



What's new in z/OS

*z/OS V1.11 Preview**

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IBM System z





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DFSMSshsm	IBM logo*	REXX	z10 EC
DFSMSrmm	IBM Scalable Financial Reporting	System Storage	z9
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IBM System Storage DS8000

Improve service, reduce cost, manage risk



§ IBM System Storage DS8000 R4.2

§ Full disk encryption for data protection

- Simplified, highly secure and cost-effective key storage, key serving and key management with Tivoli® Key Lifecycle Manager

§ Solid state drive (SSD) option for high priority, time-sensitive applications

- Increased performance for some transactional applications
- Faster data replication and recovery from outages
- Absence of mechanical moving parts makes SSDs significantly more reliable
- Fraction of the energy consumed, fraction of heat dissipated

§ FlashCopy® and Metro Mirror for more effective two-site business continuity

- Helps improve data synchronization and availability

§ z/OS

- Tivoli Key Lifecycle Manager (planned to be available for z/OS in March) is an unpriced product that leverages z/OS security, management, and reporting capabilities (W/ V1.9)
- Define new z/OS SMS policies for the allocation of new data sets on volumes backed by SSD technology and to gather usage information using SMF that is intended to help you manage data placement to take the best advantage of this new feature (w/V1.9)
- Function available with z/OS V1.8



IBM System Storage DS8000

Enhancing Security

§ Drive-Level Encryption

- New DS8000 feature supports encryption of “data at rest”
- Continuous, real-time encryption of the individual drives
- Expected to:
 - Have no performance impact
 - Require no application changes
- Uses Tivoli Key Lifecycle Manager (5608-A91)
 - Key management via ICSF and RACF®
 - Auditability via SMF
 - TKLM availability planned for March 2009
- Supported on z/OS R9 R10 with the PTF for APAR OA27393





IBM System Storage DS8000

Scalability and Performance

§ Solid-State Devices for DASD

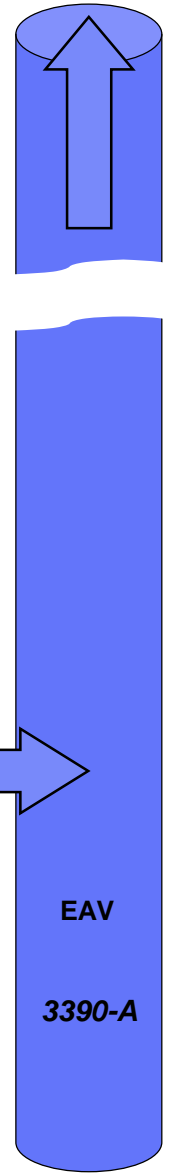
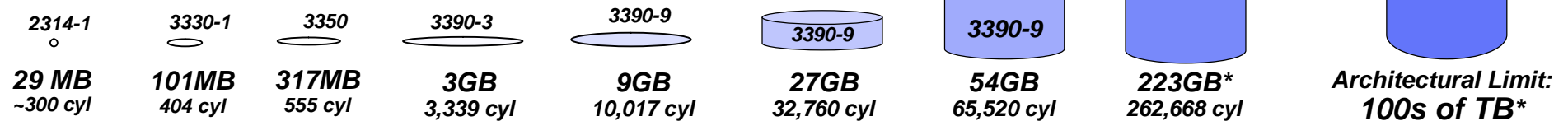
- Flash-based “drives”
 - RAID-based
 - Dynamic chip sparing
- Improved DASD response times
- Caching with controller-based prefetching means SSD probably best suited for:
 - Infrequently written data
 - Frequently read data
 - Random access data
 - Data with high read disconnect times
- HDD probably a better choice for:
 - Sequential access
 - Frequently rewritten data
- SMF records, DATACLAS support to help with data management
- Support available on z/OS R9 and R10 with APAR OA25559, planned to be included in z/OS R11
- Power consumption and cooling requirements markedly lower than for hard disk-based volumes





