



# z/OS 1.8 Update

Nordic  
Large Systems Update Seminar  
November 2006

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## Agenda

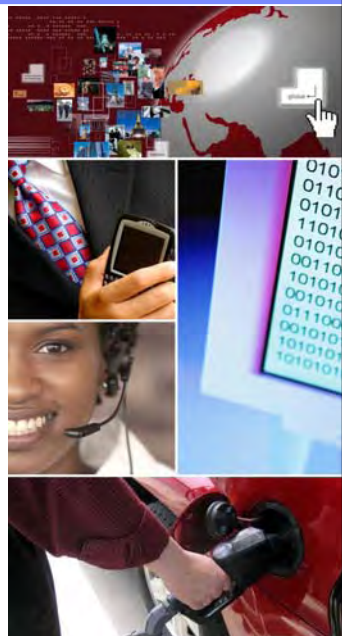
- z/OS strategy / values
- z/OS 1.8
  - Scalability and Performance
  - Availability
  - Optimization and Management
  - Security
  - Enterprise-wide roles
  - Networking
  - New applications and standards
  - Usability and Skills
  - Bit bucket





## A Different Era for Business

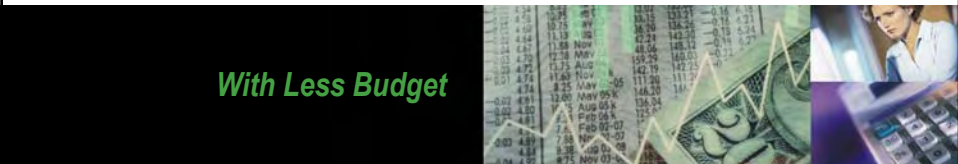
- People, organizations and economies are connected and highly interdependent
- National security / personal privacy
- New Regulatory Environment
- Pressure for revenue and profit growth



## The problem: How can I achieve more with less?



- More responsive to business needs
- More Apps
- More Data
- More security
- More availability



## If you were starting from Scratch . . . *What to require in an on-demand, 24x7, always-on world?*

- Nearly unlimited scalability
- Economies of scale
- Highly automated
- Comprehensive security



## It's Time to Re-THINK the Role of the Mainframe

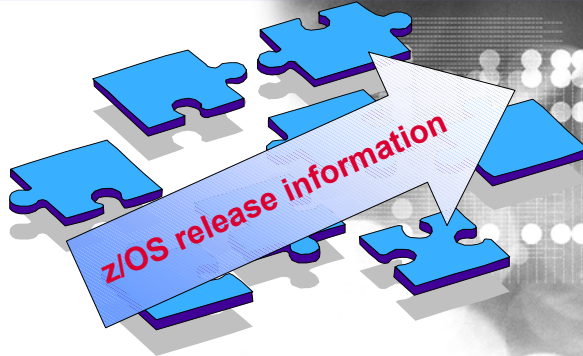
- Leadership in a new era of business and technology
  - Workload Management
  - Business Resilience
  - Security
  - Data Hub & SOA
  
- New markets
  - Russia, India, China
  
- New uses
  - Enabled by new SW



## 4 Enterprise-wide Roles of the Mainframe *extending qualities of service to your enterprise*

- **Enterprise** business resilience manager
- **Enterprise** security manager
- **Enterprise** workload manager
- **Enterprise** hub for data & SOA



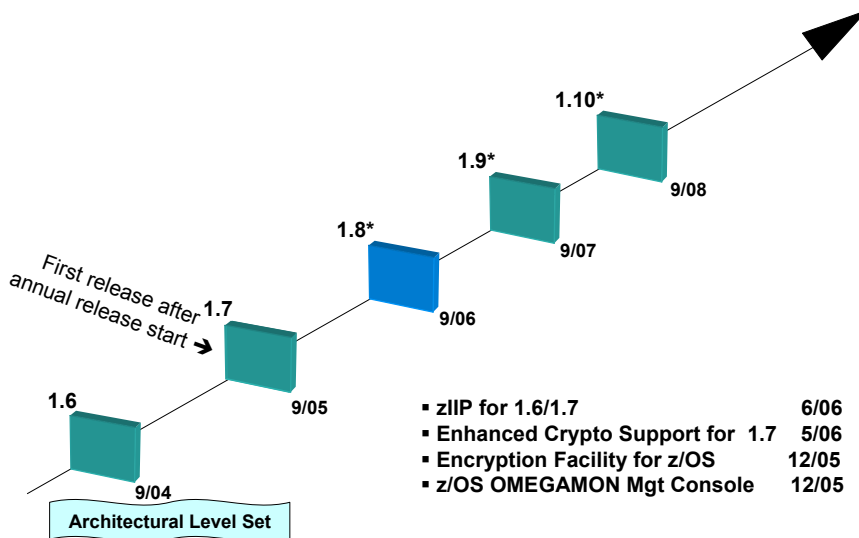


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## z/OS Release Roadmap



\* All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

## z/OS Support Summary Dates

	G5/G6 Multiprise <sup>®</sup> 3000	z800	z890	z900	z990	z9-109	DS8000 DS6000	End of Service	Coexists with z/OS...	Planned Ship Date
<b>z/OS 1.1</b>	x	x		x				3/04	1.4	
<b>1.2</b>	x	x	x <sup>c</sup>	x	x <sup>c</sup>			10/04	1.5	
<b>1.3</b>	x	x	x <sup>c</sup>	x	x <sup>c</sup>			3/05	1.6	
<b>1.4</b>	x	x	x <sup>1</sup>	x	x <sup>1</sup>	x <sup>1</sup>	x	3/07	1.7	
<b>1.5</b>	x	x	x	x	x	x	x	3/07	1.8	
<b>1.6</b>		x	x	x	x	x	x	9/07	1.8	
<b>1.7</b>		x	x	x	x	x	x	9/08*	1.9*	9/05*
<b>1.8*</b>		x	x	x	x	x	x	9/09*	1.10*	9/06*
<b>1.9*</b>		x	x	x	x	x	x	9/10*	1.11*	9/07*

\* z/OS 1.5, z/OS 1.6 and z/OS 1.7 coexistence with z/OS 1.8

\* z/OS 1.7 is planned to coexist with z/OS 1.9

x<sup>c</sup> - Compatibility support only

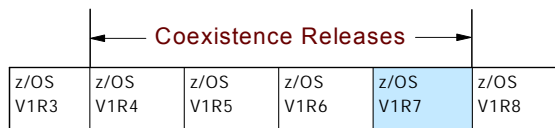
x<sup>1</sup> - z990 compatibility or exploitation feature required

There is no IBM Bimodal Accommodation Offering available for z/OS 1.5 or higher releases.

## z/OS migrating to 1.8

For z/OS V1R8, the z/OS Migration book (**GA22-7499**) is expanded to cover three migration scenarios:

1. z/OS V1R7 to z/OS V1R8
2. z/OS V1R6 to z/OS V1R8
3. z/OS V1R5 to z/OS V1R8 (which is the entire book)



## z/OS migrating to 1.8...

- z/OS 1.8 *Migration* Book available now on z/OS 1.8 bookshelf:
  - [http://publibz.boulder.ibm.com/cgi-bin/bookmgr\\_OS390/Shelves/EZ2Z010H](http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/Shelves/EZ2Z010H)
- Remember--z/OS 1.8 requires an IBM System z server:
  - IBM System z9 EC (z9 EC)
  - IBM eServer zSeries 990 (z990)
  - zSeries 900 (z900)
  - System z9 BC
  - zSeries 890 (z890)
  - zSeries 800 (z800)
- Simplify migration, ordering, and maintenance:
  - ServerPac electronic delivery available since January 2005
  - SMP/E Internet Service Retrieval available since September 2005
  - SystemPac electronic delivery available since October 2005
  - ShopzSeries enhancements made in January 2006



Check out [www.ibm.com/zseries/zos/migration](http://www.ibm.com/zseries/zos/migration) for more details.

## z/OS 1.8

### Helping meet challenges of on demand business

#### Improving Usability and Skills

More Health Checks and framework improvements, HCM, ISPF, InfoPrint Central, & RRS improvements, Extensions to the IBM Configuration Assistant for z/OS Comm Server, EE usability improvements, ...

#### Integrating new Applications and Supporting Industry and Open Standards

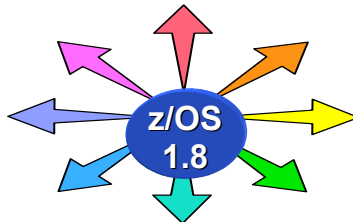
Unicode improvements; initlab support; LE improvements, new LDAP server, z/OS XML System Services, BPXBATCH, CIM, XPLINK, Networking APIs, XL C/C++ enhancements, ...

#### Extending the Network

Sysplex partitioning support, Dynamic DNS registration, JES3 NJE via TCP/IP, TN3270 and telnet improvements, IP filtering, IKE, IPSec, WTS, Samba, improved sysplex failure recovery, REXX FTP interface, ...

#### Scalability & Performance

Support for up to 4 TB memory, New zIIP processor, CFRM performance improvements, GRS ENQ limits, Parallel VARY ONLINE, z/OS UNIX file descriptors, Device Groups, DADSM/CVAF Rapid Index Rebuild, z/OS USS asynch socket fast path, 64-bit PDSE support ...



#### Enterprise-Wide Roles

WLM/EWLM Service Class Correlation, zAAP Reporting for eWLM, DFSMSrmm CIM agent, RMFServer OS Monitoring Stage II, WLM delay services mapped to ARM ...

#### Improving Availability

Master console elimination, Logstream rename, test and production logstream separation, Recoverable BRLM, GDPS enhanced recovery, Fast replication, HyperSwap trigger, z/OS UNIX latch contention detection...

#### Optimization and Management

WLM, zAAP Stage 2, Sysplex Distributor, Tape I/O priority, JES2 balancing of WLM-managed initiators, GRS CNS processing, Improved OAM BLOB support, SCLM improvements, Group Capacity Limit ...

