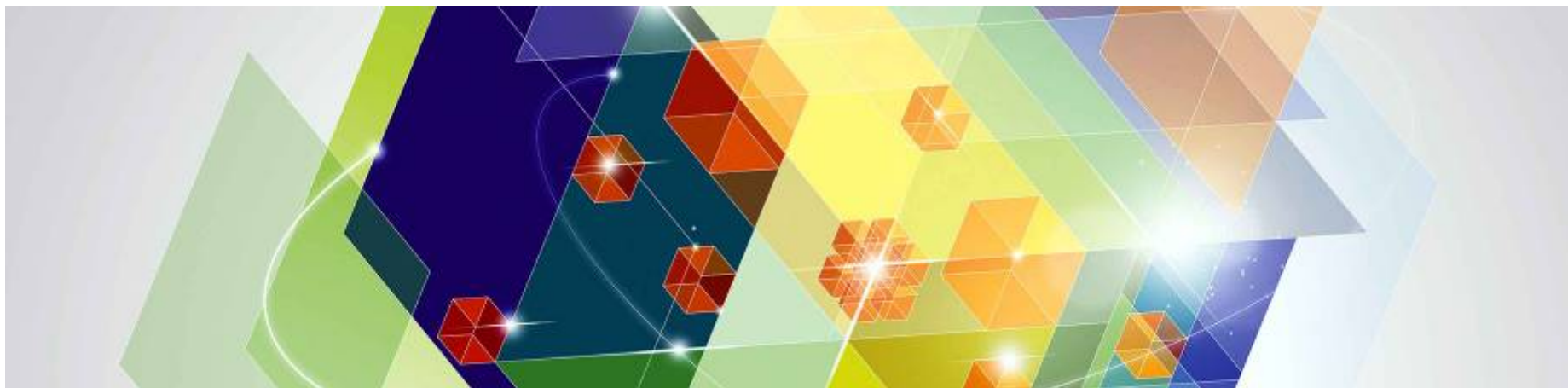# What's new with z/OS and z/OS Management Facility Version 1 Release 13

August 2011

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Notes:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

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Agenda

- z/OS® and z/OS Management Facility function and value

- Integration with IBM zEnterprise™ System

z/OS and

z/OS Management Facility R12

Available today

z/OS and

z/OS Management Facility R13

Available

September 2011

IBM

z/OS Management Facility – the new face of z/OS

No-charge product

Streamlined processes and built-in guidance address a broad scope of activities and helps create a more integrated z/OS experience.

Configuration
- Configuration Assistant for z/OS Communication Server (R11) – Simplified configuration and setup of TCP/IP policy-based networking functions

Performance
- Capacity Provisioning (R13) - simplified monitoring of CP status for domains
- Resource Monitoring and System Status (R12) – single view of sysplex and Linux® performance status and dynamic real time resource metrics.
- Workload Management – creation, editing, and activation of WLM policies (R12)

Problem Determination
- Incident Log (R11) – Simplified capture, packaging, sending of SVC dump diagnostic data

Software
- Deployment (R13) - Clone z/OS images, deploy software more easily and consistently

Storage
- DASD Management (R13) - Define new SMS storage volumes quickly and easily*

z/OS Classic Interface
- ISPF Task integrates existing ISPF into z/OSMF to launch to ISPF functions directly (R13)

Base
- A new web-based (REST) interface enables you to submit batch jobs and access batch data from non-z/OS systems (R13)
- Leverage IBM System z® Specialty engines
- IBM Assistance available to help with pre-planning, early discovery, and readiness review for new z/OSMF environment

Left panel: IBM z/OS Management Facility - Mozilla Firefox; Welcome, Configuration, Configuration Assistant, Links, ShopzSeries, Support for z/OS, System z Redbooks, WSC Flashes, z/OS Basics Information Center, z/OS Home Page, z/OS Internet Library, Performance, Capacity Provisioning, Resource Monitoring, System Status, Workload Management, Problem Determination, Incident Log, Software, Deployment, Storage, DASD Management, z/OS Classic Interfaces, ISPF, z/OSMF Administration, Application Linking Management, Links, Refresh

* The DASD Management task is planned to be made available in 1Q 2012 with the PTF for APAR PM40869
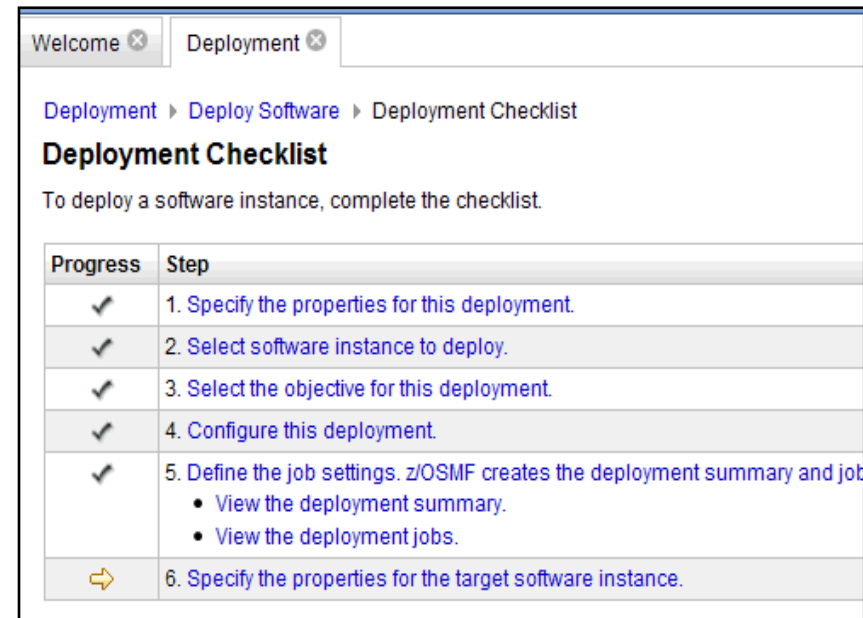
z/OSMF Software Deployment (R13)
New! - simplified deployment of installed software

- **New task designed to make deployment of installed software simpler and safer.**
  - ► Easy to follow checklist replaces manual and error prone procedures with a user friendly application
  - ► Incorporates IBM recommended best practices for software deployment.

- Software Deployment can clone software
  - ► Locally, single system or within a sysplex
  - ► Remotely, across a network, and multiple sysplexes.

- Software Deployment can also:
  - ► Identify, modify, delete software instances
  - ► Generate jobs to copy a software instance
  - ► Verify cross-system and cross-product requisites, verify fixes
  - ► Copy ALL parts of the software (SMP/E CSI inventory too)

- Clones all SMP/E installed software!
  - ► IBM, ISV, z/OS, stack or individual products
  - ► Service upgrades for all of the above (via complete replacement)

| Welcome ⊗ | Deployment ⊗ |

Deployment ▸ Deploy Software ▸ Deployment Checklist

Deployment Checklist

To deploy a software instance, complete the checklist.

Progress	Step
✔	1. Specify the properties for this deployment.
✔	2. Select software instance to deploy.
✔	3. Select the objective for this deployment.
✔	4. Configure this deployment.
✔	5. Define the job settings. z/OSMF creates the deployment summary and job • View the deployment summary. • View the deployment jobs.
⇨	6. Specify the properties for the target software instance.

z/OSMF DASD Management* (R13)
New! - The first phase in simplifying storage management

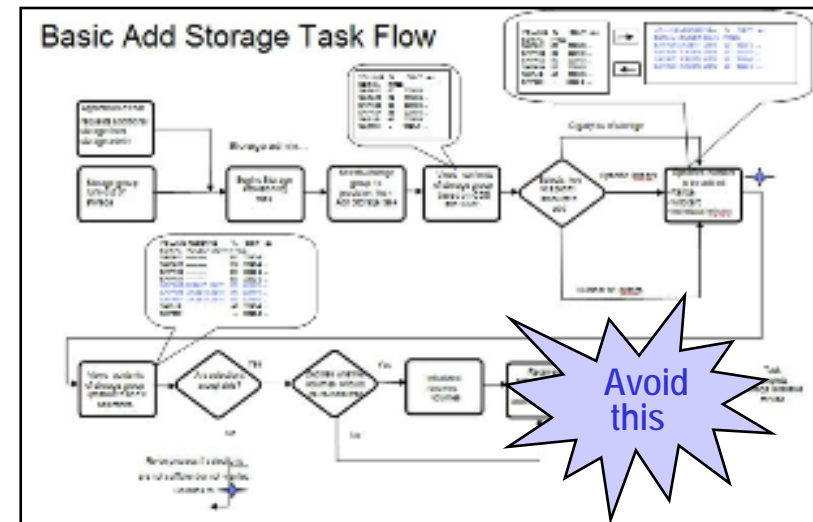- **Add storage to an SMS Pool storage group through a single user interface**
  - ► Easier, with less SMS skill needed

- Manage containers of pre-defined available volumes with the introduction of the reserve storage pool resource.

- Display new pool storage group attributes
  - ► View the list of pool storage groups associated with the active configuration
  - ► View an alert when the Storage Utilization Notification Threshold is exceeded
  - ► Display storage group level attributes
  - ► View volumes associated with a storage group
  - ► Display volume level attributes

- Select the AddStorage Wizard to guide you through steps that can simplify the task of adding storage to a storage group

Basic Add Storage Task Flow

Avoid this

*Planned to be made available in first quarter 2012 with the PTF for APAR PM40869

z/OSMF and ISPF (R13)
## *New! - Work with existing interfaces*

- **Enables system programmer to perform tasks from one interface.**
  - ▶ Also makes ISPF applications URL Web-accessible for linking and launching from other applications

- Up to 4 panes
  - ▶ Panes can be sized. Each pane can have multiple ISPF sessions, tabs can be moved between panes
  - ▶ Shows ISPF Menu bar, Command line, Function keys
  - ▶ Open and cascade multiple windows