Taking z/OS storage volumes to the extreme

- § An Extended Address Volume (EAV) helps address storage constraints for very large storage environments
- § EAV can help simplify storage management by enabling you to manage fewer, larger volumes, as opposed to many small volumes
- § Available with z/OS V1.10 and IBM System Storage DS8000 Turbo
 - Initially, 223 GB volumes supported by VSAM – applications that uses VSAM data sets (including DB2®, CICS®, zFS file systems, SMP/E CSI data sets, and NFS mounted data sets) can benefit from EAV
 - Larger volumes are planned to be rolled out over time *
 - IBM intends to enable other access methods in the future *
- § DS8000 HyperPAV function complements EAV by allowing the scaling of the I/O rates against a single, larger volume
- § DS8000 Dynamic Volume Expansion can allow non-disruptive migration to larger volume sizes
- § IBM Global Technology Data Mobility Services can assist with migration to EAV



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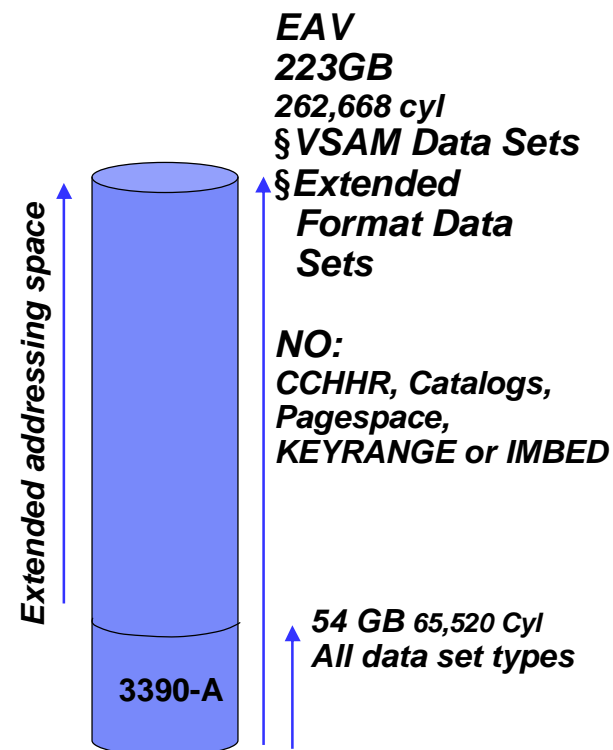
Taking z/OS storage volumes to the extreme

- § An Extended Address Volume (EAV) helps address storage constraints for very large storage environments
- § EAV can help simplify storage management by enabling you to manage fewer, larger volumes, as opposed to many small volumes

§ Planned for in 2009 with z/OS V1.11*

- EAV Support for extended format sequential data sets
 - Any application that uses extended format data sets can benefit – which is just about any app!
- Data sets can span the 64 K cylinder line
- Support for a new data set level attribute and JCL keyword, EATTR, is planned to allow you to control the migration of data sets to the extended addressing space
- Language Environment® XL C/C++ Run-Time Library support
- RACF support
- SVC dump support
- z/OS Communications Server FTP support

§ Larger volumes and other access methods are planned to be rolled out over time *





Additional scalability/performance enhancements

*Previewed with z/OS V1.11**

§ **Improvement in storage response times**

- DFSMS™ support planned for DS8000 R4.2 solid state drives (SSD, also called flash memory)
- New SMS policies to gather usage information using SMF that is intended to help manage data placement to take the best advantage the new SSDs.

§ **Performance improvements for XL C/C++ applications on System z10 servers.**

- New prefetch capability can heuristically generate System z10 prefetch instructions as appropriate

§ **Reduced memory management with large (1MB) page support**

- Support for AMODE 64 XL C/C++ Language Environment applications, in addition to current exploitation by the 64-bit SDK for z/OS, Java® Technology Edition, V6

§ **Performance improvements for large systems with many zIIPs**

- Faster processors can actually spend more time waiting for memory access! HiperDispatch helps improve cache management and overall system performance.
- HiperDispatch algorithms to be updated for zIIP processors.

§ **Increase the efficiency of batch windows**

- Use IEFBR14 to delete catalogue reference to unneeded data sets and avoids the lengthy process of recalling the DS just to delete it

§ **Virtual Storage Constraint Relief !**

- Removes constraints within the base z/OS operation system and can allow more work to be processed on a single z/OS system.



