Cheryl's Hot Flashes #14

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Session 2509; SHARE 105 in Boston

August 26, 2005 **(Updated Sept 6, 2005)**

Watson & Walker, Inc.

home of **Cheryl Watson's TUNING Letter, CPU Chart, BoxScore** and **GoalTender**

Agenda

- Survey Questions
- 6 Month Update
- z/OS 1.7
- Important APARs
- Useful Resources
- Just for Fun

Survey Questions
Current Hardware

- Current Server Type
  - z800?
  - z900?
  - z890?
  - z990?
  - Other Hardware?
- Using zAAP Processors (*10*)?
- Activated IRD CPU Management (*15*)?
- Used On/Off Capacity on Demand Since Last SHARE?
- Doing Heavy Cryptographic Work (*10*)?

Survey Questions
Current Software

- Operating System
  - z/OS.e (*5*)?
  - z/OS 1.4 (*170-180*)?
  - z/OS 1.5 (*12*)?
  - z/OS 1.6 (*20*)?
  - Earlier than z/OS 1.4 (*12*)?
- Using Variable WLC Pricing (*25*)?
- Using WebSphere on z/OS (*35*)?
- Using VSAM RLS for CICS (*12*)?
- Using Transactional VSAM (*0*)?
- Doing Heavy VSAM RLS Work?

Survey Questions
Projected Hardware (1 Year from Now)

- Current Server Type
  - z800?
  - z900?
  - z890?
  - z990?
  - z9-109?
  - Other Hardware?
- Using zAAP Processors (*25*)?
- Using IRD CPU Management?
- Using On/Off Capacity on Demand?
- Doing Heavy Cryptographic Work?

Survey Questions
Projected Software (1 Year from Now)

- Operating System
  - z/OS.e?
  - z/OS 1.4 or Earlier?
  - z/OS 1.5?
  - z/OS 1.6?
  - z/OS 1.7?
- Using Variable WLC Pricing?
- Using WebSphere on z/OS?
- Using VSAM RLS for CICS (*8*)?
- Using Transactional VSAM (*2*)?
- Doing Heavy VSAM RLS Work?

6-Month Update
PDSE CPU Time

- At Last SHARE (Hot Flashes #13)
  - Identified problem with high CPU time in PDSE
  - **www.watsonwalker.com/presentations.html**
  - It also identified important APARs

6-Month Update
PDSE CPU Time

- Recommendations
  - Don’t back off PDSE program object libraries
  - Do control use of hiperspaces if CPU time or storage is of concern
  - Options to reduce impact:
    - Turn off hiperspace usage totally (HSP_SIZE=0) – **requires an IPL**
    - Reduce amount of LRU analysis (raise LRUTIME to 60, reduce LRUCYCLES to 120)
    - Use SMS storage class to identify only those PDSE libraries to be cached **(MSR of 3 or less will cause hiperspace caching)**
    - Last ditch – identify just the members you want cached and put them in separate library (we can’t recommend this)
    - If using hiperspace caching and CPU creep occurs, submit a PMR to IBM – there is no outstanding APAR for the CPU creep problem

6-Month Update
PDSE CPU Time

- Important Redbook
  - **SG24-6106-01 – Partitioned Data Set Extended Usage Guide**
  - Updates to the Redbook were made in a Redbooks Technical Note – **Tips0567**
- Important APAR
  - **OA11068** (High CPU Usage with Default Hiperspace Values after the PTF for APAR **OA06884**)
  - Supersedes the Redbook
  - New recommendation – use MSR=1 to force caching; MSR=999 to bypass caching
- New APAR
  - **OA12822** (*PDSE Performance - Buffer Beyond Data Set Close*, **OPEN** 23Jul2005) will reduce overhead when using CA-7 with PDSE JCL libraries