- Also available in tabbed format

IBM
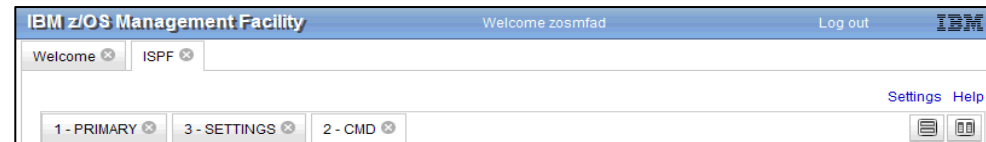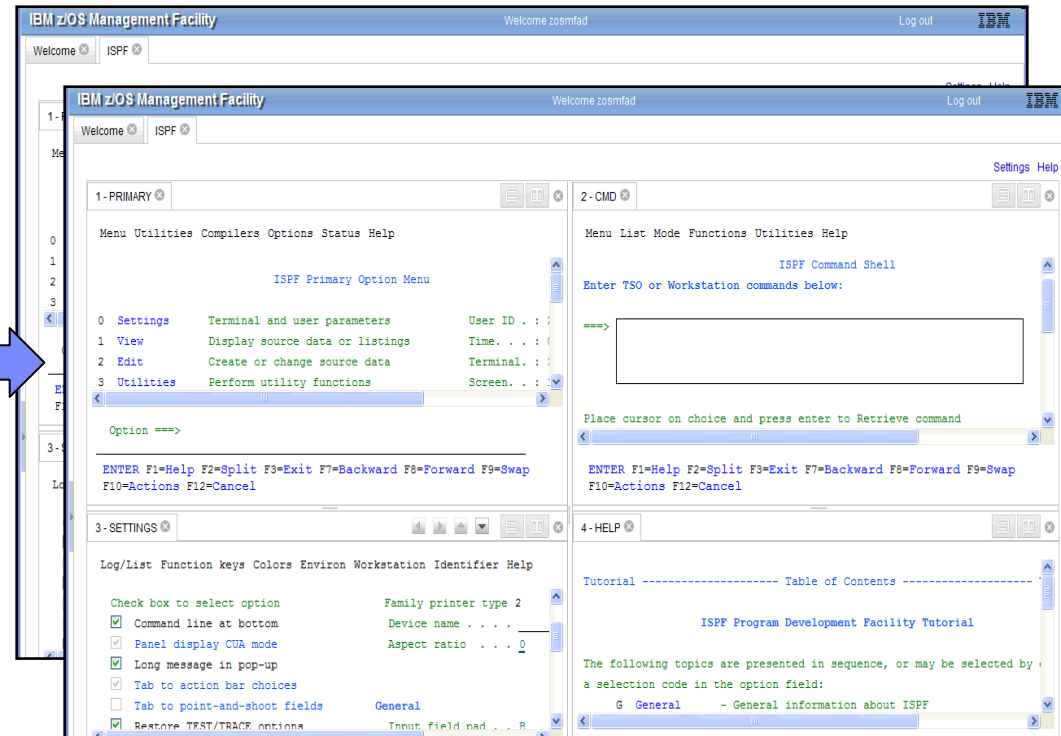
z/OSMF Capacity Provisioning (R13)
New! – view the status of z/OS capacity provisioning domains

▪ **System z On/Off Capacity on Demand**

Ideal if your business has few periodic workload peaks over the year. Potentially:
- ► Save on hardware - No need to purchase hardware, 'you rent it' for the days you need it.
- ► Save on IBM software charges – only pay for software charges for On/Off CoD peak capacity in the month it is incurred*

Also ideal if you own extra hardware capacity (banked capacity). Potentially:
- ► Save on monthly software charges – budget for peak 'banked' capacity and turn off the resources when not needed to possibly gain software savings.

▪ **z/OS Capacity Provisioning Manager can automate On/Off CoD for z/OS**
- ► Can manage processing capacity more reliably, more easily, and faster.
- ► What had taken minutes or hours to discover, identify, decide, and resolve, now can be specified to happen automatically in as little as two minutes.

▪ **New z/OSMF Capacity Provisioning task (R13)**
- ► Initial phase simplifies the **monitoring** of z/OS CP connections, domains, configurations, and policies
- ► Separate Windows-based tool required for z/OS CP **management** functions.

Provisioning Manager
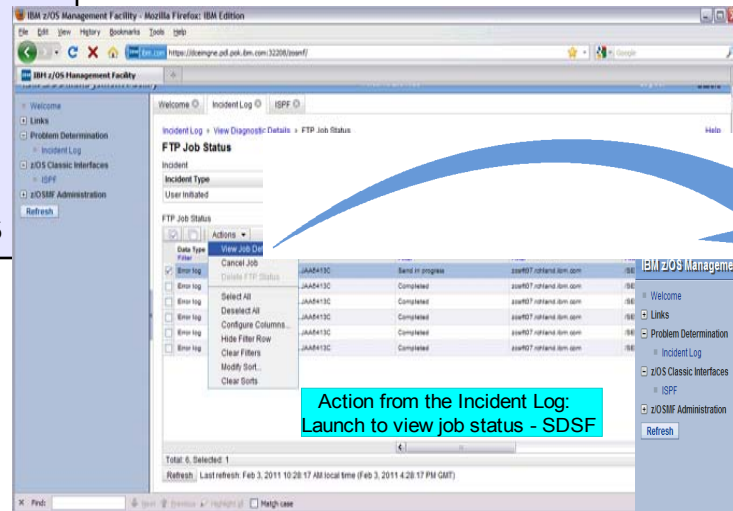
The Provisioning Manager is the component of Capacity Provisioning that controls the domain based on the active poli
Connections describe how to connect to a Provisioning Manager. The connections table shows connection definitions

Actions ▼

Host Address	Protocol	Port	
Filter	Filter	Filter	
Same system as z/OSMF			
cpmprod.ibm.com	HTTPS	5989	
cpmtest.ibm.com	HTTP	5988	

* Additional terms and conditions apply

8   8/17/2011
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Application Linking (R13)
Example, link Incident Log to SDSF in context

- **A more seamless experience when working with z/OS.**

- **Make your own linkages between z/OSMF apps and even to any web-based apps**

- Define an 'event' (such as "View Job Status")

- Then define the 'event handler' action and parameters (such as 'go to ISPF' with context of the job)

Action from the Incident Log: Launch to view job status - SDSF
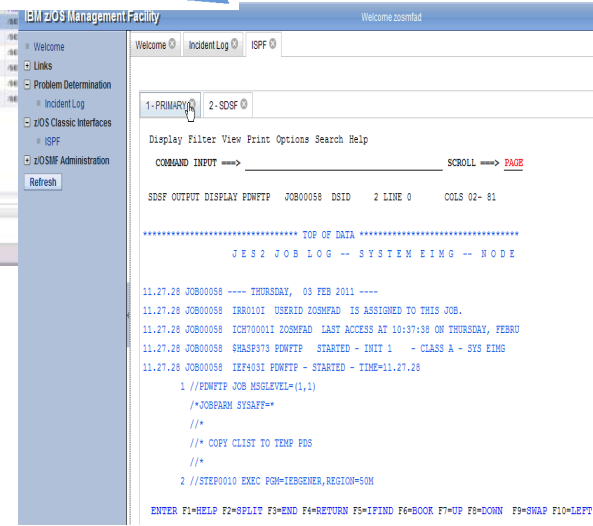
# z/OSMF Workload Management (R12)

Consolidated inventory of service definitions

- **WLM Service Definition Editor - Store all service definitions in one repository**

  - Available starting with z/OS and z/OSMF R12
  - Direct access to the WLM Couple Data Set to install/extract service definitions. No need to FTP WLM policy files!
  - Activation of service policies and monitoring of the WLM status in the sysplex

  - **For z/OSMF R13**
    - More granular authorization
    - Persistant settings
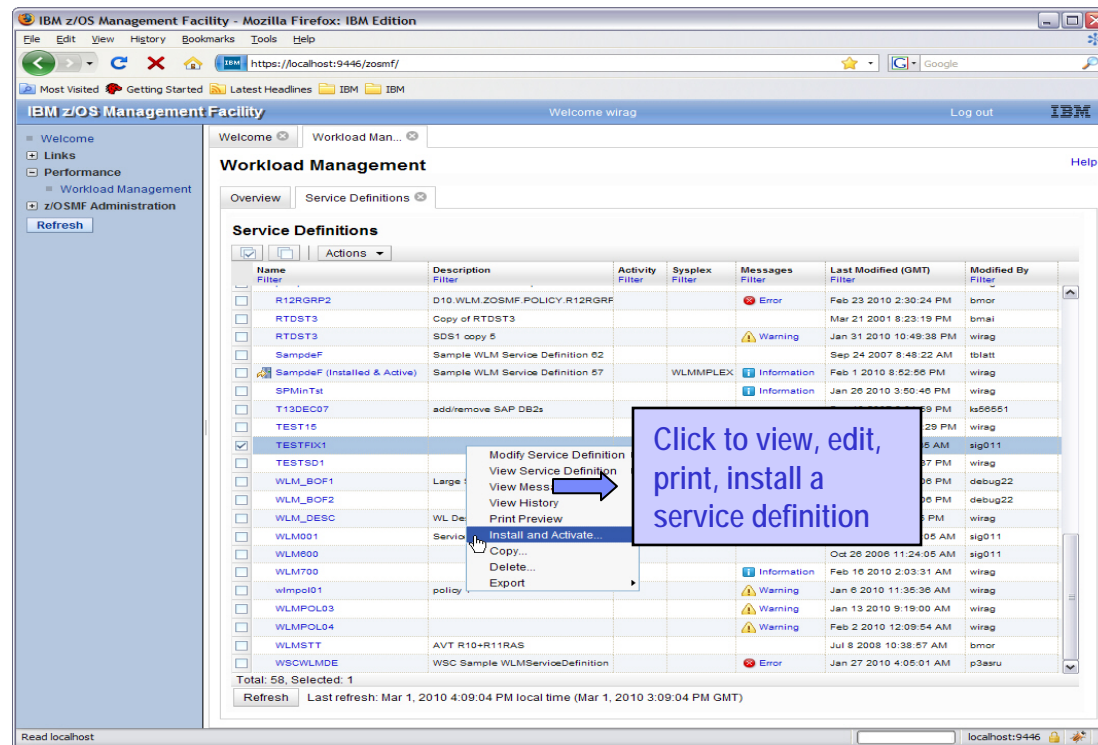
Note, screen capture from z/OSMF R12

Resource Monitoring (R12)

A snapshot of the performance of workloads running on your systems

- **Sysplex status:**
  - Instant snapshot of workload performance
  - RED, YELLOW GREEN status gives instant indication of WLM goals
  - Monitor z/OS AND Linux
  - Drill down to see RMF™ metrics
  - Renamed **System Status** (R13)

- **Monitoring Desktops**
  - GUI for RMF
  - Monitor most Resource Measurement Facility (RMF) Monitor III metrics, create and save custom views, and display real-time performance data as bar charts.
  - Renamed **Dashboards** (R13)

Note, screen captures from z/OSMF R12

Integrated z/OS and Linux resource monitoring
A monitoring solution for multi-tier workloads

- **Monitor the resources for z/OS and Linux workloads**

- **Ideal for use with System z Enterprise System**

- **For z/OSMF R12**
  – Use separate as-is, no-charge web-download tool to gather resource information for Linux systems.