Enhancements in networking performance

*Previewed with z/OS V1.11**

§ Improved throughput in support of disaster recovery or global operations

- Dynamic tuning of TCP window for bulk transfers over high-latency, long distance networks

§ More performance for Web-based applications

- System-wide caching of domain name server (DNS) responses
 - Applications with frequent resolver queries can benefit.
- Improved Fast Cache Accelerator function

§ Intelligent sysplex networking

- The Sysplex Distributor plans to take into account the capacity, performance and health characteristics of both the tier 1 and the tier 2 z/OS server applications. This new function is intended to improve the quality of the load balancing decisions made by Sysplex Distributor in a multi-tier z/OS server environment

§ Many other performance improvements

- New TCP/IP resolver improvements, Sysplex Distributor routing accelerators and WLM algorithms, socket error detection, QDIO accelerator function, Enterprise Extender and SMB improvements.



z/OS and IPv6

§ There is about 2 years before we run out of IPv4 addresses!

- <http://penrose.uk6x.com/>

§ z/OS V1.10 is IPv6 certified!

- See the “Special Interoperability Test Certification of the IBM z/OS Version 1.10 Operating System for IBM Mainframe Computer Systems for Internet Protocol Version 6 Capability”
- From US government, Defense Information Systems Agency, Joint Interoperability Test Command
 - (http://jitc.fhu.disa.mil/adv_ip/register/certs/ibmzosv110_dec08.pdf)

“The IBM z/OS Version 1.10 operating system for IBM mainframe computer systems has met the Internet Protocol (IP) Version 6 (IPv6) Capable interoperability requirements of an Advanced Server as described in the Department of Defense (DoD) Information Technology Standards Registry, “DoD IPv6 Standard Profiles for IPv6 Capable Products Version 2.0,” 1 August 2007, reference (c). The IBM z/OS Version 1.10 operating system for IBM mainframe computer systems has successfully completed the related IPv6 Interoperability portions of the “DoD IPv6 Generic Test Plan (GTP) Version 3,” August 2007, reference (d), and is certified for listing on the Unified Capabilities (UC) Approved Products List (APL) as IPv6 Capable.”



Enhancements in networking security

*Previewed with z/OS V1.11**

§ z/OS Communications Server designs for network security enhancements:

– z/OS System SSL

- Addressing requirements for NIST FIPS 140-2 Level 1 criteria.
- TLS V1.1 protocol (RFC4346)
- TLS Extensions (RFC3546)
- Certificate validation at the RFC3280 level with compatibility with RFC2459

– Application Transparent – Transport Layer Security (AT-TLS)

- Adding TLS V1.1 protocol support
- Can now validate certificates as specified in RFC3280
- Supports negotiation and use of a truncated HMAC (RFC3546), maximum SSL fragment size (RFC3546), handshake server name indication, and setting the CRL LDAP server access security level
- Application access to System SSL design changes related to FIPS 140-2 level 1 criteria
- Provides improved performance for short-lived connection workload

– IPsec

- IPsec performance improvements for Enterprise Extender traffic
- Improved Internet Key Exchange reliability
- Improved granularity in IPsec management information

§ **Apply TLS security services transparently to applications with AT-TLS. No need for program updates because TLS services are applied in the TCP layer of the z/OS Communications Server**

§ **Both AT-TLS and IPsec can help reduce application enablement requirements for network security. These functions are policy driven for consistent, system-wide enforcement of security policies.**

Simplified configuration of network definitions

Configuration Assistant for z/OS Communication Server



Configuration Assistant Value

- § **Simplified setup, editing, and auditing of the following TCP/IP features for z/OS :**
 - § IP Security
 - § Application Transparent-TLS
 - § Quality of Service
 - § Intrusion Detection Services
 - § Network Security Services (1.9)
 - § TCP/IP Policy-Based Routing (1.9)
- § **Ships with “best practice” default configurations.**
- § **Performs self-checks of configurations; notifies when exceptions are detected.**
- § **Can read and update existing policies, can re-export any changes – helpful when searching for any manual changes to network settings. (1.10)**
- § **Simplified dialogue for AT-TLS and IPsec and setting up policy-based infrastructure (planned for z/OS 1.11*)**

