES3**
  - //OUTPUT JCL statement improvements
  - DDNAME, MERGE, and PROCLIB JCL support

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Application Development and Support for Industry and Open Standards*

- **New RESTful data set and file APIs in z/OSMF (probably staged) will be designed to allow you to:**
  - Get a list of data sets matching a pattern
  - Get a list of files in a z/OS UNIX directory
  - Retrieve information about a data set or file (e.g., attributes, member lists)
  - Create, delete, rename, copy, or move a data set or file
  - Browse or edit a data set or file
  - …and more!

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Extending the Network*

- **64-bit TCP/IP Stack**
  - TCP/IP stack will be designed to support AMODE 64
- **Enterprise Extender (EE) scalability**
  - Intended to improve performance for configurations with very large number of EE endpoints
- **RoCE Improvements planned to support**
  - SMC-R autonomics
  - 4K MTU
- **DVIPA Limit**
  - Single-stack limit will be designed to be increased from 1K to 4K for application instance DVIPAs
- **TCP/IP Configuration**
  - Configuration Assistant will be designed to support configuration beyond policy-based network management

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Extending the Network*

- **NIST SP800-131a support will be designed for:**
  - TLSv1.1, TLSv1.2, SHA-2 hashes, and encryption key strengths of more than 111 bits
  - Support for Digital Certificate Access Server (DCAS), SNMP, Sendmail, and centralized policy agent
- **TLS Session Reuse planned to provide:**
  - Reduced overhead
  - One less opportunity to intercept a connection
- **CICS Sockets**
  - Support for CICS transaction tracking planned
- **Resolver Improvements planned to support:**
  - Resolver will be designed to enable nondisruptive tracing for long-running address spaces

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Secure Software Delivery, Part MMXIV

- **April 11, 2012:**
  - Said we'd require FTPS for z/OS products and service downloads October 31, 2013
- **April – June 2013:**
  - A number of customers and account teams contact us to express concern
  - Most had setup issues we are able to resolve (big thanks to Kurt Quackenbush!)
  - Some have more intractable issues such as:
    - Current hardware implementations do not support FTPS
    - Executive-level exceptions or legislative authorization needed to poke FTPS-sized holes in the firewalls
- **July 23, 2013:**
  - Announced "OK, we didn't mean it" (well, we did, but…) and deferred, no date
- **July 2013 – Present:**
  - August 2013 SHARE closed door topic
  - IBM-MAIN survey
  - Individually contacted all the customers we knew about
  - Helped with setup (where we could), discussed alternatives…
  - March 2014 zBLC call
  - March 2014 SHARE closed door topic

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Where We're At Now*

- So far, all the customers who have returned our cards and letters who could not use FTPS have said they can use HTTPS
  - Or they can use RECEIVE ORDER, which amounts to the same thing
- **Current plan is to add HTTPS as a protocol for secure delivery**
  - **FTPS to remain supported**
- This will be done with a native z/OS client to be added to SMP/E
  - Transfers will be direct from IBM servers to z/OS
  - No requirement for Download Director
    - (Download Director still planned to be supported for store-and-forward downloads)
  - We will require secure download starting: 1Q2016
  - Does this NOT work for you?
    - If not, send a note to eells@us.ibm.com and tell us why!

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

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Software Delivery*

Preventive Service

- **IBM plans a number of changes to z/OS preventive service ordering, to be made effective 3Q 2014:**
  - In Shopz, the z/OS "all licensed products" service package type and z/OS Internet delivery service subscriptions will be removed
  - ServiceLink z/OS ESO packages will be supported only when used to order service for selected FMIDs
  - z/OS preventive service orders will be based on installed products, not on licensed products
- **IBM recommends use of the SMP/E RECEIVE ORDER command**
  - Simplest way to get z/OS service
  - Can automate service acquisition using local batch scheduling tools
  - Alternatively, you can use Shopz or the ServiceLink z/OS ESO option
- **No changes to corrective service ordering**
- **For more information:**
  - http://www.ibm.com/software/shopzseries
  - http://www.ibm.com/ibmlink

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