- **For z/OSMF R13**
  – New integrated performance data gatherers for Linux on System z, Linux on IBM System x®, and AIX® systems
  – Additional monitoring capabilities for your zEnterprise System

Processor Utilization of Linux Processes

Processor Utilization of z/OS Jobs
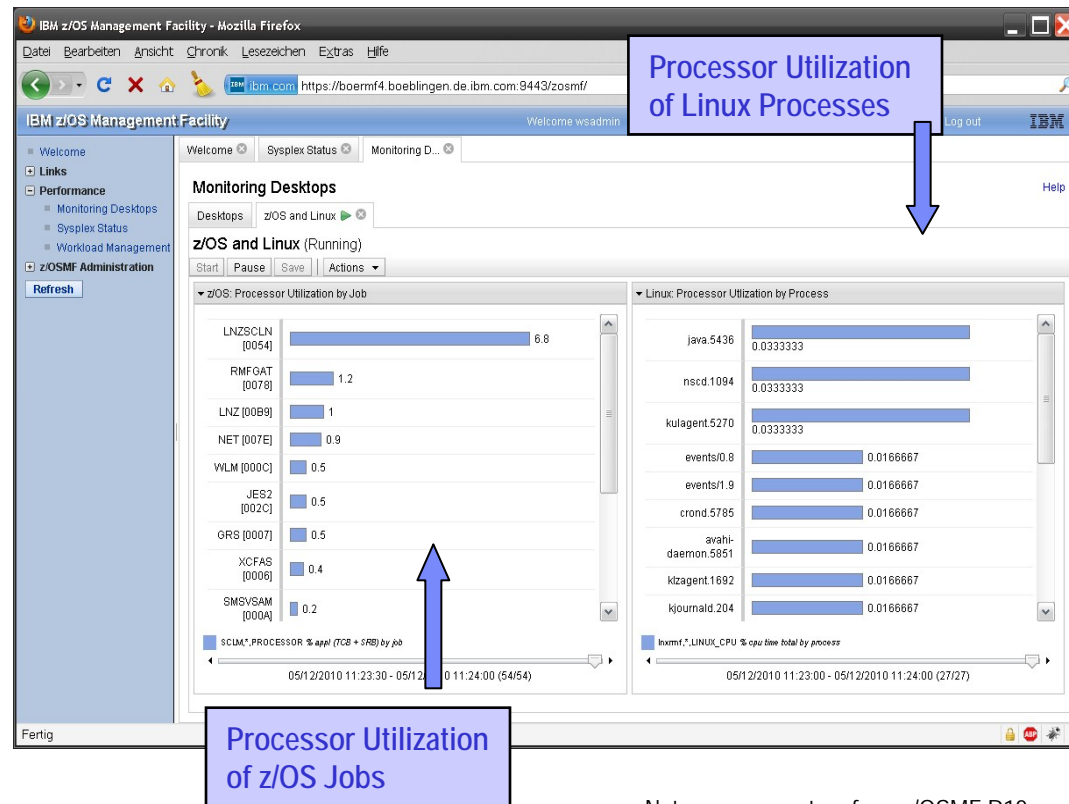
Note, screen capture from z/OSMF R12

z/OSMF Config. Assist. for z/OS Communications Server (R11)
Configure TCP/IP networks

- **Powerful!**
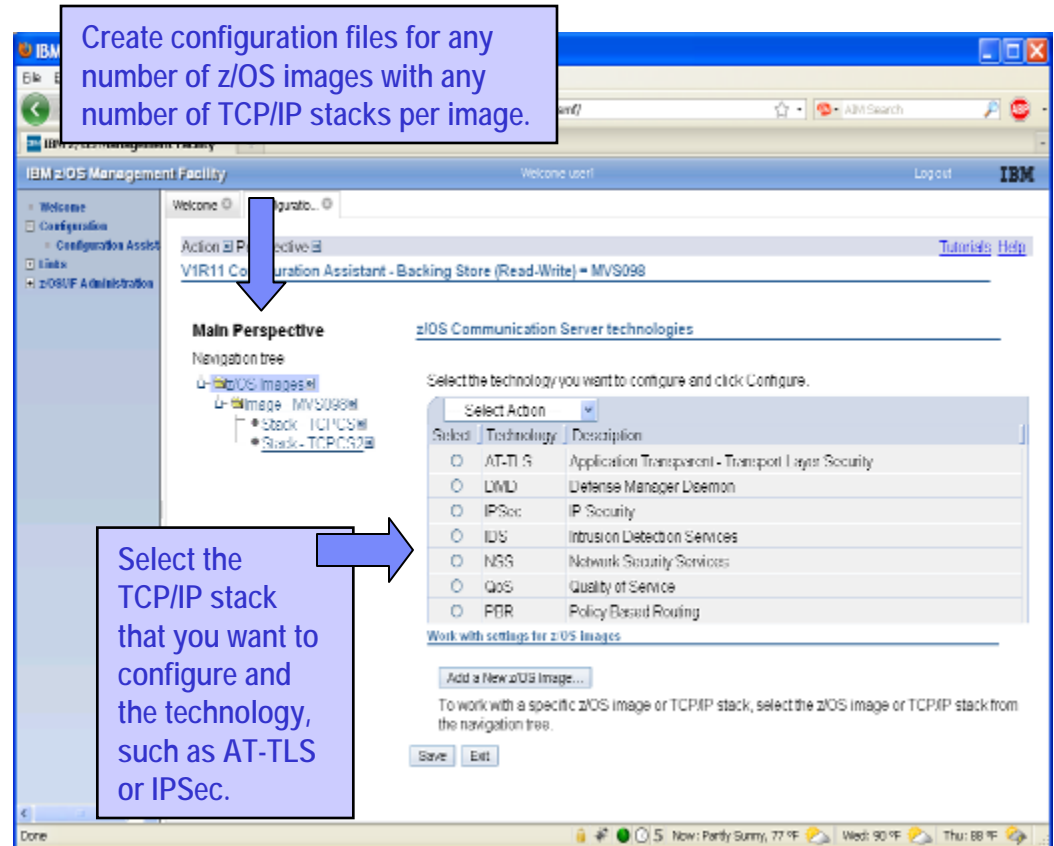 - Configure z/OS TCP/IP networks from one comprehensive interface

- **No delay!**
  - New networking / security features in z/OS are available for use with the same release of z/OSMF

- **For z/OSMF R12**
  - Support for Internet Key Exchange (IKE) version 2
  - Support for FIPS-140 cryptographic mode for IPSec and IKE
  - Simpler AT-TLS rules

- **For z/OSMF R13**
  - Configure networks for both z/OS R12 and R13 mixed environments
  - Import existing stack settings
  - Define policies once and use for multiple stacks
  - Improved Intrusion Detection – added IPv6 and Enterprise Extender traffic.

Create configuration files for any number of z/OS images with any number of TCP/IP stacks per image.

Select the TCP/IP stack that you want to configure and the technology, such as AT-TLS or IPSec.

Note, screen capture from z/OSMF R12

z/OSMF Incident Log (R11)
Save hours of time when diagnosing incidents

- **Respond to and manage incidents quickly and efficiently**
  - View, sort, and act on incidents (identified by subsystem)
  - Package dump data for transmission in minutes

- **For z/OSMF R12**
  - Add additional comments and diagnostic data
  - Encrypted parallel FTP of the incident files, to IBM .
  - Sending additional user-defined data with an incident

- **For z/OSMF R13**
  - New APAR search
  - View job status via SDSF launch
  - Utilizes new Problem Documentation Upload utility in base of z/OS R13
  - Also available as a download from http://www14.software.ibm.com/webapp/set2/sas/f/zaids/pduf.html

Note, screen capture from z/OSMF R12

New programmatic interface for z/OS batch
Function delivered with z/OSMF R13

- **A new REST API (HTTP(s)-based) interface to z/OS**

- **Easy programmatic access to the power of z/OS batch capabilities**
  - ► REST API web services can be used by: web applications (javascript/AJAX, Flex(Flash), etc) and other web service clients, such as Java, PHP, Perl, etc
  - ► The REST API web service will connect to both JES2 and JES3, as well as select secondary subsystems

- **Today:**
- **Complex programming**
  - Allocate and open internal reader
  - TSO/ISPF submit,
  - FTP "interface-level2"
  - Java z/OS submit interface
- **Security protocol limitations**

- **New option today**
- Any web-based, Java, PHP, Perl application, etc. supporting HTTP
- New RESTful HTTPs based API
- Highly secure, firewall friendly,
- Simplified text-like programming

Break the barriers of batch
Submit JCL, get status, retrieve output
files, change jobclass, cancel job, purge job

- z/OS JES2 and z/OS JES3

z/OS R13 - The foundation for modern batch

- **About 90% of customers consider batch mission critical***
- **Challenge: Greater volumes of data and larger batch and on-line processing windows.**
- **Solution: Need to make batch more efficient.**

- Expand existing COBOL applications with Java!
  - ► More choice for application development skills
  - ► Leverage specialty engines!

- Simplified programming!
  - ► Enhancements in z/OS simplify the development and maintenance of existing batch applications.
  - ► Enable distributed applications to access the power of z/OS batch

- Shorter batch windows!
  - ► New function in z/OS helps make batch processing more efficient
  - ► "Pipe" data between two batch jobs to enable these jobs to perform concurrent reads and writes

- Real time batch!
  - ► WebSphere® Compute Grid delivers a batch environment capable of supporting 24x7 batch and OLTP processing, and parallel computing

"Interactive is manual. Batch is automatic." - Gary Puchkoff, IBM Senior Technical Staff Member

*IBM Market Research

z/OS R13 - The foundation for modern batch (detail)

- **Expand existing COBOL applications!**
  - ▶ The z/OS Batch Runtime environment, provides Java-to-COBOL interoperability, for transactional updates to DB2®, and for sharing database connections between Java and COBOL (R13)*
    Ideal for processing for computationally intensive programs and extensions
  - ▶ Use JZOS Batch Toolkit for z/OS for efficient use of z/OS System interfaces for Java batch (IBM Java SDKs for z/OS)
  - ▶ Leverage specialty engines!