z/OS Security Server – RACF

Helping to address security and compliance** guidelines

RACF enhancements planned for z/OS V1.11*

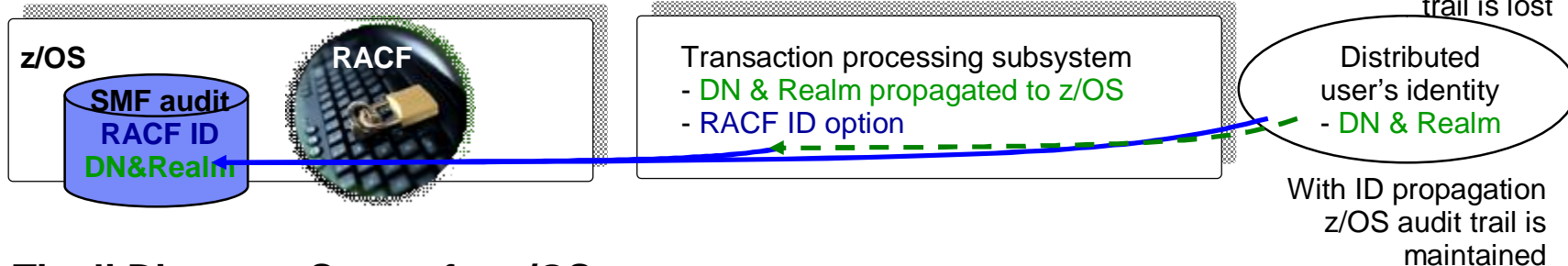
§ Validate applications and other program downloads are un-tampered

§ Sign and verify applications prior to loading and deploying on the system

§ International language and character support for certificates

§ Identity propagation

§ z/OS transactional subsystems will be able to associate users' distributed identities with RACF-controlled user IDs while maintaining the users' original identity information for audit purposes



§ Tivoli Directory Server for z/OS

§ Integrated in the base of z/OS V1.8 – provides sophisticated LDAP services for z/OS

§ Extended operation to support group access checking in addition to user access checking (1.10)

§ Manage RACF User, Group, and Connect profiles

§ Directory replication (1.11)

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A complete digital certificate solution

z/OS PKI Services

§ Alleviate need to pay a third party Certificate Authority

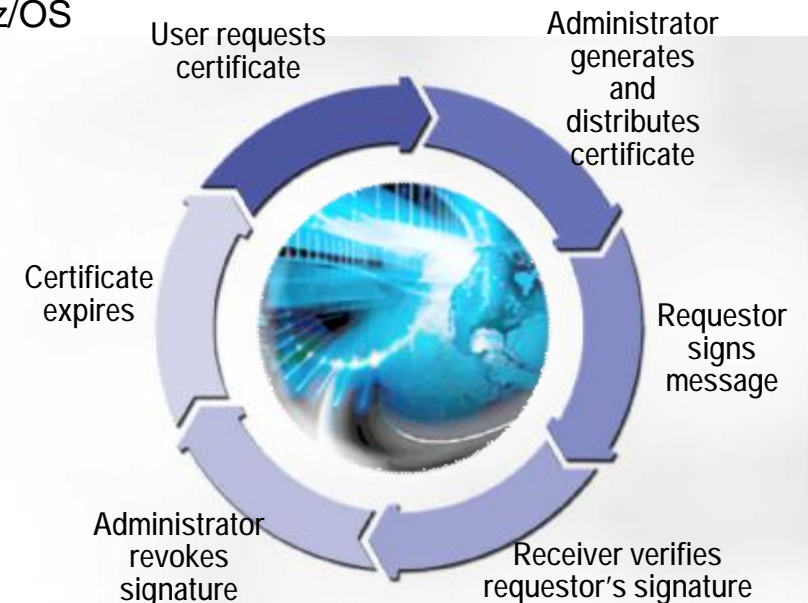
- z/OS PKI Services is a Certificate Authority solution in z/OS
- Relatively low MIPS to drive your certificate needs
- Leverage existing z/OS skills and resources

§ Provides full certificate life cycle management

- User request driven via Web pages
- Browser and server certificates
- Automatic and administrator approval process
- End user/administrator revocation process

§ PKI Services, many updates over the years!