#### Enhancing Security

PKI extensions, Distributed Identity Support, RACF password phrase support, Tape data set protection, 128-bit AES for IPSec, SAF identity tokens, RACF virtual key rings, IDS configuration, ...



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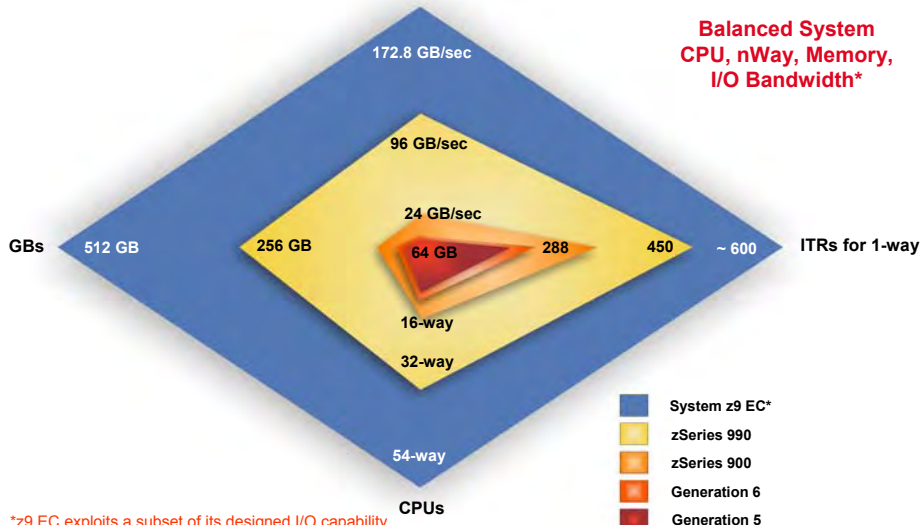
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## IBM System z: Balanced System Design

### z/OS designed to support faster CPUs, more memory and bandwidth

System I/O Bandwidth



\*z9 EC exploits a subset of its designed I/O capability



## z/OS Scalability

*more: memory, GRS ENQs, GRS VSCR, faster UNIX*

- Support for more real memory
  - **New z/OS limit will be 4 TB; old limit was 128 GB**
  - Up to 512 GB supported on z9 EC, up to 256 GB on z990
- GRS support for more concurrent ENQs
  - Default limits unchanged: Unauthorized ENQ default limit remains 4096; authorized default ENQ limit is 250,000; can specify higher maximums than the defaults
  - **New maximum is 2G**
  - New ISGADMIN authorized interface, T GRS command, and GRSCNFxx parmlib support for setting higher maximums
- GRS 31-bit constraint relief
  - **Move star-mode global QCBs and QCBS control blocks above the bar**
  - **Better compaction for remaining QCBs**
- z/OS UNIX asynch socket read/write now designed to use fast-path processing
  - **Improve performance for applications that use asynchronous I/O or that run in SRB mode.**



## z/OS Scalability

*more performance: CFRM, VARY processing, LE*

- CFRM performance enhancements Stage 2
  - Designed to allow more systems, structures, and connectors to be added without availability impacts
- Parallel VARY ONLINE processing:
  - Reduce duration of VARY commands for large numbers of devices, reduced serialization contention
  - Complements parallel VARY OFFLINE processing, in z/OS 1.7
- Language Environment support for sequential data sets larger than 64K tracks and for VSAM extended addressability data sets
  - QSAM support in Language Environment for C/C++ programs (using noseek)
  - Support for ESDS, KSDS, RRS extended format data sets with extended addressability



## CFRM Performance Enhancement

### Background

- Coupling Facility Resource Management (CFRM) manages Coupling Facility resources and is critical to the operation of a high-availability parallel sysplex environment.
- **The CFRM couple data set (CDS) is the centralized “control point” used by CFRM to manage Coupling Facilities (CF) and CF Structures.**
- High availability in a Parallel Sysplex is achieved by enabling surviving systems to recover rapidly for a failed system within the sysplex and allowing CF structures that fail to be quickly rebuilt or recovered via duplexing failover.
- **Poor CFRM performance can adversely impact the availability of CF data and thus the availability of products and subsystem using the structures.**
- Surviving systems participate in cleanup of the failed connection which requires **“one system at a time”** to access the CFRM CDS. Recovery time is applicable to structure rebuild/duplexing failover times, and to removal of a failed system from a sysplex.

## CFRM Performance Enhancement

### Stage 0 and 1 - z/OS 1.4



- Recovery actions (CEC failure, CF failure, Structure rebuild) may result in large records requiring large I/O bandwidth
  - originally: 64 structures with 32 connectors
  - currently: 1024 structures with 255 connectors
    - >120X increase
- Up to 30% CFRM CDS I/O performance improvement
- **Reduced possibility of I/O bottleneck on CFRM CDS**
- Improved Parallel Sysplex availability
- CFRM performance enhancements Stage 0 delivered in the service stream added support for **optimized sysplex failure cleanup processing** for CF Structures.

## CFRM Performance Enhancement

### Stage 2 – z/OS 1.8

- **Improve Parallel Sysplex Availability by reducing the elapsed time for key Sysplex recovery events such as:**
  - ➔ CF structure rebuilds
  - ➔ CF Duplexing failover and establishing/re-establishing CF Duplexing
  - ➔ Connecting to/disconnecting from a CF structure
  - ➔ Sysplex partitioning cleanup for CF structures
- **Focus on significantly reducing CDS I/O**
  - Processing to manage the coordination of CF Structure rebuild/duplexing failover and system recovery use a XCF **message-based protocol** to reduce serialized access to the CFRM CDS.
  - The message-based protocol defines a single system as manager and all other systems as participants.
  - The manager system is responsible for coordinating the processes involved with the participating systems and updating the CFRM CDS when needed.
  - The manager system does the I/O to the CFRM CDS which greatly reduces the number and frequency of serialized access.

## CFRM Performance Enhancement

### Installation and Migration

- A new version of CFRM CDS required for systems to enable message-based processing.
- A CDS formatted to enable message-based processing also enables all functions supported by lower level versions of the CDS.
- All systems in sysplex must be z/OS 1.8 or higher.
- Systems that do not support message-based processing will not be able to join a sysplex that is using a CDS that was formatted for message-based processing.
- A CDS formatted for message-based processing cannot be brought into use by a sysplex while there are 1 or more down-level systems (z/OS 1.7 or lower) in the sysplex.
- SA22-7625 – z/OS V1R8 MVS Setting up a Sysplex

## z/OS Scalability

*more: UNIX file descriptors, device groups, PDSE VTOC rebuild performance*

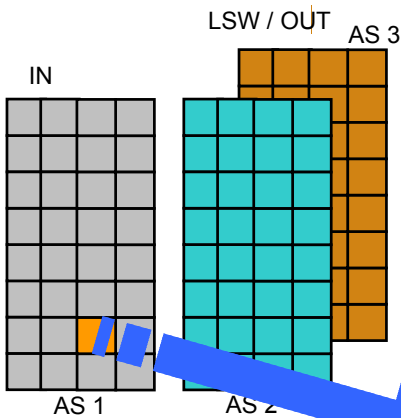
- z/OS UNIX limit on file descriptors per process increased from **128K** to **512K**
  - MAXFILEPROC limit now 512K in BPXPRMxx and SET OMVS command
  - Can restrict individual users by setting FILEPROCMAX in the OMVS segment
  - Mostly a TN3270 CICS issue, raised from 64K in 1.6, **better performance**
- Support for more than **32K** device groups
  - DGs consumed by tape devices (1 per dev) and DASD esoteric names (1 per dev. range per esoteric name).
  - You can reach this limit with fewer than the 64K maximum number of devices
  - APAR OA02983 increased limit to **64K** devices in 03
  - The new limit will be **4G**
  - Note: check your system by looking at the number of entries in the Group Pointer Table using the IPCS LISTEDT command.
- DADSM/CVAF Rapid VTOC Index Rebuild
  - Designed to help speed VTOC conversions from non-indexed to indexed
- 64-bit exploitation by PDSE
  - SMSPDSE and SMSPDSE1 will use storage above the bar for control blocks
  - New SMS initialization parameter to specify amount of storage to use above bar
  - Relieves the prior limitation of about a million open PDSE members
  - Option to retain directory and member cache for closed data sets and SMF14/15 cache statistics

## z/OS 1.8 RSM/SRM Support for Large Real storage

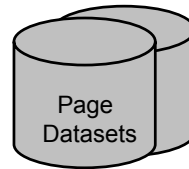
- Support up to 4 Terabytes of real storage
- Page Replacement and UIC enhancements
  - The CPU cost of the current function continues to grow as we move to systems with more and more real storage while its effectiveness is diminishing. This algorithm was changed to perform more efficiently in large real systems.
- Physical Swap Processing
  - Physical Swaps to Auxiliary storage eliminated
- Pageable Storage Shortages
  - **Used to be resolved by physical swaps**
  - **Often RSM spin loops during swap-in**
  - They are now resolved by **frame exchanges**

## Page Replacement

*prior to z/OS 1.8*

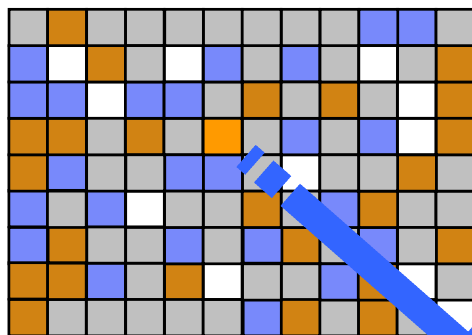


- Today's LRU algorithm
  - Implemented by keeping an Unreferenced Interval Count (UIC)
  - Available Frame Queue (AVQ) Low/OK thresholds
- UIC update process runs periodically to update the UIC of each in-use frame
- Stealing starts when we go below AVQ Low and continues until AVQ OK is reached
- Stealing happens on an AS basis
  - Oldest frames are stolen first