- **Simplified programming!**
  - ▶ JES2 JCL enhancements provide in-stream data in catalogue procedures, more options on setting job return codes, and the ability to stop and hold a job at the end of a step (not just at the end of the job) give much more granularity and control (z/OS R13)
  - ▶ An new REST API allows you to submit z/OS batch jobs and retrieve z/OS batch job information from distributed systems as well as z/OS systems; and is intended to make z/OS batch processing much more accessible to distributed systems and web-based processes (z/OS and z/OSMF R13)

- **Shorter batch windows**
  - ▶ Allow overlapping processing for multi-volume data sets (FREEVOL=EOV, R13)
  - ▶ Avoid recalling migrated datasets, just to delete them (IEFBR14, R11)
  - ▶ "Pipe" data between two batch jobs to enable these jobs to perform reads and writes concurrently (BatchPipes®, 5655-D45)

- **Real time batch**
  - ▶ WebSphere Compute Grid delivers a resilient, highly available, secure, and scalable runtime with container-managed services for batch applications
  - ▶ Capable of supporting 24x7 batch and OLTP processing, and parallel computing

* Prerequisites:
IBM 31-bit SDK for z/OS, Java Technology Edition, Version 6.0.1 (5655-R31)
DB2 V9.1 for z/OS (5635-DB2) or later with PTFs
IBM Enterprise COBOL for z/OS V4.1 (5655-S71) or later

Additional z/OS R13 simplification enhancements

- **Health Checker Framework, updates**
  - ► Greater ability to schedule health checks
  - ► Ability for checks to raise message severity as conditions change

- **New health checks:**
  - ► Two new checks for Allocation – intended to warn about potential Allocation deadlock conditions
  - ► Detects tape library initialization errors with suggestions on how to resolve.

- **New Migration checks for:**
  - ► zFS configuration options, new symbolic links, z/OS console mode of operation

- **DFSMSrmm™, updates:**
  - ► NEW automatic recovery for missing our out-of-sequence tape volumes. For multivolume data sets, DFSMSrmm will attempt to return the corrected list
  - ► New ability to specify data sets by expiration date or VRS policy management. Help simplify retention policies, avoid batch VRS policy management, and enable you to determine how long a tape data set will be retained

- **DFSMSdfp™ updates:**
  - ► New includes the explanatory text for Open, Close, and End of Volume error conditions along with the error message.

- **SMF dump improvement for log streams** (SMF dump to log stream introduced with z/OS R9)

z/OS Availability Enhancements

- **Availability enhancements (with R13)**

  - ▶ **Avoid JES2 re-starts** with JES2 dynamic spool migration, rapidly discontinue and drain spool volumes quickly

  - ▶ **Avoid JES3 re-starts** with JES3 dynamic spool add

  - ▶ **Improved channel recovery** - track errors and automatically remove failing paths (on a controller level) faster

  - ▶ **zFS internal restart** - automatically recover disabled aggregates in Sysplex aware mode – avoiding lengthy manual system recovery process.

  - ▶ **Automatic rerouting and recovery of z/OS system name server resolver**

  - ▶ **Concurrent service for DADSM and CVAF and DADSM dynamic exits** – avoid planned outages

Smart!

z/OS Availability Enhancements

- **Availability enhancements with (R12)**

  - ▶ **VSAM Control Area (CA) Reclaim (R12**) – Improve application performance, storage utilization, and availability by avoiding the planned outages used for defragmenting and reorganizing VSAM KSDSs to eliminate empty Control Areas.

  - ▶ **z/OS Run Time Diagnostics (R12)** – Helps reduce the time spent deciding what actions to take to resolve a problem. This function is designed to analyze and help identify possible problem areas in as little as one minute, whereby an experienced operator might take up to 20 minutes.

    - For R13 – RTD checks GRS latch and z/OS UNIX® System Services file system latch contention

    - RTD automatically invoked when PFA detects very low SMF arrival rates.

  - ▶ **Smart components** - GRS will identify itself as a critical component of a member of a sysplex. If GRS fails, XCF will recognize that and partition out the system on which it failed to avoid sysplex-wide slowdowns.

  - ▶ **Timed Auto Reply** – Gives z/OS the option to respond automatically to certain messages when you cannot, preventing small incidents from cascading to larger ones.

Smart!

z/OS Predictive Failure Analysis and Runtime Diagnostics

- **z/OS PFA checks intelligently analyze the rate and trends of specific z/OS system resources and report on z/OS system anomalies, potentially helping you to identify and avoid failures. PFA checks analyze:**
  - ► Common storage usage checking (R10)
  - ► LOGREC arrival rate detection (R10)
  - ► Frame and slot usage checking (R11)
  - ► Message arrival rate detection (with z/OS R11)
  - ► SMF Message Arrival rate detection (R12)
  - ► ENQ and SPOOL utilization tracking (R13)
  - ► **Additional customization** (R12)
    - You can specify atypical jobs and address spaces to be excluded from learning algorithms

  SMART!

- **Runtime Diagnostics helps you to pin point the source of a 'soft failure' by looking at z/OS system resources in real time and reporting on areas of contention. RTD checks for:**
  - ► Select critical messages in the Operlog (z/OS R12)
  - ► Address spaces with high CPU usage or which might be in a loop (z/OS R12)
  - ► Address spaces suspended in local lock contention (z/OS R12)
  - ► System address spaces that are ENQ "waiters" (z/OS R12)
  - ► Evaluates GRS latch and z/OS UNIX System Services file system latch contention (z/OS R13)

- **Autonomics (R13)** - RTD is automatically invoked from PFA when PFA detects very low SMF arrival rates, RTD problem notification sent to PFA. (R13)

z/OS Availability Enhancements
Parallel Sysplex updates for R13

- **Fully shared zFS in a sysplex!**
  - ► **Between 50% (1.5x) and 150% (2.5x)* I/O performance improvement** for any z/OS UNIX workload using shared zFS in a Parallel Sysplex®. Applications that use zFS, such as z/OS UNIX System Services and WebSphere Application Server for z/OS, are expected to benefit
  - ► Also: Less-disruptive recovery from most internal zFS problems (for both single system and sysplex-aware systems)
  - ► Also: A new health check for zFS configuration files

- Simplified software deployment – clone z/OS and software in a sysplex (z/OSMF R13)
- Eliminate the need for WebSphere MQ for SDSF Sysplex environments.
- Automatic monitoring, takeover, and recovery to prevent CSM-constrained conditions
- NEW Easier to use XCF signaling protocol
- Updated volume information on all systems in the sysplex when DFSMSdss™ or DFSMShsm™ Fast Replication Backup and Recovery processing complete
- More responsive to VIPA changes
- Workload balancing of IPsec IKEv2 and IPv4.

* I/O performance improvements measured for fully shared zFS ranged from very small to 900%, with the majority of workload conditions tested falling between 50% and 150%. The actual amount of improvement will depend on the environment (monoplex or Parallel Sysplex) and the type of file processing being done.

z/OS Availability Enhancements
Parallel Sysplex updates for R12

- **Sysplex function**
  - ► z/OSMF Sysplex Status function provides a quick simple consolidated view of resources in a sysplex
  - ► Option for SFM to automatically partition systems with malfunctioning critical members to preserve sysplex availability
  - ► New health checks for Coupling facility structures and sysplex-aware zFS
  - ► Updated CFSIZER tool, support for larger CF structures

- **Sysplex distributor**
  - ► Sysplex Distributor Hot Standby capability
  - ► Sysplex Distributor self-healing capabilities with problem detection and recovery, event notification, and stack isolation
  - ► Trusted TCP connections:
    - Allows endpoints within a z/OS image, Sysplex, or Subplex to establish a trust relationship with no overhead and CPU-related costs of SSL/TLS with client authentication
    - Security information exchanged using secure XCF messaging

NEW suite of GDPS solutions

IBM GDPS active/active continuous availability family of solutions is the next generation of GDPS

IBM Geographically Dispersed Parallel Sysplex (GDPS)

| **GDPS/HyperSwap ™ Manager** Continuous availability of data within a data center | **GDPS/PPRC** Continuous availability or disaster recovery within a metropolitan region | **GDPS/GM GDPS/XRC** Disaster recovery at extended distances | **GDPS/MGM GDPS/MzGM** Continuous availability regionally and disaster recovery extended distance | **GDPS active/active** Near-continuous availability across unlimited distances |

GDPS/ A-A concept: two or more data centers running the same applications and data with cross-site workload balancing and replication

- z/OS workload monitoring, management, and distribution

- z/OS data and transaction replication

- GDPS automation

- First configuration is 'Active Standby'

IBM GDPS active/active continuous availability family of solutions

The next generation of GDPS.

- **Challenge**
  - ► Multi-site, global-distance solutions may take <u>up to an hour to recover</u> full application availability at the remote site.

- **What's New**
  - ► GDPS/ Active-Active solution, Active Standby configuration*
  - ► Designed to provide continuous availability for <u>two or more sites separated by global distances and achieve Recovery Time Objective of 1 minute or less</u>**
  - ► Statement of Direction for Active Query configuration***

- **Value**
  - ► Automated recovery of z/OS applications means recovery can be faster and without human error
  - ► A complete solution for continuous availability (consulting, design, implementation, and maintenance) means piece of mind for you
  - ► Continuous availability over global distance sites helps meet more stringent audit and legislative compliance requirements

* Active Standby is the first configuration available under the GDPS/Active-Active family of solutions. Additional IBM software prerequisites required
** Recovery Time Objective (RTO) is a definition of the amount of time it takes from the initial disaster declaration to having critical business processes available to users. Less than one hour RTO is based on use of IBM best practices and includes the time it takes to: IPL an LPAR, reconfigure disk, reconfigure coupling facility and CF structure, apply System z Capacity Back Up, as well as switching network connections.
***All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

z/OS R13 Performance for many key workloads

- **Between 50% and 150%* I/O performance improvement for any z/OS UNIX workload using shared zFS in a Parallel Sysplex.**
  - Applications that use zFS, such as z/OS UNIX System Services and WebSphere Application Server for z/OS, are expected to benefit

- **Between 15% and 55%* IEBCOPY performance improvement for traditional workloads**
  - Workloads copying PDS to PDS, copying PDS to sequential, or compressing a PDS are expected to benefit

- **Potential for shorter batch windows ***
  - New JCL FREEVOL=EOV parameter frees up a tape volume when the batch job is done with it.