- Multiple certificate authorities (in one image) (1.7)
- SCEP (Simple Certificate Enrollment Protocol) support to accept certificate request from network devices (routers) (1.8)
- Automated e-mail notification for certificate requests, renewals, expirations (1.9)
- Support for Unicode (UTF8 subset) – helps improve compatibility with existing CAs. (1.10)
- New key archival/recovery capabilities – provides a backup process for recovery of keys (1.11*)



Example of feedback

Used by a large bank to help secure connection between data center and branch offices - *Saved an estimated \$16M a year*

z/OS Public Key Infrastructure (PKI)

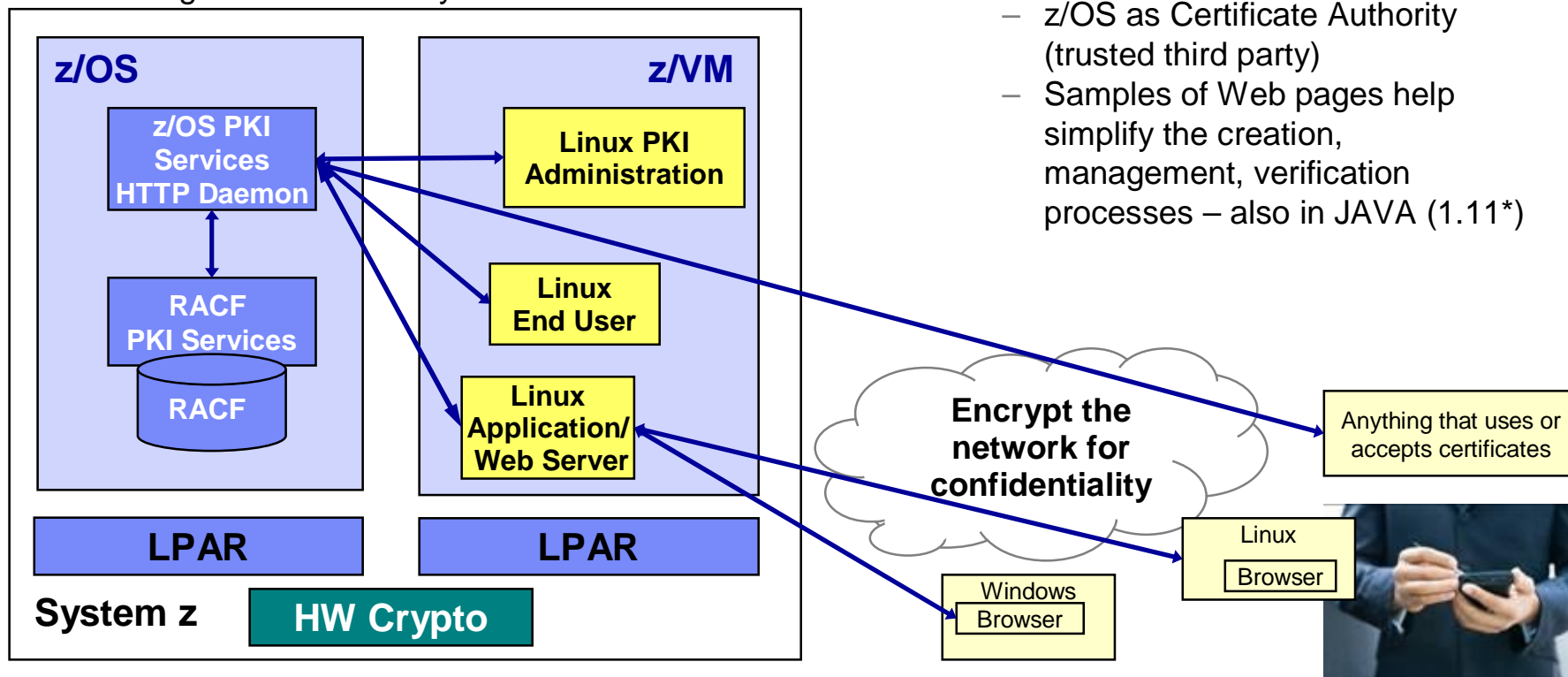
Certificates for Linux on System z and more!