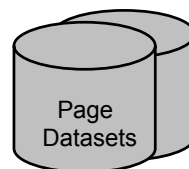


## Page Replacement

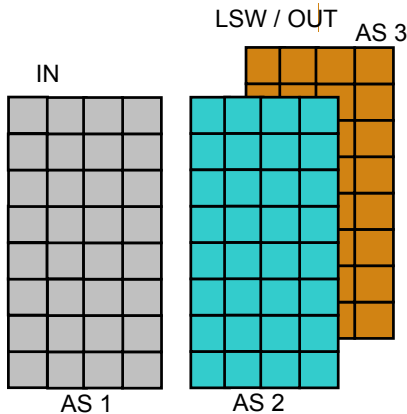
*z/OS 1.8 and beyond*



- Why Change?
  - Disruption of the UIC update process is intolerable as the amount of real storage allocated to ASs increases
- Enhanced page replacement algorithm:
  - **Runs when the AFQ needs to be replenished**
  - **Stealing happens on a global basis**



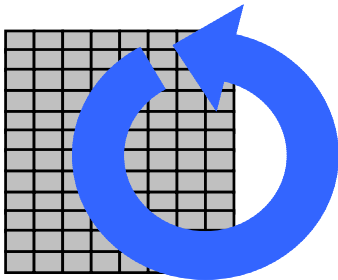
## UIC Calculation

*prior to z/OS 1.8*

- UIC Update process scheduled every 10 secs.
- Process analyzes **every pageable frame** from each AS on the Swapped-IN queue
- The analyzed frames are counted, then distributed into age buckets.
- The oldest frame in an AS represents the **AS High UIC**
- The highest AS UIC represents the **Highest System UIC** (MCVSTCRI)

While stealing happens on a demand basis, UIC update still needs to run and consume **considerable CPU** while **holding AS locks**, even in environments where the system is not paging. While UIC update is running for a particular AS, RSM can not perform any other functions for that AS (such as service page faults) due to UIC is holding locks.

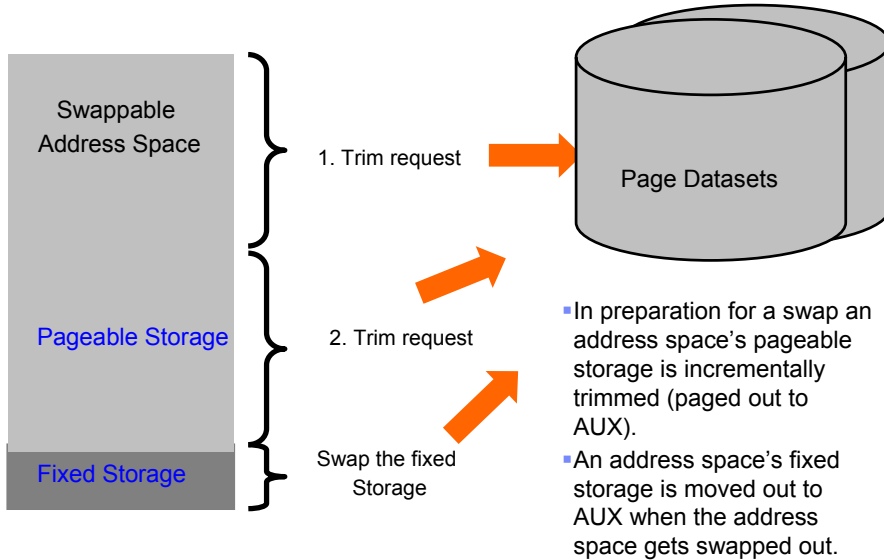
## UIC Calculation

*z/OS 1.8 and beyond*

- Page replacement algorithm enhanced to efficiently process large amounts of RS.
- z/OS 1.8 defines the UIC as a single walk through the whole storage in seconds.
- As a result the UIC values you might see in an RMF report will vary from 0–65535 (18 hours), in the past the UIC value range was 0-2540.
  - The higher the UIC value the less contention for storage in the system
  - A very low UIC indicates that the system is storage constrained.

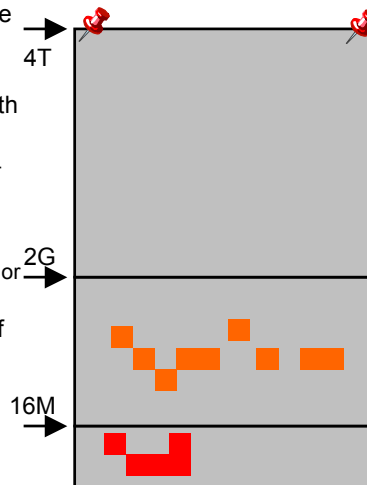
- 3 UICs displayed by performance monitors:
  - Current UIC (calculated every 1 sec)
  - Minimum UIC (last walk through)
  - Maximum UIC (last walk through)

## Physical Swap - pre z/OS 1.8



## Pageable Storage Shortages – z/OS 1.8 ...

- Pre-z/OS 1.8 pageable storage shortages were resolved via physical swaps.
- In z/OS 1.8 an "In-Real Swap" occurs where frames in the shortage area are exchanged with other frames:
  - For a pageable storage shortage between 16M-2G frames will be exchanged with frames above 2G.
  - For pageable storage shortages below 16M frames will be exchanged with frames above 2G or above 16M.
- Message IRA404I lists the five largest users of fixed frames in the shortage area





## New Message to Indicate High AUX Usage

### ▪IRA205I 50% AUXILIARY STORAGE ALLOCATED

The message is issued when more than 50% of the Auxiliary storage slots are in use.

- This allows an automation product to add additional page datasets before a critical shortage occurs
- The message is repeated every 2 hours as long as the Auxiliary slot usage is above 50%
- You should add more page data sets to your system already when utilization exceeds 30%,
  - the slot allocation algorithms become less efficient, and may degrade I/O performance.

## OA14409 IEAOPT MCCAFC TH Enhancement

- MCCAFC TH (lowvalue, okvalue) Available on z/OS R6 and above
  - Specifies the LOW and OK threshold values for central storage.
    - The low value indicates the number of frames on the available frame queue when stealing begins.
    - The okvalue indicates the number of frames on the available frame queue when stealing ends.
    - SRM will automatically adjust the actual threshold values based on measurements of central storage usage
  - The **Initial** lowvalue and okvalue are calculated by the following formula:
    - $RCEAFCLO = \text{MAX}(\text{OPT Parameter (lowvalue)}, 400, 0.2\% \text{ of the pageable storage})$
    - $RCEAFCOK = \text{MAX}(\text{OPT Parameter (okvalue)}, 600, 0.4\% \text{ of the pageable storage})$
    - But capped to 35/70k, respectively
  - The formulas above will enforce the value, if the OPT parameter has specified a smaller value
- RCEAFCLO will vary between Initial Value and 70K frames
- RCEAFCOK will vary between Initial Value and 140K frames

## z/OS 1.8

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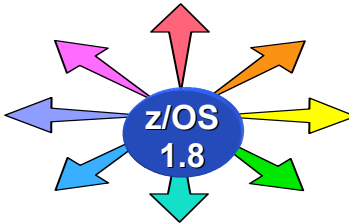
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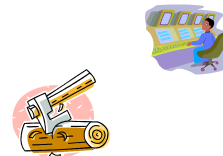
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## z/OS Some 1.8 Availability Enhancements at a Glance

- Master Console elimination
- Log Stream rename, test and production logstream separation
- z/OS UNIX latch contention detection
- GDPS enhanced recovery
- Fast replication
- HyperSwap trigger
- Recoverable BRLM



## Consoles - Problems to be solved



Old news

- (1) Message delivery:
  - Buffer shortages
  - Varying speeds and feeds
- (2) Synchronizing console state information:
  - Data replicated on every system in the sysplex
  - State changes, system join/leave cause flurries of activity
  - More systems => elongated startup, shutdown and recovery time
- (3) Limit of 99 MCS/SMCS/Subsystem consoles in a sysplex:  
Installation constraint

## Consoles Enhancement Staging Plan



Old news

- Enhancements to be staged:
- Stage 1a solves problem 1
  - Delivery in z/OS: 1.4.2 feature, 1.5 base
- Stage 1b delivers improved RAS, IPL/recovery time improvements
  - Available in z/OS 1.7
- Stage 2 solves problems 2 & 3
  - z/OS 1.8 and future release of z/OS (delay since announcement)

## Console Restructure - Summary

- Stage 1a (z/OS 1.4/1.5) solves message delivery
  - Targets WTO buffer shortages (accounting for ~45% of consoles multi-system outages)
  - Can re-IPL an image to “fall out” of stage 1
- Stage 1b (z/OS 1.7) provides:
  - Internal RAS / Problem determination enhancements
  - Ability to delete EMCS consoles
  - Operational changes in preparation for stage 2
- Stage 2 to solve the CONSOLE state data problem
  - Remove 99 console per sysplex constraint
  - Reduce serialization bottleneck on SYSZMCS global resources
  - Solves “the rest” of the consoles multi-system outages
  - Command activated – limited “reverse migration” all systems must be at required z/OS level
  - Future z/OS release; no “rollback” planned



## System z Console Restructure Road Map

### Stage 1 Overview: z/OS 1.5 – 1.8 Enhancements, more to come

- z/OS 1.8
  - Master Console Elimination
- z/OS 1.7
  - Console state information volume reduction, EMCS console removal, reduced IPL/join time
  - Serviceability Items
- z/OS 1.5
  - Message production/consumption imbalance eliminated
  - System Outage Avoidance, due to:
    - Buffer exhaustion avoidance
    - Workload slowdown and/or job abend reduction
    - Message throughput improvement
      - by reducing single task bottleneck



## z/OS 1.8 Console Enhancements

### *Master Console Elimination, 1-byte consoles now history*

- Master Console elimination
  - Removes a single point of failure for improved RAL
    - Ability to define multiple master authority consoles **not** changed
    - Attributes unique to Master Console made available to any console
      - > Console ID zero “gone”
    - “No Consoles Condition” and “No Master Console Condition” no longer considered undesirable
  - Console Switch no longer needed to ensure Master Console function was never lost
    - Elimination of Master Console reduces importance of Console Switch
    - Complex task setting up “switch” definitions for all consoles eliminated
  - 1-byte console IDs no longer supported
  - Note: **Consoles Stage 2 delayed** (i.e. not in 2007)
    - Reduce configuration data passed around the sysplex under serialization
    - Increase max # of cons. from 99/sysplex to 250/system



## Master Console Elimination

### *New Message Routing Attributes: “Internal and unknown IDS”*

- Since the master console no longer exists, predictable destinations for certain messages are needed
- New console routing attributes, **INTIDS** and **UNKNIDS**, ensure console destinations for messages which would previously have gone to the master console
- In a mixed sysplex, the toleration **APAR, OA10632**, has partially implemented these attributes on the lower levels of z/OS. It supports sending messages to consoles on 1.8, receiving INTIDS and UNKNIDS, from lower-level systems.