- **Network throughput Enterprise Extender can be improved**
  - Using Inbound Workload Queuing (IWQ), available on OSA-Express3 and OSA-Express4S (July 12, 2011)

- **Foundation for extreme data handling and simplified storage management**
  - Potentially improved I/O performance without the need for application changes for QSAM-, BPAM-, and BSAM-based workloads by leveraging High Performance FICON™. Also, existing EAV functionality is enhanced with support for larger, 1 TB Extended Address Volumes (EAVs).** - IBM statements of direction

* Based on IBM Lab results, your results will vary.
I/O performance improvements measured for fully shared zFS ranged from very small to 900%, with the majority of workload conditions tested falling between 50% and 150%. The actual amount of improvement will depend on the environment (monoplex or Parallel Sysplex) and the type of file processing being done.
IEBCOPY improvement will depend on conditions such as: the amount of data being copied, block size, and type of IEBCOPY operation
Batch concurrency for multi volume tape datasets and will depend on the amount of data being processed
** All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

z/OS R12 - Performance for many key workloads

- **Up to 44% improvement for VSAM-based workloads (batch and online)***

- **Up to 30-50% improvement for z/OS XML System Services validating parsing***

- **Up to 50-90% for SVC dump capture time***

- **Shorter DB2 9 for z/OS restart time***

- **Up to 11% performance improvement for z/OS R12 XL C/C++ workloads***

- **Processing overhead for Application Transparent -- Transport Layer Security (AT-TLS) can be improved by 30%*.**

- **Network throughput for interactive workloads can be improved by 30-50%*** using the new Inbound Workload Queuing (IWQ) function, streaming and sysplex distributor traffic improved as well.

* Based on IBM Lab results, your results will vary.
  - ▶ VSAM performance improvement is through the use of VSAM CA Reclaim; actual benefit may be more or less and will depend on the degree of VSAM data fragmentation and how the data is accessed. It is anticipated that VSAM key sequenced data sets (KSDS) that are severely fragmented or rarely reorganized will see the most benefit. For applications that delete a large number of records from a narrow key range and then immediately re-insert them, CA Reclaim could result in some performance degradation.
  - ▶ z/OS XML System Services validation parsing performance will depend on the amount of data being parsed and the degree of complexity of the schema.
  - ▶ Actual SVC dump time will depend on amount of data being captured and the amount of that data dumped from auxiliary storage.
  - ▶ DB2 9 for z/OS startup time reduction is through z/OS Allocation, DFSMSdfp, and GRS improvements; actual benefit will depend on number of data sets opened. It is anticipated that address spaces opening up many thousands of data sets will see more benefit.
  - ▶ Performance improvements are based on internal IBM lab measurements, and the performance improvement of over 11% was observed using compute-intensive integer workload code generated by the z/OS R12 XL C/C++ compiler with high optimization when compared to code generated using the z/OS R11 XL C/C++ compiler, on a IBM zEnterprise 196 server. The AT-TLS CPU consumption results were obtained on System z10, model 2097-E64. Actual AT-TLS CPU consumption improvement will depend on the amount of data being transmitted and whether the workload is interactive or streaming. Throughput gain due to this improvement in CPU consumption is likely, but would vary depending on overall utilization of the z/OS image.
  - ▶ The interactive networking throughput measurements were obtained on System z10, model 2097-E64 with OSA Express 3 Inbound Workload Queuing function. Actual benefit will depend on amount of data being transferred, presence of bulk-data traffic in the mix, and whether communication is z/OS to z/OS, or z/OS to distributed system.

Enhancements in Security (R13)

- **IKEv2**
  - ► Initial support with z/OS R12 Communications Server. z/OS R13 adds Network Address Translation (NAT) traversal support for IKEv2 over IPv4.

- **System SSL, ECC**
  - ► z/OS R12 Communications Server added support for Elliptic Curve Cryptography (ECC), ECDSA (Elliptic Curve Digital Signature Algorithm).
  - ► z/OS R13 to extend System SSL ECC support for :
    - Creating ECC-style certificates in key database files or ICSF PKCS#11 tokens
    - Creating ECC-style certificates through the Certificate Management Services (CMS) API
    - Enabling ECC for TLS V1.0 and TLS V1.1 handshakes (RFC4492)
    - ECC certificate support with Crypto Express3 Coprocessor (on zEnterprise server)

- **ICSF support for additional HMAC algorithms**
  - ► Support for FIPS-198, support planned for SHA-1, SHA-224, SHA-256, SHA-384, and SHA-512

- **TN3270 and FTP support for password phrases**

- **Ported tools**
  - ► IBM Ported Tools for z/OS (5655-M23), a no-charge product, provides the sudo (su "do") open source tool that allows system administrators to delegate authority to users or groups while providing the RACF® (or equivalent) audit trail of the user and their commands. Already available on UNIX platforms, now available with z/OS UNIX System Services.

z/OS Security Server – RACF
Helping to address security and compliance** guidelines

Enhancements with z/OS R13

- **RACF**
  - RACF Remote Sharing Facility (RRSF) support for TCP/IP (in addition to SNA APPC)
  - Support for generating Elliptic Curve Cryptography (ECC) secure keys (using Crypto Express3 Cryptographic Coprocessors (CEX3C) available with zEnterprise servers)
- **Tivoli Directory Server for z/OS (LDAP)**
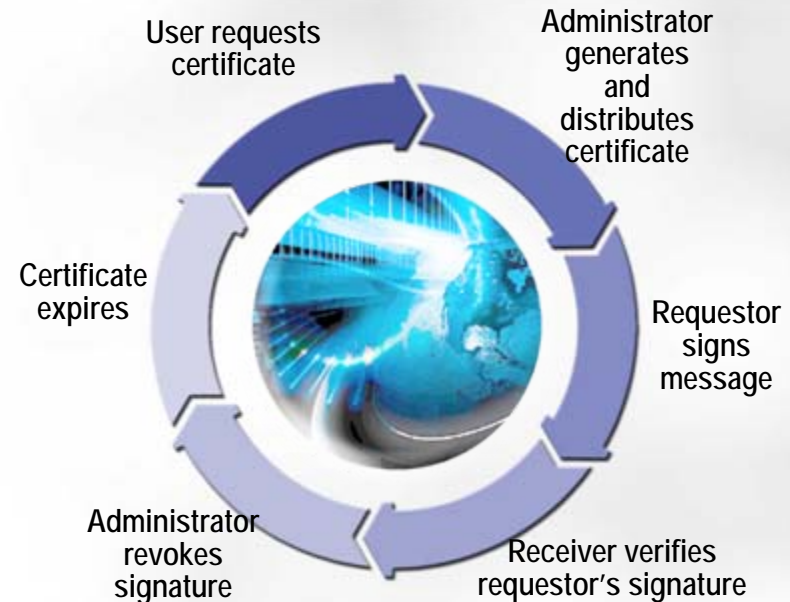 - Support for SHA-2 and salted SHA-2 hashing of user password attributes. Addresses:
    - Need for stronger hashing and cryptographic algorithms
    - Enhanced interoperability with distributed IBM TDS, openLDAP, and other LDAP servers.
    - The National Institute of Standards and Technology (NIST) policy for the use of hash functions.
  - Support for LDAP administrators to delegate LDAP administrative authority
    - Can improve LDAP administration flexibility, help improve auditability, and help improve security
  - Support for DB2 9 for z/OS (5635-DB2) backend for scalability of large LDAP deployments
  - Improved interoperability between z/OS applications and Microsoft Active Directory environments for Kerberos
  - Support for RFC 2696 and RFC 2891 for improved LDAP sorted search performance

** It is the customer's responsibility to identify, interpret, and comply with laws or regulatory requirements that affect its business. IBM does not represent that its products or services will ensure that the customer is in compliance with the law.

A Complete Digital Certificate Solution
z/OS PKI Services

- **If your organization spends more than $200,000 a year on digital certificates, then it may be worth it to invest in z/OS PKI Services to address your certificate needs**

- Provides full certificate life cycle management
  - ► Generate certificates for end users, network devices, browsers, and servers
  - ► Administration, approval, renewal, and revocation processes can be automated

- PKI Services, many updates over the years!
  - ► New key archival/recovery capabilities – provides a backup process for recovery of keys (R11)
  - ► Support for ECC keys (in addition to RSA and DSA), automation to find unused cert. serial numbers, support for Certification Management Protocol (CMP) for integration with existing Certificate Authority solutions (R12)
  - ► Support for DB2 V9 backend for large, resilient certificate environments. Support for ECC keys. Integration with Mozilla and Microsoft browsers (R13)

User requests certificate

Administrator generates and distributes certificate

Certificate expires

Requestor signs message

Administrator revokes signature

Receiver verifies requestor's signature

Example of feedback

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

System z Security Portal
Automatic notification of 'Security' and 'Integrity' PTFs

- **IBM has commitment to stringent z/OS system security and integrity**
  - ► Integrity Statement : http://www-03.ibm.com/systems/z/os/zos/features/racf/zos_integrity_statement.html

- **To help you to maintain rigorous z/OS system security and integrity standards :**
  - ► IBM recommends that you promptly install security and integrity PTFs, and that you …
  - ► … sign up for the System z Security Portal
    - Can help you stay more current by providing you with advanced automatic notification of **SECINT PTFs.**
    - Provides SMP/E HOLDDATA used to identify fixes before they are marked RSU (Recommended Service Upgrade)
    - Also provides associated Common Vulnerability Scoring System (CVSS) V2 ratings for new APARs*
    - Delivers information on security and integrity patches – well – more securely!
      - Must register – confidentiality is maintained
      - Avoids widespread communication of the specifics of the potential vulnerability - Because widespread specifics about a vulnerability could increase the likelihood that an attacker could successfully exploit it
  - ► Visit System z Security Portal site at http://www.vm.ibm.com/security/aparinfo.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 o 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.

z/OS and IPv6

- **<u>IPv4 address pool is exhausted</u>** February 3, 2011
  - ► http://www.ipv6news.info/2011/02/04/ipv4-address-pool-is-exhausted/
  - ► Now the IPv4 Internet only has the stock of IPv4 addresses held by the regional registrars and Internet Service Provides (ISPs) to keep it going.