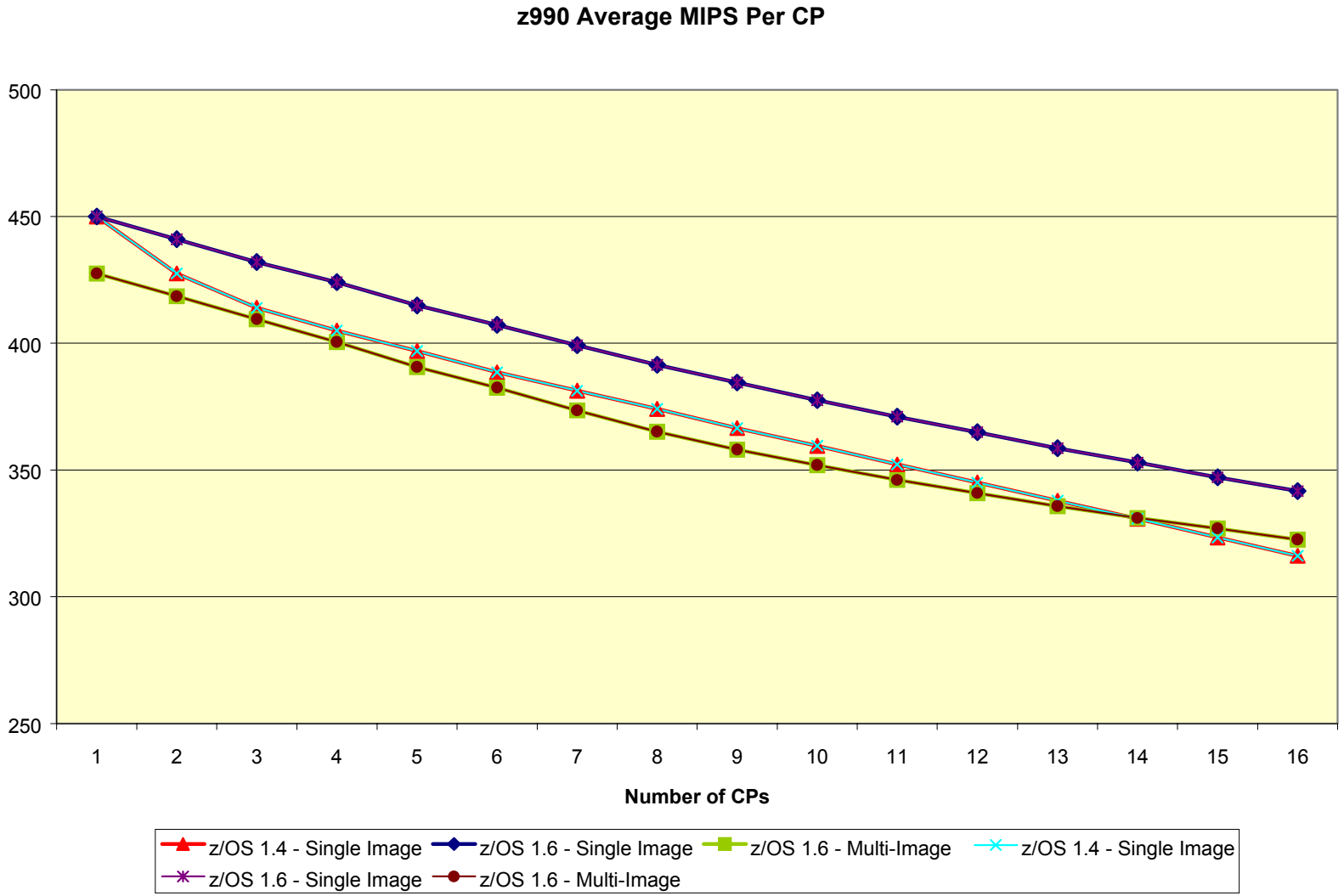
New LSPR Values

- zSeries LSPR Values for z/OS 1.6
  - Newly Published on July 26, 2005
  - Primitive LSPR workloads for zSeries:
    - CB-L – Commercial Batch
    - CB-J – Commercial Batch Java (new workload replacing CB-S)
    - OLTP-W – Online Web-enabled Processing
    - OLTP-T – Online Traditional Processing
    - WASDB – WebSphere
  - Mixed workloads
    - Mixed – now uses CB-J instead of CB-S, so MIPS appear much higher
    - TI-Mix – Transaction-Intensive Mix
    - LOIO-Mix – Low I/O Mix (MIPS are more consistent)

New LSPR Values

- Changes in the LSPR values for z/OS 1.6
  - Changes: CB-J replaced CB-S so MIX MIPS appear higher; now includes z9-109 processors; published values for single image and for multi-image (LPAR) environments
  - New LSPR materials warn against using anybody's CPU Chart
    - We obviously disagree about our CPU Chart, because we publish MIPS by workload and not just average MIPS. We agree about any CPU Chart that only publishes average MIPS – these will not be accurate or even close!
- ***TUNING* Letter** (2004 No. 2)
  - The entire issue on this topic is now available on our Web site (see Sample Issues)
  - IBM says it's out of date. We don't believe so. The concept of using Low I/O LSPR values is extremely important. It's just that now IBM publishes LSPR values for Low I/O.