§ Digital certificates can be managed in one place

- No need to buy a separate server and SW for a separate CA authority
- No need to pay a third party to issue and manage certificates for you

§ z/OS PKI Services

- Confidentiality and data integrity with PKI public/private key pair
- Full life cycle management of digital certificates
- z/OS as Certificate Authority (trusted third party)
- Samples of Web pages help simplify the creation, management, verification processes – also in JAVA (1.11*)





z/OS availability enhancements

*Previewed with z/OS V1.11**

- § **z/OS V1.11 plans to extend predictive failure analysis** - z/OS system heuristically learns from its own environment and is able to anticipate and report on potential system issues (however rare) before they are an impact to your business.
- § **z/OS UNIX® System Services with System Call (Syscall) Trace** - intended to gather more information about program processing history to facilitate application debugging.
- § **New Allocation commands** - can help improve system availability by allowing you to change Allocation settings without an IPL.
- § **New latch identity service for improved latch contention**
- § **Improved serviceability**, including IPL restart improvements and improved dump management
- § **Parallel Sysplex:**
 - § **Networking** (Sysplex Distributor)
 - New WLM routing algorithms for better zIIP and zAAP workload routing
 - Connection routing accelerator for performance
 - Intelligent routing for multitier z/OS applications
 - § **Availability**
 - New health checks for DAE and STP
 - Alternate Sysplex root file system support
 - Enhancement to XCF and XEC
 - Auto IPL (R10)

CIM server workload eligible for zIIP*, planned

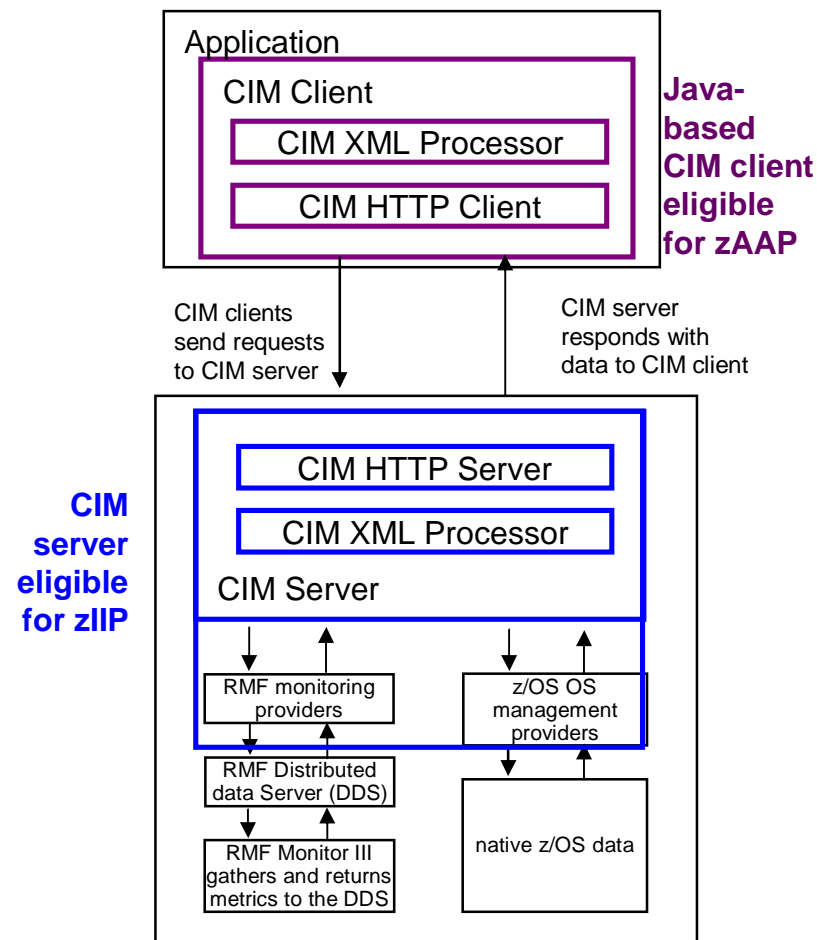
§ z/OS V1.11 is planned to be updated so z/OS CIM server processing is eligible to run on the System (zIIP)*

- Eligible CIM server workloads include CIM provider workloads as well
- Other CIM-related workloads (such as CIM client and CIM-enabled resource systems processing) are not eligible for zIIP