- **<u>z/OS is IPv6 certified!</u>** (http://jitc.fhu.disa.mil/adv_ip/register/certs/ibmzosv11r_dec08.pdf)

- **z/OS Communications Server is adding function for IPv6 networks:**
  - ► **For z/OS R11**
  - ► Support RFC4941 and RFC5095; and the AES-based AES-XCBC-MAC-96 and AES-XCBC-PRF-128 algorithms - intended to meet new government IPv6 standards

  - ► **For z/OS R12**
  - ► Health checks for IPv4 and IPv6 routing
  - ► Support for DFSMSrmm, IKEv2, ability to Send DNS Queries over IPv6, support for security-related RFC3484 and RFC5014
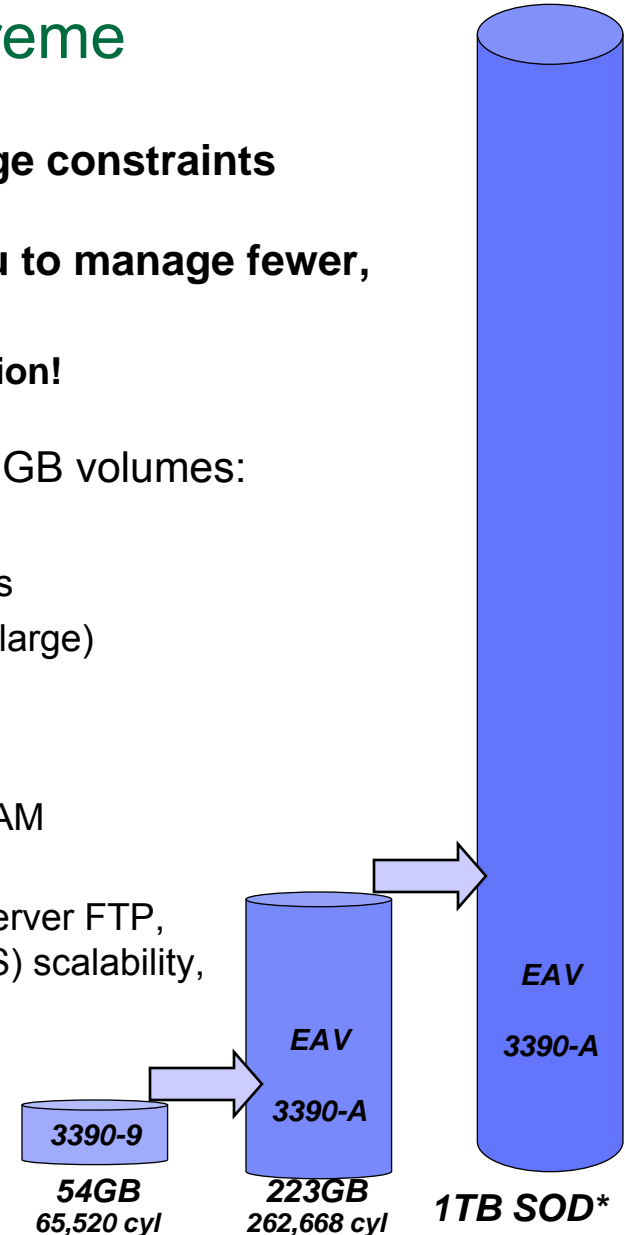
  - ► **For z/OS R13**
  - ► Support for IPv6 intrusion detection security equivalent to that provided for IPv4, integrated with the Configuration Assistant (in z/OSMF)
  - Support for IPv6 checksum and segmentation offload enhancements and for LPAR-to-LPAR checksum offload for both IPv4 and IPv6 packets available with OSA-Express4S QDIO (announced July 12 2011)
    - ● TCP/IP segmentation and checksum processing on OSA card and not on CP

Taking z/OS Storage Volumes to the Extreme

- **Extended Address Volumes (EAVs) help address storage constraints**

- **Can help simplify storage management by enabling you to manage fewer, larger volumes, as opposed to many small volumes**
  - ▶ **Also IDEAL for large datasets, may improve storage utilization!**

- DS8000® exploitation rolled out over time, starting with 223 GB volumes:
  - ▶ With z/OS R10, support for VSAM
  - ▶ With z/OS R11, support for extended format sequential data sets
  - ▶ With z/OS R12, support extended to sequential (both basic and large) data sets, partitioned (PDS/PDSE) data sets, catalogs (ICF now larger than 4 GB), BDAM data sets, JES spool and checkpoint data sets, standalone Dump extended format dump data sets, DFSMSrmm data sets, generation data groups (GDGs) and VSAM volume data sets (VVDSs).
  - ▶ With z/OS R13 - Support extended to z/OS Communications Server FTP, SDSF extended format print files, VSAM volume data set (VVDS) scalability, ISPF to display data sets eligible for EAV.
  - ▶ **SOD** - support for larger extended address volumes (EAVs), up to 1 TB per volume, on IBM System Storage® DS8700 and DS8800 series, with new DS8000 licensed machine code.*

EAV

3390-A

EAV

3390-A

3390-9

54GB
65,520 cyl

223GB
262,668 cyl

*1TB SOD**

*All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.

IBM statements of direction - July 12, 2011*
Synergies with IBM System Storage and zEnterprise Server

- **z/OS V1.13 and IBM System Storage DS8700 and DS8800 series (with new licensed machine code) planned to support 1TB EAVs.**
  - ► Helps relieve storage constraints and simplify storage management with the ability to manage fewer, larger volumes as opposed to many small volumes

- **z/OS V1.13 Workload Manager (WLM) and IBM System Storage DS8700 and DS8800 series (with new licensed machine code) planned to support improved I/O and workload prioritization within in the disk controller.**
  - ► Disk resource management from z/OS WLM. Working toward the goal of true end-to-end workload management

- **z/OS V1.13, zEnterprise System z High Performance FICON (zHPF), and IBM System Storage is planned to support certain QSAM, BPAM, and BSAM access methods.**
  - ► Potentially faster batch

- **z/OS V1.13, IBM System Storage DS8700 or DS8800, and GDPS V3.8, Hyperswap support is planned to be enhanced to improve recovery in Hyperswap-enabled configurations.**

- **z/OS V1.13 (and z/VM) and zEnterprise server are planned to integrate HiperSockets™ with the intraensemble data network (IEDN)**
  - ► Seamless exploitation of HiperSockets in multi tier zEnterprise workloads
  - ► High performance HiperSockets
  - ► Exploit zIIP-Assisted HiperSockets for Large Messages

IBM zEnterprise System

*A system of systems that unifies IT for predictable service delivery*

IBM zEnterprise™ 114

zEnterprise Unified Resource Manager

IBM zEnterprise BladeCenter® Extension (zBX)

- The next generation of mainframe technology, more performance, more scale, more efficient
- Designed for up to 1.2 times the z10 BC in total system capacity
- Connectivity improvements include bandwidth and throughput
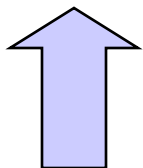
System zEnterprise z114 Functions and Features

Two hardware models (M05, M10)
Up to 5 CPs
Up to 26 subcapacity settings
Up to 10 processors per server configurable as supported combinations of CPs, zAAPs, zIIPs, IFLs, ICFs, or SAPs
Dedicated spares (on M10)
New 32 slot PCIe-based I/O drawer.
Concurrent I/O drawer add, remove, replace
Up to 128 CHPIDs
2 New OSA CHPIDs – OSX and OSM
Up to 72 coupling links/ server, 64 / LPAR
6.0 GB/sec InfiniBand I/O interconnect
Up to 32 HiperSockets
Optional High Voltage DC power
Optional overhead I/O cable exit
New and additional instructions
Out of order instruction execution
STP enhancements
Improved availability with Redundant Array of Independent Memory (RAIM)
Up to 248 GB of RAIM

Simplified cryptographic card and master key management (TKE V6 or V7)
CPACF enhanced protected key support (R10)
Elliptic Curve Cryptography (ECC) Digital Signatures (R10)
Improved HiperDispatch leverages new processor cache design (R10)
Memory power save (R10)
On Demand (with z/OS Capacity Provisioning) enhancements (R10)
CFCC Level 17 enhancements (R10)
zBX Model 002 with ISAOPT, POWER7, DataPower and IBM System x Blades (R10)
Platform Monitoring from HMC (R10)
Crypto Express3 new extensions for the banking and finance industry (ICSF web deliverable R11, and z/OS R11)
Enhanced instruction set (XL C/C++ R12)
OSA-Express-3 Inbound Workload Queuing (IWQ) (R12)
z/OS discovery and auto-configuration (zDAC) (R12)

▪**The minimum z/OS requirements:**

– R11, R12, R13 and higher

– R8, R9, R10 with Lifecycle Extension for z/OS

– zBX and Ensemble support with R10 and later

(z/OS toleration/exploitation in blue)

z/OS and the IBM zEnterprise System

Seamless integration, freedom of application and data system design, and ultimate in multi-tier, multi-architecture system management and quality of service

IBM zEnterprise 114

- z/OS leverages z114 technologies … with exploitation for:
  - ► CPACF enhanced protected key support (R10)
  - ► Elliptic Curve Cryptography (ECC) Digital Signatures (R10)
  - ► Memory power save (R10)
  - ► CFCC Level 17 enhanced (R10)
  - ► zBX Model 002 with ISAOPT, POWER7®, DataPower® and IBM System x Blades (R10)
  - ► HMC platform monitoring (R10)
  - ► Crypto Express3 new extensions for the banking and finance industry (ICSF web deliverable R11, and z/OS R11)
  - ► Enhanced instruction set (XL C/C++ R12)
  - ► OSA-Express-3 Inbound Workload Queuing (IWQ) (R12)
  - ► z/OS discovery and auto-configuration (zDAC) (R12)

zEnterprise Unified Resource Manager

- Cloud done right
  - ► Unifies monitoring and management of resources, extending IBM System z qualities of service across the infrastructure
  - ► z/OS integrates easily with Unified Resource Manager: New OSA CHPIDs, new z/OS Communication Server settings is all it takes to connect z/OS to zEnterprise ensemble.
  - ► z/OS can send high level WLM data to the HMC for display / monitoring with other virtual servers

IBM zEnterprise BladeCenter Extension (zBX)

- z/OS provides
  - ► Traditional strengths of availability, scalability and security of your data and core applications.