## z/OS 1.8 Logger Rename Logstream

- Issues with your log stream? "local fix" was often to delete and redefine the log stream in order to get applications up and running
  - **When log stream deleted all data associated with the log stream gone**
  - **No way to review data nor have application process the lost data**
- Logger utility and API to **rename a log stream** introduced in z/OS 1.8:
  - Update Log stream request indicate new name of the log stream:

```
UPDATE LOGSTREAM  NAME(xname) ...
                NEWSTREAMNAME(xnewstreamname)
```



## z/OS 1.8 Log Stream Separation

- **Installations combine both production and test in the same sysplex**
  - Possible for work on test log streams to have an **adverse effect on production log streams.**
  - Problems encountered on a test log stream can lead to **outages**
  - Some Logger tasks, such as data set recall, and data set allocation are **single threaded**
    - Data set recall for the test log stream can hold off the data set recall for production log stream
- **This feature allows you to define both Test and Production logstreams in the same sysplex**
  - Reduces the effect of test log stream outages on production log streams
  - Benefit will be **less interference from test environment on production**
  - ```
DEFINE LOGSTREAM ...
                        STG_DUPLEX(NO),
                        GROUP(TEST)
```
- **Coexistence APAR OA14009 required on pre z/OS 1.8 in sysplex**



## z/OS 1.8 Latch Contention Analysis

### Part 2: Follow-on to support introduced in z/OS 1.7

- `DISPLAY OMVS, WAITERS` operator command extended to show **contention on File System Latches** (similar to what is shown for Mount Latch) and a table of all remaining **threads** that are waiting.
  - The information shown for a waiting thread enhanced to include:
    - Any File System Latch that it is holding,
    - And for operations in progress on a file
      - the file's name, device number and inode number
  - Benefit will be when a system gets hung, the display contributes to determining:
    - **What needs cancellation?**
    - **Actions needed to alleviate the system hang situation?**

## GDPS Enhanced Recovery

### CFRM Site Awareness improvement

- In GDPS/sysplex XES can detect a connectivity failure **before** GDPS
  - XES may delete a structure inconsistently with GDPS policy
    - `FREEZE=STOP`: desired to keep structure at recovery site. Lossconn site failure might result in structure in recovery site being deleted instead of the copy in the primary site
    - GDPS does not allow duplexed structures to be used in DR operation, timeconsuming log-based methods needed for DR. **Application availability & performance may suffer**
- z/OS 1.8 provides CFRM *site awareness*:
  - Awareness of which CFs exist in each site. Duplexing failover decisions consistent with the recovery manager decisions (failover to a recovery site)
    - Duplexed structure available in recovery site, allowing GDPS to use it DR
    - Eliminates need for log-based recovery,
      - **and shortens recovery time**
  - Site awareness enabled by `SITE` keyword in CFRM policy.

```
CF NAME(FACIL01)  SITE(SITE1)
TYPE(002084) MFG(IBM) PLANT(EN) SEQUENCE(111111111111)
PARTITION(0) CPCID(00)
```



## z/OS 1.8 HyperSwap trigger enhancement

### *MIH – I/O Timeout*

- Prior to this HyperSwap function was invoked automatically for error indications returned for I/O operations:
  - Subsystem failures, boxed devices, or I/O errors.
- z/OS 1.8 support extended to act on I/O timeouts
  - Detected by Missing Interrupt Handler (MIH)
  - Allow transactions to **resume processing quickly on secondary volumes**

## z/OS 1.8 Recoverable Byte Range Lock manager (BRLM)

### *BRLM History: OS/390 R9 – z/OS 1.8*

- z/OS 1.8 – Distributed BRLM with **recoverable** locks
- z/OS 1.6 – Distributed BRLM with **moveable** locks
  - Locks move when file system moves
  - Distributed BRLM now default in a R6 sysplex
- z/OS 1.4 – Distributed BRLM
  - One BRLM per system in a sysplex
  - Lock commands are routed to the file system owner
- OS/390 R9 - Central BRLM in a shared HFS sysplex
  - one BRLM is a **single point of failure**

## z/OS 1.8 Recoverable Byte Range Lock manager (BRLM)

### Resolved BRLM USS Application locking remote file Issue

- Problem when USS applications locks a remote file
  - **Lock is lost when the remote system is lost (I.e., fails).**
  - **Solution: backup remote locks locally, and recover them when system fails**
- Function will now be:
  1. Application issues lock/unlock command to a remote file
  2. USS forwards the lock/unlock command to local BRLM
  3. USS forwards the lock/unlock command to remote BRLM.. remote system fails
  4. USS recovers file system & declares a new owning system
  5. USS re-issues lock/unlock to new owner
- The MVS console command, **F BPXOINIT,FILESYS=DISPLAY,GLOBAL** identifies whether USS is using central BRLM or distributed BRLM in a sysplex.
  - z/OS sysplex => R6 – Distributed BRLM is the default
  - z/OS sysplex member < R6 – DISTBRLM(1) must be set in the USS CDS

## z/OS 1.8

### Helping meet challenges of on demand business

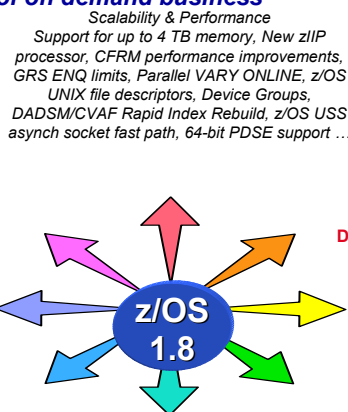
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## IBM Workload Manager enhancements for z/OS 1.8

### WLM enhancements at a glance

- Enhanced zAAP and zIIP Support
- RSM/SRM Support for Large Real storage > 128GB
- JES2 enhancements for WLM-managed batch (enhanced)
- New Resource Group types
- User Friendly Interface for WLM Admin Application

## Initial Handling of zAAP-Related IEAOPTxx Parameters

| IFACROSSOVER | IFAHONORPRIORITY | Meaning                                                                                                                                                                                                                                                                                                                         |
|--------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>YES</u>   | <u>YES</u>       | <ul style="list-style-type: none"> <li>▪ CP's help zAAP's honoring priorities until discretionary work is reached.</li> <li>▪ CP's always help zAAP discretionary work after all CP work.                             <ul style="list-style-type: none"> <li>– With soft-capping in effect: See next row</li> </ul> </li> </ul> |
| YES          | NO               | <ul style="list-style-type: none"> <li>▪ CPs always help zAAP's after all CP work</li> </ul>                                                                                                                                                                                                                                    |
| NO           | YES              |                                                                                                                                                                                                                                                                                                                                 |
| NO           | NO               | <ul style="list-style-type: none"> <li>▪ CPs never help zAAPs, except when no zAAPs are operational</li> </ul>                                                                                                                                                                                                                  |

Changed

## OA14131/OA13953: IFAHONORPRIORITY Enhancements

| IEAOPT Parameters |                  | New Behavior                                                                                                                                                                                                                                    |
|-------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IFACROSSOVER      | IFAHONORPRIORITY | R6 and R7 with<br>OA14131+OA15297/OA13953                                                                                                                                                                                                       |
| YES               | YES              | Standard processors can run zAAP eligible work in priority order <b>if the zAAPs become unable to process all queued work</b><br><br>Notice: <b>regular CPs are asked for help therefore not all CPs may process zAAP work at the same time</b> |
| NO                | YES              |                                                                                                                                                                                                                                                 |
| YES               | NO               | unchanged                                                                                                                                                                                                                                       |
| NO                | NO               |                                                                                                                                                                                                                                                 |

- **Old Behavior**
  - IFAHONORPRIORITY became only effective if IFACROSSOVER was set to YES
- **New Behavior** (R6 and R7 with OA14131+OA15297/OA13953)
  - This change is intended to allow more zAAP eligible work to run on zAAP processors while still remaining responsive to the zAAP demand
  - **IFAHONORPRIORITY is independent from IFACROSSOVER**
  - **IFAHONORPRIORITY now has the meaning that the zAAPs may “need help”**

## WLM Treatment of the zAAP Resource

- **A System z Application Assist Processor is a new WLM resource type:**
  - Contributes using and delay samples, and service times
  - zAAP utilization is reported by RMF (SPE OA05731)
- **Up to z/OS 1.7 zAAPs are managed by WLM as extension of CPs**
  - Java work executing on zAAPs **inherits the dispatch priority from regular CPs**
  - **Execution is accounted for in execution velocity and goal achievement (PI)**
- **zAAP management support**
  - **Beginning with z/OS 1.8 work on zAAP is managed independently**
- **zAAP service not:**
  - Included in defined capacity computations
  - Part of resource group management
  - Included in routing decisions
  - varied by IRD Vary CPU Management
- **On z9 specialty engines, such as zAAPs, are in separate pools.**
  - On z890 and z990: zAAPs inherit weight from CP pool but are part of the ICF/IFL pool

## How does the zIIP work? .....

Work on z/OS may have all or a portion of its Enclave Service Request Block (Enclave SRB) work directed to the zIIP. The types of DB2 V8 work listed below are those executing in enclave SRBs, portions of which can be sent to the zIIP.