§ Makes the development and deployment of z/OS systems management applications more attractive option

§ Applications that access CIM-enabled resources and providers can benefit

- Information providers include RMF, WLM, DFSMS and BCP
- Systems management exploiters include z/OS Capacity Provisioning Manager and z/OS Management Facility* (planned, statement of direction)



An example with z/OS system data and RMF metrics



z/OS Simplifying operations and programming

*Previewed with z/OS V1.11**

§ A z/OS Management Facility (Statement of Direction)*

- More easily manage system
- Initial release to facilitate problem data management

§ IBM Health Checker for z/OS

- New health checks for:
 - Auto IPL best practices and device validation
 - DFSMS to detect IMBED and REPLICATE
 - Static resource manager
 - Dump Analysis and Elimination
 - SDSF using SAF
- New migration checks for:
 - IPsec filter rules, BIND9 DNS usage, DFSMSrmm, STP/ ETR, Message Flood Automation

§ Advanced Communications Facility Trace Analysis Program (ACF/TAP) is planned to be made a part of z/OS Communications Server element (no need for use the Advanced Communications Facility Network Control Program (ACF/NCP)).

§ Faster and easier report generation for DFSMSrmm and RMF.

§ Lots of ISPF updates

§ Lots of DFSMSrmm updates



z/OS optimization and management

*Previewed with z/OS V1.11**

§ **Sysplex Distributor support for WLM enhanced workload routing**

- Considers displaceable capacity, considers zIIP and zAAP capacity

§ **z/OS Workload Manager:**

- Improved routing algorithms
- More granularity in reporting classes (2,048 Reporting Classes in WLM!)

§ **Optimized LDAP (IBM Tivoli Directory Server)**

- Cross-system load balancing using WLM
- “Storm drain” avoidance through ITDS’s use of the WLM server health service

§ **New BCP internal interface (BCPii) component**

- API for authorized programs to perform HMC functions
 - List CPCs, Images, Capacity records, and query related attributes
 - Change profile contents
 - Activate, deactivate, start, stop, reset, restart systems
 - initiate capacity changes (up and down)
- Can communicate using internal HMC network, isolated from other network traffic
- **z/OS Capacity Provisioning** - BCPii exploitation and logical processor management

§ **Improved Allocation tape load balancing algorithm**

§ **Lots of DFSMSrmm™ and DFSMSHsm™**



Simplified software, service verification and installation *SMP/E programmatic PSP buckets (SMP/E V3.5, 5655-G44)*

Value

- § Can simplify the verification and installation tasks for required service for new hardware and software levels, or to enable new hardware or software functions
- § Can be less manual and error-prone
- § Can result in faster implementation of hardware and software functions
- § ... and help provide ongoing verification of hardware as new software is introduced
- § ... ongoing verification of software as new hardware is introduced.



Capabilities

- § IBM to create metadata that associates PTFs with one or more fix categories. Such as fixes needed for:
 - Specific hardware levels
 - New software FMIDs
 - Enabling new hardware/software functions
- § IBM to deliver the metadata with existing PTF and HOLDDATA acquisition procedures.
- § Integrate verification and installation tasks within typical SMP/E operations.
 - Conditionally process the metadata based on user's interest and what is currently installed.
 - Extend well known SMP/E functions RECEIVE, APPLY, ACCEPT and REPORT

<http://www-03.ibm.com/systems/z/os/zos/smpe/>



Statements of Direction* (February 2009)

- § **IBM intends to expand support for EAV with larger volume sizes and to allow additional data set types to reside in the cylinders after the first 65,520 cylinders.**

- § **IBM intends to update z/OS with a new function designed to generate messages for Server Time Protocol (STP) - related hardware events.**

- § **IBM intends to introduce the z/OS Management Facility, a separate product which will be designed to enable system programmers to more easily manage and administer a mainframe system by simplifying day to day operations and administration of a z/OS system.**
 - The initial release is planned to provide a problem data management capability which is intended to facilitate problem data management tasks for new or less skilled system programmers and system administrators.

- § **In a future release of z/OS, the BIND 9.2.0 function will be removed from the z/OS Communications Server component.**



Thank you

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