- zEnterprise System provides
  - ► Centralized provisioning, monitoring, management, and consistent quality of service for non-z/OS virtual servers

- Together …
  - ► Improved throughput for interactive workloads
  - ► Highly secure isolated data network
  - ► Insight for multi-tier workloads
  - ► Simplified infrastructure for multi-tier environments

Simplified FICON I/O configuration
NEW ! z/OS FICON discovery and auto-configuration (zDAC)

- **Automatic discovery and configuration for FICON disk and tape devices**
  - ► Helps reduce level of IT skill and time required to configure new devices
  - ► Uses intelligent analysis to help validate server and storage definitions are compatible with each other
  - ► Uses built-in best practices to help configure for high availability, helps avoid single points of failure

- **Transparent to existing configurations and settings**
  - ► Invoked through, integrated with z/OS Hardware Configuration Definition (HCD) and z/OS Hardware Configuration Manager (HCM)
  - ► Use with single systems or sysplexes
  - ► No z/OS migration actions required

▪**Requires**:
   –IBM zEnterprise 114 (or 196) server with FICON Express8 or FICON Express4
   –Switch/director attached fabric (no direct attachment)
   –z/OS V1.12 (at least 1 LPAR for Dynamic I/O capability)
   – Any IBM (or other vendor) FICON-attached System z controller that registers with the FICON name server (see your vendor for any required maintenance)
   –Suggested: FICON DCM (z/OS dynamic channel management) to help manage performance

IBM zEnterprise System

A system of systems that unifies IT for predictable service delivery

zEnterprise Unified Resource Manager

IBM zEnterprise 114

- Centralized management of heterogeneous resources for simplification and resiliency
- Unifies management of resources, xtending IBM System z® qualities of service across the infrastructure

IBM zEnterprise BladeCenter Extension (zBX)
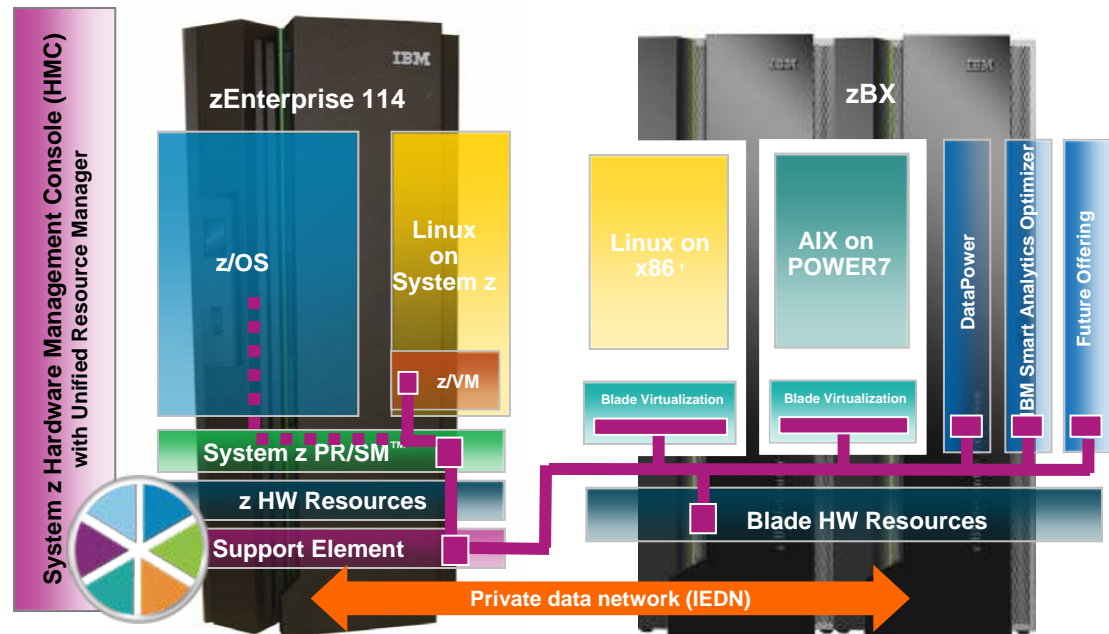
z/OS and the IBM zEnterprise Unified Resource Manager

- **z/OS connects with zEnterprise 114 and zEnterprise BladeCenter Extension seamlessly**

  z/OS needs ….

- New HCD (or HCM) definitions for the new networks
  - New OSA CHPIDs: OSM for management network and OSX for data network
  - IBM SOD* HiperSockets

- z/OS Communications Server configuration to enable z/OS to participate in a zEnterprise ensemble

  Additional z/OS function …

- New z/OS agent (Guest Platform Management Provider) can send high level z/OS WLM data to zEnterprise Unified Resource Manager

- z/OSMF Resource Monitoring can monitor z/OS and Linux workloads

- **Unified Resource Manager defines the ensemble, provisions the new management and data networks, and can manage virtual environment.**

- **IBM zEnterprise Unified Resource Manager:**
  - **-** can <u>manage</u> 'virtual servers' (z/VM and blade)
  - can <u>monitor</u> 'virtual server' workloads and z/OS workloads.

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IBM zEnterprise System
*A system of systems that unifies IT for predictable service delivery*

The world's fastest and most scalable system: **IBM zEnterprise 114**

zEnterprise Unified Resource Manager

IBM zEnterprise BladeCenter Extension (zBX)

- Select IBM POWER7 and System x blades.

- Comes with an hypervisor for a single management umbrella.

- Offers the possibility of running an application that spans z/OS, Linux on System z, AIX on POWER, or Linux on System x

- High performance optimizers and appliances to accelerate time to insight and reduce cost
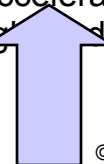
IBM zEnterprise System – targeting the systems that rely on z/OS

- **z/OS provides …**
  - ► High availability components, subsystems, sysplex
  - ► Disaster recovery with GDPS
  - ► z/OS workload and resource management
  - ► Image, server, storage scalability
  - ► User, resource, and network security and auditability
  - ► New simplification and productivity
  - ► DB2 synergies: scale, data sharing, data compression, WLM of DB2 bufferpools, XML, zIIP specialty engine.

- **zEnterprise System provides …**
  - ► …. centralized provisioning, monitoring, management, and consistent quality of service for non-z/OS virtual servers

- **Together…. co-locating new applications with z/OS**
  - ► Throughput for interactive workloads (as well as batch and FTP) with OSA-Express3 IWQ
  - ► Highly secure isolated data network
    - Option to secure with improved throughput for AT-TLS connections between zBX and z/OS
    - Option for secure transactions/ transfers with z196 hardware-based cryptography, ECC
  - ► Insight for multi-tier workloads –
    - New z/OS agent can send high level z/OS WLM data to the Unified Resource Monitor for end–to–end workload monitoring
    - Unified Resource Manager adds insight by linking zBX workloads with z/OS workloads
  - ► Simplified infrastructure for multi-tier workload

z/OS and server support

	z800/ z900	z890/ z990	z9 EC/BC	z10 EC/ BC	z196	z114	DS8000 DS6000®	TS1130	End of service	Lifecycle Extension for z/OS	Coexists with	Ship date
R7	X	X	X	X (1,2)	X(1)	NO	X(1)	X	9/2008	9/2010	R9	9/2005
R8	X	X	X	X	X	X(4)	X	X	9/2009	9/2011	R10	9/2006
R9	X	X	X	X	X	X(4)	X	X	9/2010	9/2012	R11	9/2007
R10	X	X	X	X	X(3)	X(3,4)	X	X	9/2011	9/2013	R12	9/2008
R11	X	X	X	X	X	X	X	X	9/2012*		R13	9/2009
R12	X	X	X	X	X	X	X	X	9/2013*		R14*	9/2010
R13	X	X	X	X	X	X	X	X	9/2014*		R15*	9/2011*
R14*	X	X	X	X	X	X	X	X	9/2015*		R16*	9/2012*

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(1) IBM Lifecycle Extension for z/OS V1.7 (5637-A01) was required for the z10 BC, z196, and disk storage
(2) IBM Lifecycle Extension for z/OS V1.7 (5637-A01) required for support for some z10 EC features
(3) z/OS V1.10 and later required for zBX and Ensemble management exploitation
(4) IBM Lifecycle Extension for z/OS V1.8 (5638-A01) and for z/OS V1.9 (5646-A01) required for z114.
    Lifecycle Extension for z/OS V1.10 (5656-A01) required starting October 2011.
(5) See IBM GTS services for additional fee-based extended service options

Out of service (5)

Lifecycle Extension withdrawal 2 years later

General support

z/OS – smarter operating system for a smarter planet

z/OS V1.13 - More value from your workloads with performance, programming, and operations improvements:

- Foundation for modern batch applications
  - Simplified batch application programming and potentially shortened batch windows, with new JES2 JCL improvements
  - New z/OS base component, z/OS Batch Runtime environment, designed to enable COBOL and Java interoperability for DB2*.
  - Leverage the strength of z/OS batch, a new web-based (REST) interface enables you to submit batch jobs and access batch data from non-z/OS systems**
- Improved performance for z/OS UNIX workloads and traditional workloads***
- Autonomics to give you earlier warning of issues before they can potentially disrupt business
- More options to secure your data with newer, faster, and more scalable encryption and security capabilities

z/OSMF V1.13 - Streamlined processes and built-in guidance address a broad scope of z/OS activities and helps create a more integrated z/OS experience:

- Clone z/OS images and deploy software more easily and consistently.
- Define new storage volumes quickly and easily
- More easily maintain highly secure connections, even in large complex networks
- Launch and work with multiple 'classic' ISPF interfaces from within z/OSMF, and ink and launch z/OSMF applications to other web-based applications
- Leverage System z Specialty engines

* Prerequisites: IBM 31-bit SDK for z/OS, Java Technology Edition Version 6.0.1 (5655-R31), DB2 V9.1 for z/OS (5635-DB2) or later with PTFs, IBM Enterprise COBOL for z/OS V4.1 (5655-S71) or later
** Prerequisite: RESTful API included in z/OSMF V1.13.
*** Based on IBM Lab results, your results will vary.
    I/O performance improvements measured for fully shared zFS ranged from very small to 900%, with the majority of workload conditions tested falling between 50% and 150%. The actual amount of improvement will depend on the environment (monoplex or Parallel Sysplex) and the type of file processing being done. IEBCOPY improvement will depend on conditions such as: the amount of data being copied, block size, and type of IEBCOPY operation

Thank you

z/OS and z/OSMF R13
a collection of summary charts
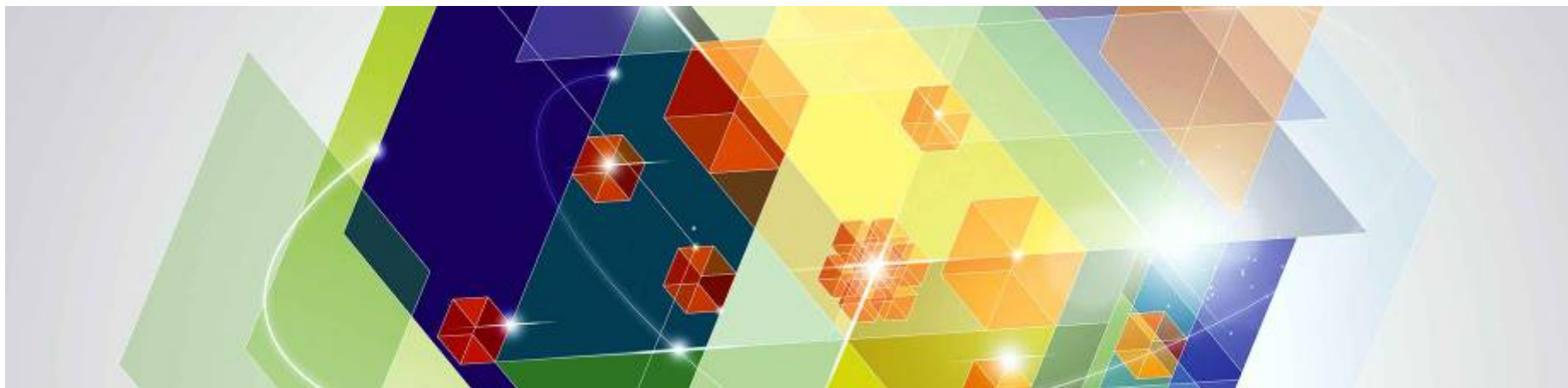
z/OS – smarter operating system for a smarter planet

z/OS V1.13 – Performance, programming, and operations improvements help you to gain more value from your workloads.

http://www.ibm.com/systems/z/os/zos/

z/OSMF V1.13 - Streamlined processes and built-in guidance address a broad scope of z/OS activities and helps create a more integrated z/OS experience and improved productivity

http://www-03.ibm.com/systems/z/os/zos/zosmf/

z/OS – smarter operating system for a smarter planet

Improved performance, programming, and operations provide more value from your workloads.
Enhancements in z/OS and z/OS Management Facility Version 1 Release 13 help provide:

- Advantages for your organization. Autonomics and smart operations proactively avoid errors, reduce risk from outages, speed software deployment, simplify z/OS management, and make your organization more productive.