### Example 1 = Distributed SQL requests (DRDA)

Queries that access DB2 for z/OS V8 via DRDA over a TCP/IP connection are dispatched within z/OS in enclave SRBs. z/OS directs a portion of this work to the zIIP.

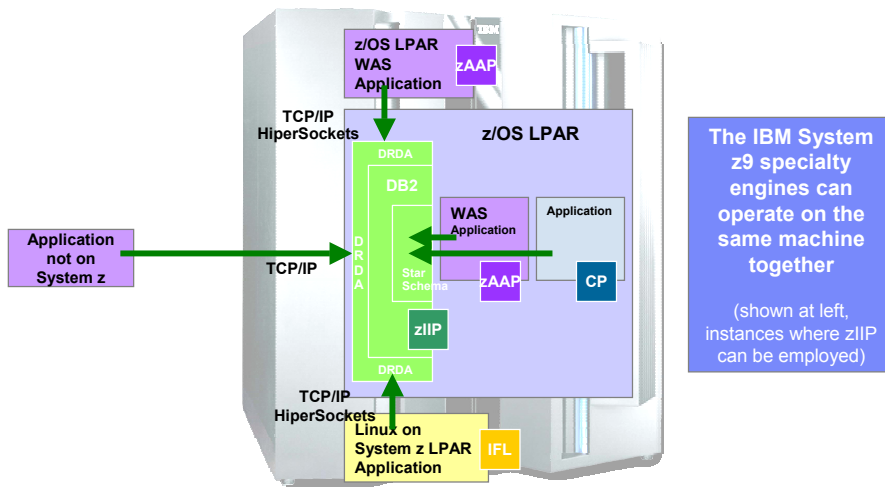
### Example 2 = Complex parallel query (BI)

Complex star schema parallel queries will now use enclave SRBs. z/OS directs a portion of this work to the zIIP.

### Example 3 = DB2 utilities for index maintenance

DB2 utilities LOAD, REORG, and REBUILD will now use enclave SRBs for the portion of the processing that is related to index maintenance. z/OS directs a portion of this work to the zIIP.

## Specialty Engines work Together!



## Handling of zIIP Work

- In many respects WLM/SRM support of zIIPs is equivalent to the zAAP monitoring support with the zAAP processing enhancements
- zIIP work managed as an extension of CP work
- zIIP work will flow over to general purpose CPs
  - Like zAAP work with the zAAP processing enhancements (“needs help”)
  - But: No external controls
- Not included in routing decisions
- zIIP service not included in defined capacity computations and resource group management
- zIIPs are not varied by IRD Vary CPU Management
- On System z9 specialty engines, such as zIIPs, are in separate processor pools.

## zIIP Reporting via RMF

- WLM Services provide data on zIIP usage comparable to data on zAAP
- **RMF Monitor I**
  - CPU and Workload Activity reports
- **RMF Monitor III**
  - CPC, SYSINFO and ENCLAVE reports
- **zIIP Usage projection available without real zIIPs in the configuration**
  - Via IEAOPT parameter PROJECTCPU=YES
- **Detailed information available via <http://www.ibm.com/systems/z/ziip/>**
  - See “Introduction to System z9 Integrated Information Processor (zIIP)” at <http://publibz.boulder.ibm.com/zoslib/pdf/zosr6r7ziip.pdf> and the Program Directory <http://publibz.boulder.ibm.com/epubs/pdf/i1007730.pdf>

## JES2 Improved Batch Initiator Balancing

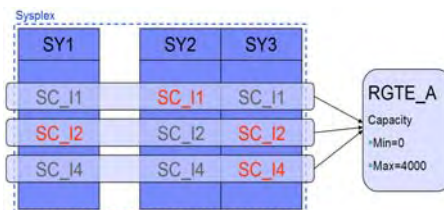
*Problem prior to z/OS 1.8*

- In a WLM managed initiator environment JES2 will **preferably start jobs on the submitting system**
- Enhancement in R8 attempts to use *approximately the same percentage of active WLM-managed initiators in each Service Class on each system.*
  - May help balance batch workloads across a JES2 MAS configuration within a sysplex

## Existing WLM Resource Group Concept

*Now referred to as a type 1 Resource Group*

- **Sysplex-wide defined in unweighted service units per second**
- **Sysplex-wide managed**
- **General Considerations**
  - Multiple service classes may be assigned to a resource group
    - With different utilizations on different systems
- **Systems may have different capacities, resulting in:**
  - **Not easy to understand how much is consumed on which system**
  - **Consumption depends highly on the capacity of the systems!**
  - **Resource Group definitions need to be revisited every time**
    - **Systems are upgraded**
    - **Workload utilization changes**
- **Resource Groups are sometimes hard to understand**

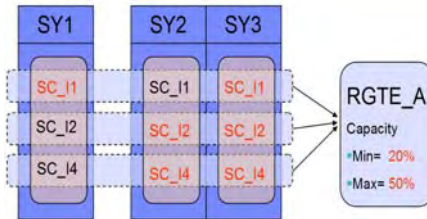




## New Types of WLM Resource Groups

Introduced in z/OS 1.8: Type 2 & Type 3 RGs

- **Sysplex-wide defined, but definition applies to each system**
- **Managed by each system**
- **General Considerations**



- Multiple service classes can be assigned to a resource group but this has no sysplex-wide effect anymore
- Definition is based on one of two possible units:
  - **LPAR capacity: based on system weight (+...)** ⇒ **Type 2 Resource Group**
  - **LCP capacity** ⇒ **Type 3 Resource Group**

- **Results:**
  - **New resource groups are managed by system, thus they must be evaluated on a per system basis**
  - **Resource groups grow automatically if systems are upgraded**
- **Easier to understand**

## Comparison of WLM Resource Group Types

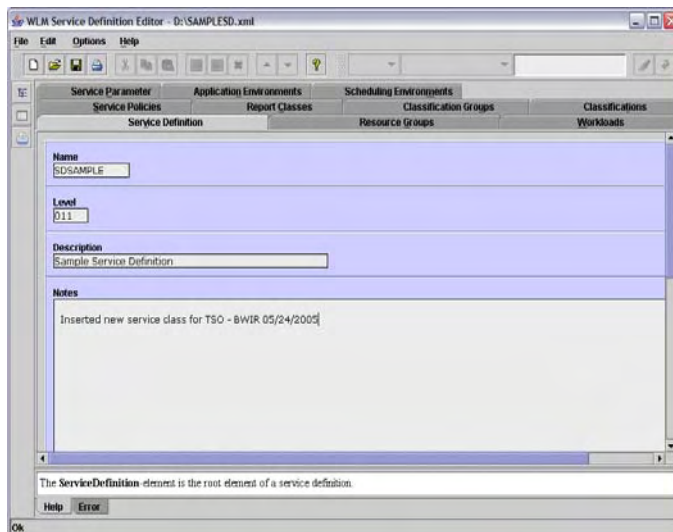
...all three may coexist

| Definition                     | Scope   | Advantages                                                                                                                                                       | Possible Disadvantages                                                                                                                                                                                           |
|--------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Service Units<br><b>Type 1</b> | Sysplex | <ul style="list-style-type: none"> <li>▪ Allows balancing of resources across members in a sysplex</li> </ul>                                                    | <ul style="list-style-type: none"> <li>▪ Requires adjustments for Migration</li> <li>▪ Difficult to monitor</li> <li>▪ Not applicable to constrained work on a single system in a sysplex environment</li> </ul> |
| % of LPAR<br><b>Type 2</b>     | System  | <ul style="list-style-type: none"> <li>▪ Allows to control work on single members in a sysplex</li> <li>✓ <u>Stable for migrations</u></li> </ul>                | <ul style="list-style-type: none"> <li>▪ Perhaps difficult to understand what LPAR capacity really is</li> </ul>                                                                                                 |
| % of LCPs<br><b>Type 3</b>     | System  | <ul style="list-style-type: none"> <li>▪ Allows to control work on single members in a sysplex</li> <li>✓ <u>Easy and straight forward definition</u></li> </ul> | <ul style="list-style-type: none"> <li>▪ Requires adjustments for migration</li> </ul>                                                                                                                           |

## Resource Groups: Migration Considerations

- **New system service classes and new resource group concept introduce incompatible changes to the WLM service definition**
  - Introduce new WLM policy level to LEVEL019
  - APAR OA13837 is required on pre-R8 systems
    - listed in GA22-7499 z/OS V1R8.0 Migration: z/OS V1Rx coexistence and fallback PTFs
  
- **The compatibility APAR OA13837**
  - Ensures that type 2 and 3 resource groups are not managed on pre-1.8 systems
  - As long as policies are only installed / activated from back level systems the compatibility code is not required
    - Compatibility PTFs can be installed via rolling IPL
      - no Sysplex-wide IPL necessary

## User Friendly Interface for WLM Administrative Application



- Java application
- Interface to WLM ISPF datasets
- Different views to show relations between policy elements
- Real-time error checking
- Real-time help
- No popup menus
- Tabular input processing

## Additional Optimization and Management bits and bites

### z/OS 1.8

- **WLM Tape I/O priority**
  - SRM calculates a static I/O priority for all ASs and enclaves for tape devices, to be used when no dynamic I/O priority has been assigned
- **WLM delays mapped to ARM services**
- **GRS CNS processing**
  - Now you can specify the contention notifying system (CNS) for GRS Star. Available also for z/OS V1.7 with APAR OA11382.
- **Improved OAM BLOB support**
  - OAM DB2 Binary Large Object Support enabling objects larger than 32 KB using the binary large object (BLOB) data type. Coexistence support for earlier release levels to coexist in an OAMplex.
- **SCLM improvements**
  - Improved performance of the SCLM Library utility (option 3.1). Reduced number of ISPF service calls and caching of certain data,
  - Member level locking avoids loss of updates that can occur when 2 or more users update the same member at the same time
  - Reduced amount of DASD space required to store listings from SCLM since they can now be compressed