- Advantages to your business. Foundation for modern batch capability, industry leading security, resiliency, and data handling capability enables you to access and transform business data to business value more readily.

- Advantages to your operations. Improved performance and new technologies for Web-based and traditional workloads improves integration of core data in your enterprise and opens new opportunity for applications with affinity to z data.

z/OS R13 – smarter operating system for a smarter planet

More value from your workloads with programming, performance, and operations improvements. Enhancements for release 13:

▪**Foundation for modern batch applications**
- A new z/OS base component, z/OS Batch Runtime environment, provides the framework for Java-to-COBOL interoperability, for transactional updates to DB2, and for sharing database connections between Java and COBOL. *
- Simplified batch application programming and potentially shortened batch windows, with new JES2 JCL improvements, giving you more control of your batch applications.
- Leverage the strength of z/OS batch, a new web-based (REST) interface enables you to submit batch jobs and access batch data from non-z/OS systems**

▪**Improved performance for new and traditional workloads***:**
- Between 50% and 150%* I/O performance improvement for workloads using shared zFS in a Parallel Sysplex.
- Up to 15% to 55%* IEBCOPY performance improvement for traditional workloads
- Potentially shorter batch windows using JES2 JCL improvements to free tape volumes more quickly

▪**Availability enhancements:**
- Improve spool volume management by using new JES2 spool migration function and JES3 dynamic spool add capability
- Improved channel recovery - track errors and automatically remove failing paths (on a controller level) faster
- zFS internal restart - automatically recover disabled aggregates in Sysplex aware mode – avoiding lengthy manual system recovery process.
- Avoid planned outages - Concurrent service for DADSM and CVAF

* Prerequisites: IBM 31-bit SDK for z/OS, Java Technology Edition Version 6.0.1 (5655-R31), DB2 V9.1 for z/OS (5635-DB2) or later with PTFs, IBM Enterprise COBOL for z/OS V4.1 (5655-S71) or later
** Prerequisite: RESTful API included in z/OSMF V1.13.
*** Based on IBM Lab results, your results will vary.
 I/O performance improvements measured for fully shared zFS ranged from very small to 900%, with the majority of workload conditions tested falling between 50% and 150%. The actual amount of improvement will depend on the environment (monoplex or Parallel Sysplex) and the type of file processing being done.
 IEBCOPY improvement will depend on conditions such as: the amount of data being copied, block size, and type of IEBCOPY operation

z/OS Management Facility – the new face of z/OS

Streamlined processes and built-in guidance address a broad scope of activities and helps create a more integrated z/OS experience.

- **Configuration**
  - Configuration Assistant for z/OS Communication Server (R11) – Simplified configuration and setup of TCP/IP policy-based networking functions
- **Performance**
  - Capacity Provisioning (R13) - simplified monitoring of CP status for domains
  - Resource Monitoring and System Status (R12) – single view of sysplex and Linux® performance status and dynamic real time resource metrics.
  - Workload Management – creation, editing, and activation of WLM policies (R12)
- **Problem Determination**
  - Incident Log (R11) – Simplified capture, packaging, sending of SVC dump diagnostic data
- **Software**
  - Deployment (R13) - Clone z/OS images, deploy software more easily and consistently
- **Storage**
  - DASD Management (R13) - Define new SMS storage volumes quickly and easily
- **z/OS Classic Interface**
  - ISPF Task integrates existing ISPF into z/OSMF to launch to ISPF functions directly (R13)
- **Base**
  - A new web-based (REST) interface enables you to submit batch jobs and access batch data from non-z/OS systems (R13)
  - Leverage System z Specialty engines
  - IBM Assistance available to help with pre-planning, early discovery, and readiness review for new z/OSMF environment(s).

z/OS and the IBM zEnterprise System

Seamless integration, freedom of application and data system design, and ultimate in multi-tier, multi-architecture system management and quality of service

IBM zEnterprise 114

- z/OS leverages z114 technologies … with exploitation for:
    - ► CPACF enhanced protected key support (R10)
    - ► Elliptic Curve Cryptography (ECC) Digital Signatures (R10)
    - ► Memory power save (R10)
    - ► CFCC Level 17 enhanced (R10)
    - ► zBX Model 002 with ISAOPT, POWER7, DataPower and IBM System x Blades (R10)
    - ► HMC platform monitoring (R10)
    - ► Crypto Express3 new extensions for the banking and finance industry (ICSF web deliverable R11, and z/OS R11)
    - ► Enhanced instruction set (XL C/C++ R12)
    - ► OSA-Express-3 Inbound Workload Queuing (IWQ) (R12)
    - ► z/OS discovery and auto-configuration (zDAC) (R12)

zEnterprise Unified Resource Manager

- Cloud done right
    - ► Unifies monitoring and management of resources, extending IBM System z qualities of service across the infrastructure
    - ► z/OS integrates easily with Unified Resource Manager: New OSA CHPIDs, new z/OS Communication Server settings is all it takes to connect z/OS to zEnterprise ensemble.
    - ► z/OS can send high level WLM data to the HMC for display / monitoring with other virtual servers

IBM zEnterprise BladeCenter Extension (zBX)

- z/OS provides
    - ► traditional strengths of availability, scalability and security of your data and core applications.
- zEnterprise System provides
    - ► centralized provisioning, monitoring, management, and consistent quality of service for non-z/OS virtual servers
- Together …
    - ► Improved throughput for interactive workloads
    - ► Highly secure isolated data network
    - ► Insight for multi-tier workloads
    - ► Simplified infrastructure for multi-tier environments

Backup

z/OS R12 – smarter operating system for a smarter planet

More value from your workloads with availability, performance, and integration with zEnterprise. Enhancements for release 12:

- **Availability enhancements:**
  - VSAM Control Area (CA) Reclaim – avoid planned outages from VSAM data re-organizations
  - z/OS Run Time Diagnostics – real time diagnostics help pinpoint source of soft failures
  - GRS can tell XCF to automatically partition itself out and preserve sysplex availability
  - Timed Auto Reply – Option for z/OS to automatically respond to its own messages

- **Performance for many key workloads:**
  - Up to 44% improvement for VSAM-based workloads (batch and online)*
  - Up to 30-50% improvement for z/OS XML System Services validating parsing*
  - Up to 50-90% improvement for SVC dump capture time*
  - Shorter DB2 9 for z/OS restart time*
  - Up to 11% performance improvement for z/OS V1.12 XL C/C++ workloads*
  - Processing overhead for Application Transparent -- Transport Layer Security (AT-TLS) improved by up to 30%*.
  - Network throughput for interactive workloads can be improved by 30-50%* using the new Inbound Workload Queuing (IWQ) function, which is exclusive to OSA-Express3 on IBM zEnterprise 196 (z196) and IBM System z10® servers.

- **Integrates with and leverages capabilities of the zEnterprise servers**

* IBM Lab results, actual results with vary depending on amount of data and other workload conditions.

z/OS on DVD

- **z/OS and related software (such as ServerPac®, CBPDO, SystemPac®, ProductPac®) are available on DVD media.**

  ► z/OS (such as ServerPac or CBPDO) is no longer available on 3480, 3480 Compressed (3480C), and 3490E tape media.

- **Your choice for z/OS delivery media is now:**

  ► **Over the Internet**.

  ► Internet delivery is the most popular delivery option, see:

  http://www-03.ibm.com/systems/z/os/zos/serverpac_internet_delivery.html

  ► **IBM 3590 and 3592 Enterprise Tape**

  ► Our highest-density media means there are much fewer tapes to manage!

  ► **DVD**

  ► Requires a workstation with a DVD drive that can read discs in DVD-5 (single-sided, single layer) format and a network connection to your z/OS system

   • z/OS Customized Offering Driver (COD) is also available on DVD, but requires the DVD drive in and installation from the HMC.

Resource Optimization (R13)

- **DFSMShsm – improved space management and reduced CPU overhead with improved automigraiton capability.**

- **Object Access Method (OAM) component of DFSMSdfp enhanced**
  - ► OAM adds support for zFS and NFS
  - ► Improved move, copy, and backup commands

- **RMF metrics added for**
  - ► GRS enqueue and GRS latch contention
  - ► WLM response time distribution information

- **Infoprint Server adds support for:**
  - ► A secondary JES2 subsystem (as overflow for primary JES2)
  - ► PrintWay® Extended Mode and Infoprint® Central enhancements – granularity and control over you print jobs.

Application Integration (R13)

- **z/OS Batch Runtime environment – new Java/COBOL/DB2 interoperability**

- **NEW Easier to use XCF signaling protocol**

- **IBM Tivoli® Directory Server (LDAP) updates**

- **Better Binder support for unnamed sections - easier to maintain load modules and program objects in place while avoiding unnecessary growth and virtual storage use due to an accumulation of unnamed sections**

- **C/C++ Updates**
  - ► Enhancements to METAL C
  - ► Exploitation of new ARCH(9) instructions on zEnterprise
  - ► Additional source and binary compatibility with standards

- **DFSORT updates – Many new functions!**

- **UNIX System Services updates – many new updates**

- **z/OS XML System Services – support for a binary XML format, Extensible Dynamic Binary XML (XDBX) and is expected to provide performance improvements for validating parsing operations**

- **z/OS Unicode Services implement improved bidirectional character support for applications that process scripts such as those for the Arabic and Hebrew languages**

- **Language Environment® smart recovery for C/C++ - more predictable C/C++ environment when I/O errors occur.**

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