## z/OS 1.8

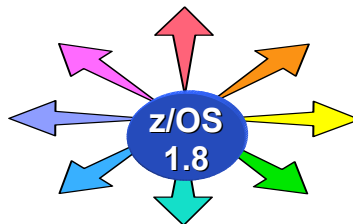
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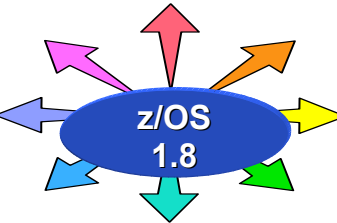
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- EWLM/WLM service class correlation
  - WLM accepts classification when same-named SC passed from EWLM
- New DFSMSrmm CIM agent support
  - Support creation, change, and deletion of volumes and data sets
  - Complements the query and display functions in z/OS 1.7
- zAAP reporting for EWLM
- Infoprint Central GUI improvements
  - Real-time status information display
  - Change online/offline status, reset a printer
  - Stop a print job without canceling it
  - Auditability enhancements
  - TRACEROUTE support



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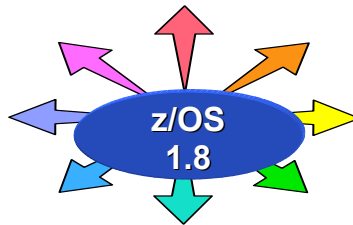
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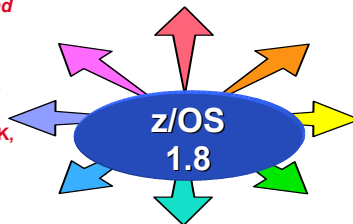
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 WLM, zAAP Stage 2, Sysplex Distributor, Tape I/O priority, JES2 balancing of WLM-managed initiators, GRS CNS processing, Improved OAM BLOB support, SCLM improvements, Group Capacity Limit ...

**Enhancing Security**  
 PKI extensions, Distributed Identity Support, RACF password phrase support, Tape data set protection, 128-bit AES for IPSec, SAF identity tokens, RACF virtual key rings, IDS configuration, ...

**Enterprise-Wide Roles**  
 WLM/EWLM Service Class Correlation, zAAP Reporting for eWLM, DFSMSrmm CIM agent, RMFeServer OS Monitoring Stage II, WLM delay services mapped to ARM ...

## z/OS 1.8 Enhancements at a Glance

### *Integrating New Applications*

- NEW LDAP server
- BPXBATCH enhancements
- z/OS XML System Services
- Unicode improvements
- USS `/etc/inittab` support
- XPLINK enhancements

## z/OS 1.8 LDAP Enhancements at a Glance

### *Significantly improved performance, availability, scalability and auditing*

- Better performance
  - The z/OS LDAP V1.8 server is rewritten:
    - from C++ to C, which includes a restructure of both front and back end.
    - The SDBM backend is modified to use the enhanced SAF R\_Admin interface.
    - A file based back end, LDBM, provides better performance as **all entries are cached in storage for quick retrieval.**
- Better availability
  - The z/OS LDAP server will now provide **ARM, TCP/IP restart, Dynamic network interface management, and sysplex support for LDBM**
- Scalability and constraint relief
  - The z/OS LDAP server is **64 bit capable** for all backends **except for TDBM** because DB2 does not support 64 bit in the 1.8 time frame.
- Auditing support
  - z/OS LDAP 1.8 provides new **SMF 83 audit records** for the LDAP server.

## z/OS 1.8 LDAP Enhancements at a Glance...

*Significantly improved RAS, ease of use, cross-platform consistency and security*

- Additional RAS support
  - LDAP 1.8 provides 2 Health Checks. Ability to trace and invoke dumps in LDAP
- Ease of use support
  - LDAP server provides a file-based backend, LDBM, eliminating need for DB2. Also the change log (GDBM) no longer uses DB2. Instead it is file based.
  - Both of these supports make it easier for you to setup and deploy z/OS LDAP.
- Cross-platform consistency
  - z/OS 1.8 LDAP Client and Server provide additional functions that the current IBM Tivoli Directory Server already has.
- Security enhancements
  - z/OS 1.8 LDAP eliminates requirement for OCSF for cryptographic support. The functions provided by OCSF are now contained in z/OS LDAP.

**New ITDS LDAP server **NOT** available at z/OS 1.8 GA**  
Planned availability on z/OS 1.8 in **1H 2007**

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

## z/OS 1.8 BPXBATCH enhancements

*longer input parameters and MVS DS output support: description*

- Current limitations in BPXBATCH input and output
  - **make it more difficult to create and maintain BPXBATCH jobs** compared to other batch utilities.
- BPXBATCH Enhancement enables you to:
  - Specify much longer *input* parameters
    - **Up to 64,536 chars** as opposed to old **100 chars limit**
    - **Up to 32,754 chars for TSO Commands**
  - Be able to have data from the standard *output* and standard error streams **to MVS Data sets (instead of just z/OS Unix Files)**





## z/OS 1.8 BPXBATCH Enhancements

### *longer input parameters and MVS DS output support: implementation*

- Larger Input Parameter Strings:
  - New **STDPARM DD** to allow specification of UNIX file or MVS DS to contain input parameters up to **65,536** in length
  - Traditional MVS input data sets can be used for **STDPARM**
    - **SYSIN**, Sequential, PDS/PDSE member
  - Specification of **STDPARM overrides** usage of **PARM=** on BPXBATCH invocation
  - **BPXBATCH TSO** Command enhanced to allow up to **32,754** length input string on command invocation
- **STDOUT/STDERR** to MVS Data Sets
  - DDs will now support specification of traditional MVS data sets:
    - Allows output from BPXBATCH jobs to be directed to **SYSOUT**, **Sequential** or **PDS/PDSE** Members
    - Data sets should have **LRECL** that will allow all lines to fit or **truncation** will occur

## z/OS 1.8 XML Services

### *Overview – why is this new component needed?*

- z/OS XML System Services is a **NEW** component of z/OS 1.8
  - XML is important to z/OS
  - New workloads are often XML based
  - Databases (i.e. DB2) provides integrated XML Support
  - Platforms, middleware, applications must handle XML efficiently
  - XML parsing overhead threatens to become serious cost problem
  - Imbedding, or pre-req. of a parsing package not feasible
  - Need a good place to implement platform-unique optimization
  - Open software APIs are often not stable
  - Need to support z/OS operating environments





## z/OS 1.8 XML Services

### Overview – and what are the benefits?

- Using z/OS XML, you can expect these **benefits**:
  - Parse XML documents into an easily digested binary form
  - Verify “well-formedness” of XML documents
  - Have large documents be parsed in segments.
  - Use application-specific exits for storage management and string identifiers
  - Query the encoding of XML documents
  - Obtain high performance and high availability in z/OS environments designed for enterprise class z/OS applications with a need to handle XML



## z/OS 1.8 Unicode Improvements

- “Unicode on Demand” introduced in z/OS 1.7
  - Support dynamic loading of tables when running in **TCB mode only**.
  - SRB mode environments **cannot dynamically add tables** to storage.
    - All tables that are loaded in storage are always **page fixed**.
    - Tables loaded in Common Area Data Space - CADS). **You do not have a choice**.
- Changes are made to z/OS 1.8 Unicode support:
  - Allow adding tables when running both **TCB mode and SRB mode**.
  - Provide an **option to page fix** the tables when loaded into storage.
- The previous support based on the Unicode **3.0.1 Standard**
- z/OS 1.8 Provide support for later Unicode Standards in Normalization service
  - **Unicode 3.2.0**
  - **Unicode 4.0.1**
  - **Unicode 4.1.0**



## z/OS 1.8 USS etc/inittab support

- In z/OS 1.8 the `/etc/inittab` file is the same as used on other UNIX platforms.
- `/etc/inittab` allows you to:
  - Identify system processes that can be started at system initialization;
  - To identify processes that can be restarted automatically when they unexpectedly end.
- If `/etc/inittab` exists in your system, it is used instead of the `/etc/rc` files.

## XPLINK – *What is it? And what is it good for?*

*... implemented at the System z Hardware level*

- **Extra Performance Linkage (XPLINK) is a call linkage between programs that has the potential for significant performance increase in case of frequent calls between small functions or subprograms.**
- **The C/C++ subroutine linkage on z/OS cannot be considered state-of-the art with respect to performance.**
  - It represents a disproportionate percentage of total execution time, higher yet for C++ than for C due to the many, typically small, functions.
  - Depending on the style of programming, the total prolog/epilog cost may reach a double digit percentage even for C, and thus represents a significant potential for further program optimization.
- **XPLINK significantly speeds up the linkage for C and C++ routines by using a downward-growing stack and by passing parameters in registers. It includes support for reentrant and non-reentrant code, for calls to functions in DLLs, and compatibility with old code.**
- **With XPLINK, the linkage and parameter passing mechanisms for C and C++ are identical. If you link to a C function from a C++ program, you should still specify extern C to avoid name mangling.**
- **The primary objective of XPLINK is to make subroutine calls as fast and efficient as possible by removing all nonessential instructions from the main path.**

## XPLINK Enhancements Overview

- XPLINK Improvements
  - Improve execution environment between XPLINK and non-XPLINK programs,
    - LE now allows a **function pointer to be passed from a non-XPLINK compiled program to an XPLINK compiled program without restrictions**
- Improved XPLINK transition tracing
  - **XPLINK greatly increases the performance of C/C++ applications**
  - **Transitions between XPLINK and non-XPLINK code can reduce its effectiveness.**
  - Often **difficult/impossible to determine where transitions occur** in the application
  - With this enhancement a new **trace levels** added to the existing LE TRACE run-time option to trace these transitions

## Application Integration

### New z/OS XML System Services component of z/OS

- Expected to help satisfy requirements for high performance or unique environmental XML non-validating parsing
- Support for cross-memory and SRB modes
- Initial support for HLASM; IBM plans to add C/C++ high-level lang; in a future release
- Also planned to be made available on z/OS 1.7\*

### New CIM version, designed to include

- An upgrade of the CIM Server Runtime Environment to V2.5.1 of OpenPegasus from the Open Group
- CIM Schema upgrade to 2.9
- Additional resource instrumentation
- Support for Embedded Objects, Events (CIM Indications), HTTP Chunking, and the capability to run CIM providers in a separate address space
- Command line interface for running CIM Client requests against the CIM Server
- Designed to provide security, reliability, and scalability improvements for CIM Server



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## Perl - Practical Extraction and Report Language

### Perl for z/OS

- Perl V5.8.7
  - All core functions and libraries supported
  - Pre-configured/compiled
  - SMP/E installed
  - All known defects addressed
  - Runs on z/OS 1.4 and higher
- Feature of IBM Ported Tools for z/OS V1R1M1
  - **Program number: 5655-M23**
  - **COMPID: 5655M2303**
  - **FMID: HPRL110**
- Facilitate migration of web-based applications to z/OS
- Provide a popular tool for new applications

## z/OS 1.8

### Helping meet challenges of on demand business

**Improving Usability and Skills**  
**More Health Checks and framework improvements, HCM, ISPF, InfoPrint Central, & RRS improvements, Extensions to the IBM Configuration Assistant for z/OS Comm Server, EE usability improvements, ...**

*Integrating new Applications and Supporting Industry and Open Standards*

*Unicode improvements; inittab support; LE improvements, new LDAP server, z/OS XML System Services, BPXBATCH, CIM, XPLINK, Networking APIs, XL C/C++ enhancements, ...*

*Extending the Network*  
 Sysplex partitioning support, Dynamic DNS registration, JES3 NJE via TCP/IP, TN3270 and telnet

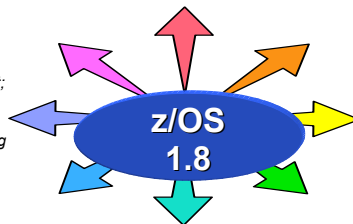
*improvements, IP filtering, IKE, IPsec, WTS, Samba, improved sysplex failure recovery, REXX FTP interface, ...*

*Scalability & Performance*  
 Support for up to 4 TB memory, New zIIP processor, CFRM performance improvements, GRS ENQ limits, Parallel VARY ONLINE, z/OS UNIX file descriptors, Device Groups, DADSM/CVAF Rapid Index Rebuild, z/OS USS asynch socket fast path, 64-bit PDSE support ...

*Improving Availability*  
 Master console elimination, Logstream rename, test and prod logstream separation, Recoverable BRLM, GDPS enhanced recovery, Fast replication, HyperSwap trigger, z/OS UNIX latch contention detection, ...

*Optimization and Management*  
 WLM, zAAP Stage 2, Sysplex Distributor, Tape I/O priority, JES2 balancing of WLM-managed initiators, GRS CNS processing, Improved OAM BLOB support, SCLM improvements, Group Capacity Limit ...

*Enhancing Security*  
 PKI extensions, Distributed Identity Support, RACF password phrase support, Tape data set protection, 128-bit AES for IPsec, SAF identity tokens, RACF virtual key rings, IDS configuration, ...



*Enterprise-Wide Roles*  
 WLM/EWLM Service Class Correlation, zAAP Reporting for eWLM, DFSMSrmm CIM agent, RMFeServer OS Monitoring Stage II, WLM delay services mapped to ARM ...

## z/OS 1.8 Simplification

### IBM Health Checker for z/OS

#### Value

- Configuring for best practices
  - Helping to avoid outages
- Checks against active settings
- Notifies when exceptions found
- Runs on all supported releases of z/OS



#### Latest Enhancements

- In z/OS 1.8, the Health Checker Framework is enhanced and will provide following:
  - Enabled for NLS
  - PARMLIB Check Definition
    - Define/add a check via a PARMLIB definition instead of needing a program that does the definition
  - Enhanced Policy Support
    - Support multiple policies
  - Verbose command output
    - Check output be as verbose as possible
  - Parameter Parser
    - Provide a service usable by check routines to parse parameters

<sup>†</sup> Majority of these checks are available on prior releases

## z/OS 1.8 Simplification

### IBM Health Checker for z/OS – New Checks

- Communications Server checks to alert you to non-recommended TCP/IP configuration values
- TCPIP Checks
  - `CSTCP_TCPMAXRCVBUFSIZE_tcpipstackname`
  - `CSTCP_SYSTCPIP_tcpipstackname`
- VTAM Check
  - `CSVAM_CSM_STG_LIMIT`
- RACF Checks
- RRS check to highlight when a configuration varies from the IBM recommendation
- ASM
  - Check for unused PARTE entries
  - Check for COMMON page data set
  - Check the current TOTAL AUX SLOT usage
- **LOGGER (OA15593) – z/OS 1.7 and z/OS 1.8**
  - `CHECK( IBMIXGLOGR, IXGLOGR_STRUCTUREFULL)`
  - `CHECK( IBMIXGLOGR, IXGLOGR_STAGINGDSFULL)`
  - `CHECK( IBMIXGLOGR, IXGLOGR_ENTRYTHRESHOLD)`

## z/OS 1.8 Simplification

### *IBM Health Checker for z/OS – GRS Check*

- GRS will provide GRS\_GRSQ\_SETTING, which will examine the current GRSQ setting.
  - IBM recommends having a GRSQ setting of CONTENTION
    - Which may significantly reduce dump time
- IBM Development has provided two sample checks:
  - **Download website**
    - [ibm.com/server/eserver/zseries/zos/integst/](http://ibm.com/server/eserver/zseries/zos/integst/)
  - Select IBM health Checker for z/OS: Sample Checks

## z/OS 1.8 Simplification

### *Resource Recovery Services Orderly Shutdown*

- RRS currently must be cancelled to come down. Cancel processing results in one or more RRS abends during the shutdown process
  - Allow “clean” shutdown of RRS
  - Allows an installation to shutdown RRS without experiencing abends
  - New shutdown command - `SETRRS SHUTDOWN`
  - `ATR104I SHUTDOWN REQUEST WAS RECEIVED FOR RRS`
  - `ATR105I RRS SHUTDOWN REJECTED, RRS SHUTDOWN IS ALREADY IN PROGRESS`
  - `ATR106I AN UNEXPECTED ERROR OCCURRED DURING RRS SHUTDOWN PROCESSING. RRS CANCEL COMMAND IS ISSUED`
- Install toleration APAR OA15144 on all 1.4 to 1.7 systems

## z/OS 1.8 Ease of Use

- ISPF improvements
  - Display and process z/OS UNIX files and directories
  - Data Set List (OPT3.4) support for SuperC and Search-for
  - Better member list searching
  - Autodiscovery of IP address for ISPF workstation GUI
  - Improved alias processing for copy, move, delete
  - Tape data set support in DSLIST
- SDSF display of zAAP utilization
- RMF postprocessor & Monitor III improvements
- HCM enhancements:
  - Literally, too many to list!
  - Some are: IODF import/export; saving layouts for modeling; Copy, Add Like, and Repeat support; and IODF compare



## z/OS System Management Strategy

**Goal: Make z/OS servers easy to deploy, administer, and service.**

| <b>Today</b>                                                     | <b>Tomorrow</b>                                                                 |
|------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Manual, time-consuming tasks                                     | Highly automated, efficient tasks                                               |
| Multiple UIs and manuals often required to perform a single task | A modern web UI for performing tasks end-to-end, with integrated task guidance; |
| Years of z/OS experience required                                | Designed with novices in mind; but experts will benefit                         |

### Over the next five years, IBM plans to significantly simplify:

- System health monitoring with event analysis and problem management
- System installation and configuration (for instance, network and hardware configuration)
- Workload management
- Storage and data management
- Security management

## IBM OMEGAMON z/OS Management Console

- Available at no charge for z/OS 1.4 and above; easy upgrade to comprehensive Tivoli Monitoring products
- For monitoring the health of z/OS sysplexes and systems; replaces complex DISPLAY commands; integrated Health Checker reports
- Powerful features:
  - Event notification
  - Drill-down to problem details and expert advice
- Version 4.1 adds new workspaces for monitoring sysplexes, LPAR clusters, and UNIX processes



**Version 4.1  
available  
12/06**

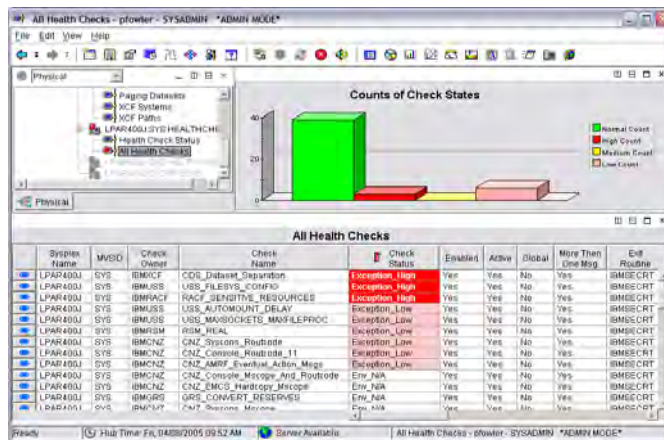
Learn more at: <http://www.ibm.com/servers/eserver/zseries/zos/zmc/>

## z/OS Health Checks in zMC 1.1.1/4.1.0

The Health Checker examines configuration values for deviations from best practices.

Health check exceptions are highlighted in the zMC.

IT staff can open a report for details and recommended corrective actions.



**Health Checker integration is a unique feature of the IBM OMEGAMON z/OS Management Console (zMC)**



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LPAR Clusters Data - RGATSKI - SYSADMIN

View: Physical

Logical Processor Counts

Physical & Special CPs

LPAR Clusters Information

| Cluster Name       | LPAR Name | LCPs Online | LCPs Offline | LCPs Reserved | LCPs Standby | CP Status | LPAR Status | CPC Model# | St     | Timestamp     |
|--------------------|-----------|-------------|--------------|---------------|--------------|-----------|-------------|------------|--------|---------------|
| LPAR4003.0960.2064 | CANSF23   | 2           | 0            | 1             | 0            | SHR       | Active      | 2064-109   |        | 08/29/06 11:2 |
| LPAR4003.0960.2064 | CANSY3G   | 3           | 0            | 1             | 0            | SHR       | Active      | 2064-109   |        | 08/29/06 11:2 |
| N/A                | RALNSCF9  | 1           | 0            | 0             | 0            | DED       | Active      | 2064-109   |        | 08/29/06 11:2 |
| N/A                | RALNS0    | 2           | 0            | 0             | 0            | SHR       | Active      | 2064-109   |        | 08/29/06 11:2 |
| LPAR4003.0960.2064 | CANSF11   | 2           | 0            | 1             | 0            | SHR       | Active      | 2064-109   |        | 08/29/06 11:2 |
| N/A                | TIVVM2    | 5           | 0            | 2             | 0            | SHR       | Active      | 2064-109   |        | 08/29/06 11:2 |
| LPAR4003.0960.2064 | CANSF13   | 1           | 0            | 1             | 0            | SHR       | Active      | 2064-109   |        | 08/29/06 11:2 |
| LPAR4003.0960.2064 | CANSF22   | 3           | 0            | 1             | 0            | SHR       | Active      | 2064-109   | 050960 | 08/29/06 11:2 |
| N/A                | RALHCD    | 1           | 0            | 0             | 0            | SHR       | Active      | 2064-109   | 050960 | 08/29/06 11:2 |
| N/A                | PHYSICAL  | 9           | 0            | 0             | 0            | SHR       | NoActive    | 2064-109   | 050960 | 08/29/06 11:2 |

Hub Time: mar., 08/29/2006 11:31 AM

Server Available

LPAR Clusters Data - RGATSKI - SYSADMIN

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11/15/2006

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LPAR Clusters View in zMC 4.1

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## IBM Configuration Assistant for z/OS Communication Server

- Accelerates the implementation new network features
- Version 1.8 adds support for setting up Quality of Service (QoS) and Intrusion Detection Services (IDS) policies
- Helps customers make the right configuration decisions for their environment
- Ready to take it for a spin?  
[Click here](#) to download it!

**Configuration Assistant**  
for z/OS Communications Server  
Version 1, Release 8

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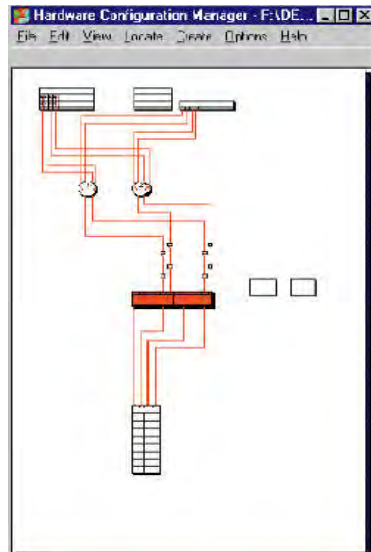
92

11/15/2006

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## Hardware Configuration Manager

- Lets you easily navigate through configuration diagrams and make changes
- 1.8 adds many new ease of use enhancements including:
  - **Wizards that simplify complex configuration tasks**
  - **Improved configuration reports**
  - **Access to RMF Monitor III reports which speeds up the detection and resolution of performance bottlenecks**
  - **Ability to import and export I/O Definition Files (IODFs) – another productivity saving**



## z/OS Application Programmer's Experience Today

Scenario: Correcting an error in a COBOL source file

The screenshot shows a terminal window titled 'Session A - [24 x 80]'. The main display shows a COBOL source file being edited. The text includes:
 

```

    EDIT  DNET017.STEM.COBOL (IGYTSALE) - 01.08      Columns 0001 0002
    000004 ***                                     ***
    000005 *** Program name: IGYTSALE.                ***
    000006 ***                                     ***
    000007 *** Introduction                            ***
    000008 ***                                     ***
    000009 *** This is a hypothetical IBM COBOL program created for ***
    000010 ***                                     ***
    Command ===>                                     Scroll ==>
    F1=Help  F2=Quit  F3=Exit  F4=Print  F5=Change  F7=Tab  F8=Cancel
    F9=Down  F10=Up   F11=Left  F12=Right  F13=Insert  F14=Delete
    Display Filter View Print Options Help
    SDSF OUTPUT DISPLAY DNET017C JOB02277 0510 2 LINE 0  COLUMNS 02- 81
    COMMAND INPUT ==>
    ===== TOP OF DATA =====
    ===== JES2 JOB LOG - SYSTEM MVSA - NO D I
    04-15-34 JOB02277 ***** MONDAY, 15 SEP 2006 *****
    04-15-34 JOB02277 INR001 USERID DNET017 IS ASSIGNED TO THIS JOB.
    F1=HELP  F2=QUIT  F3=END  F4=RETURN  F5=PRINT  F6=BOOK  F7=
    F8=SD  F9=DOWN  F10=UP   F11=LEFT  F12=RIGHT  F13=DELETE
    10/019
    
```

1. Start 3270 emulator
2. Logon to the z/OS system
3. Navigate to the dataset and member using ISPF
4. Select the member for editing
5. Locate the line in the source code
6. Change the source code and save the member
7. Switch to the JCL that is used to submit and schedule the compile job
8. Submit the JCL job
9. Switch to SDSF to monitor the job and review the output
10. Repeat 5-9 until program runs correctly

## Strategic Environment for Application Developers

- **WebSphere Developer for zSeries (WDz) provides a modern environment for developing:**
  - Dynamic Web applications including Java™ and Java 2 Enterprise Edition
  - Traditional COBOL and PL/I applications
  - High level Enterprise Generation Language (EGL) applications
  - Web services to integrate these applications together
  
- **WDz offers advantages over traditional environment:**
  - Single environment for programming tasks: design, code, debug from the same UI
  - Productivity features like syntax-checking, JCL generation, visual debugging
  - Integrated user assistance

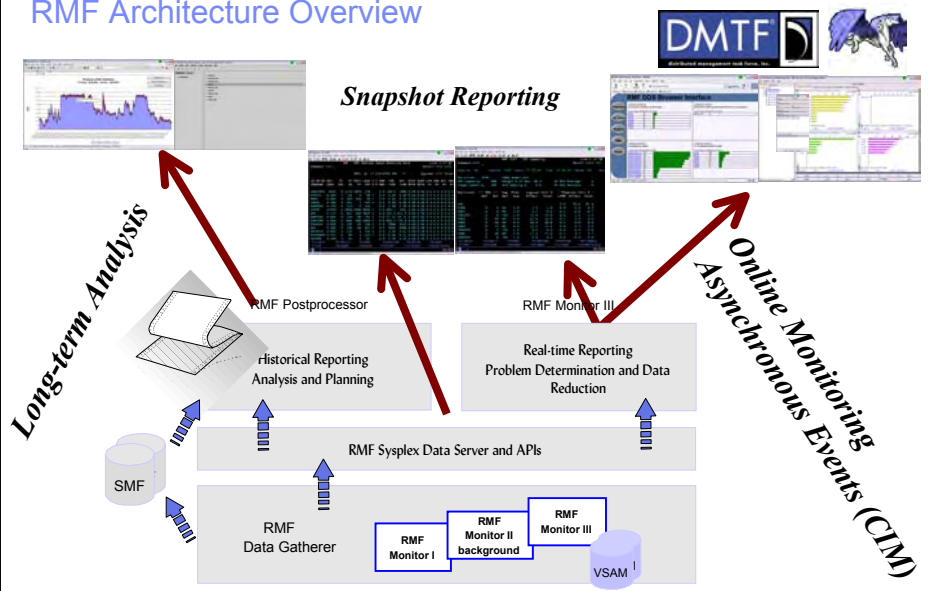


[Click for Details](#)

## ICSF Parallel Sysplex Support for Shared CKDS

- **Problem**
  - The CKT (in storage copy of Cryptographic Key Dataset (CKDS)) is only updated on the system that initiated the change.
  - When CKDS is shared across a Parallel Sysplex, the change is not propagated to the CKTs on the other systems.
  - Change propagated manually or by running a batch job
  - However, if not propagated, **units of work routed to the systems that did not see the change may fail**
  
- **Solution**
  - **Sysplex wide consistent updates to the CKDS (and CKT) using XCF signaling**
  - **Sysplex wide updates triggered by new SYSPLEXCKDS option in ICSF installation options dataset**
  - Was 05 Web deliverable for installation on z/OS 1.6 and 1.7; rolled into future z/OS release.

# RMF Architecture Overview



# RMF z/OS 1.8

## Software

- Group Capacity Limits
- zFS support
- Disk Space Monitoring
- CPU activity enhancements
- WLM report class periods

## Tivoli OMEGAMON XE integration

**Tivoli.** software



- Some System z interfaces are expensive to be exploited, so it's much better to gather that data only once per sysplex
- First step since the acquisition of Candle Corp. is that Tivoli OMEGAMON XE will be enabled to use RMF gathered CF data, so we can reduce overall monitoring overhead if using RMF as well as OMEGAMON
- Existing OMEGAMON customers will lose the capability to monitor individual CF paths if using RMF as the data source, on the other hand the gathering interval will be much shorter (100 seconds instead of 5 minutes if running with default settings), so we think the quality of the data will be much better. Nevertheless, it's still optional to have the data gathered by OMEGAMON if you prefer for whatever reason
- RMF DDS Infrastructure has been extended to add HA features if exploited by Tivoli