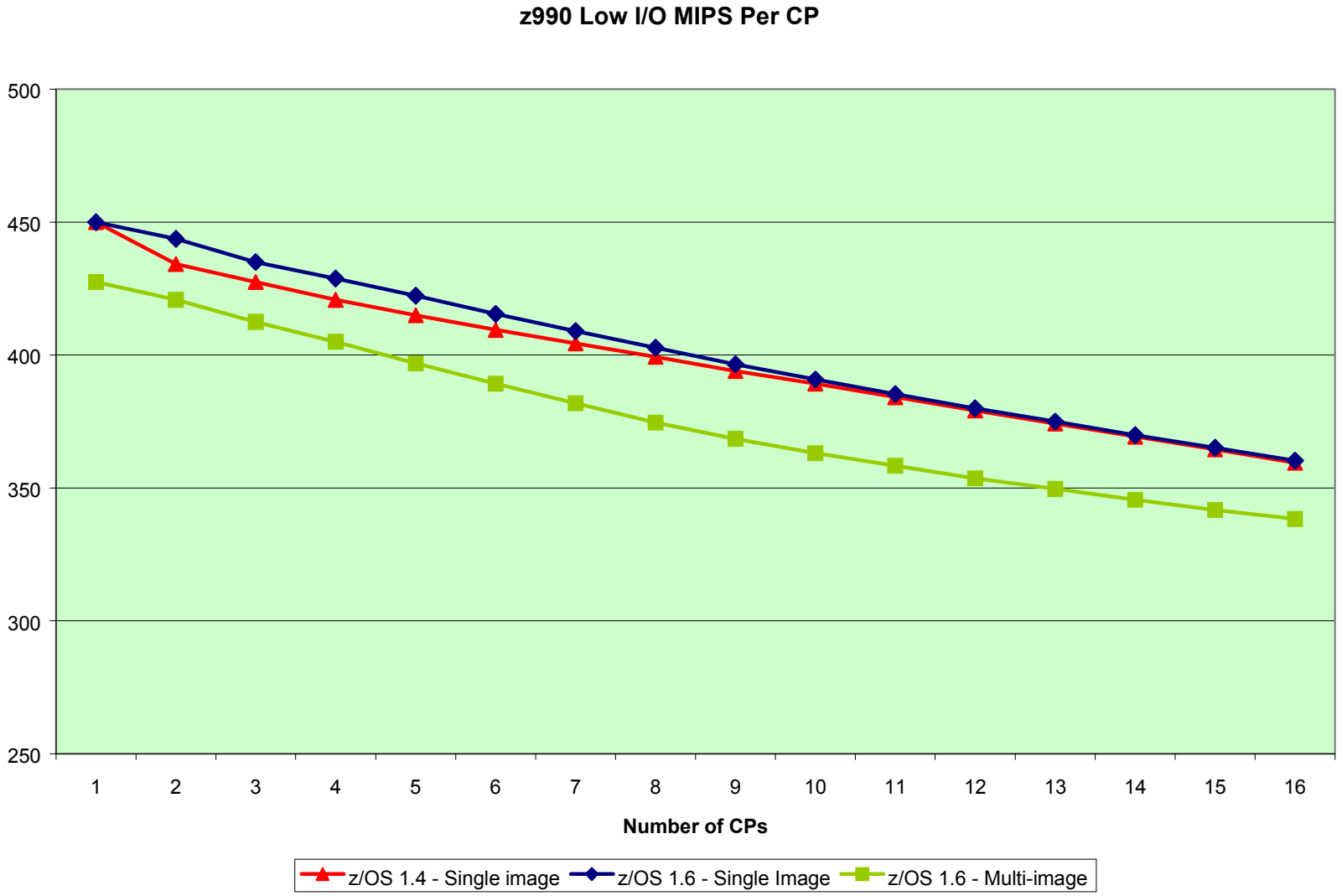
New LSPR Values



New LSPR Values

- Analysis of ‘z990 Average MIPS Per CP’
  - From this chart, please note the following:
    - **z/OS 1.6 single image MIPS for the z990 are higher than z/OS 1.4 values (primarily due to the replacement of CB-S by CB-J)**
    - Multi- image MIPS are consistently lower than single image – as we would expect
  - BUT - Multi-image MIPS more accurately reflect what your installation will see
  - It’s important to begin using multi-image MIPS for your installation

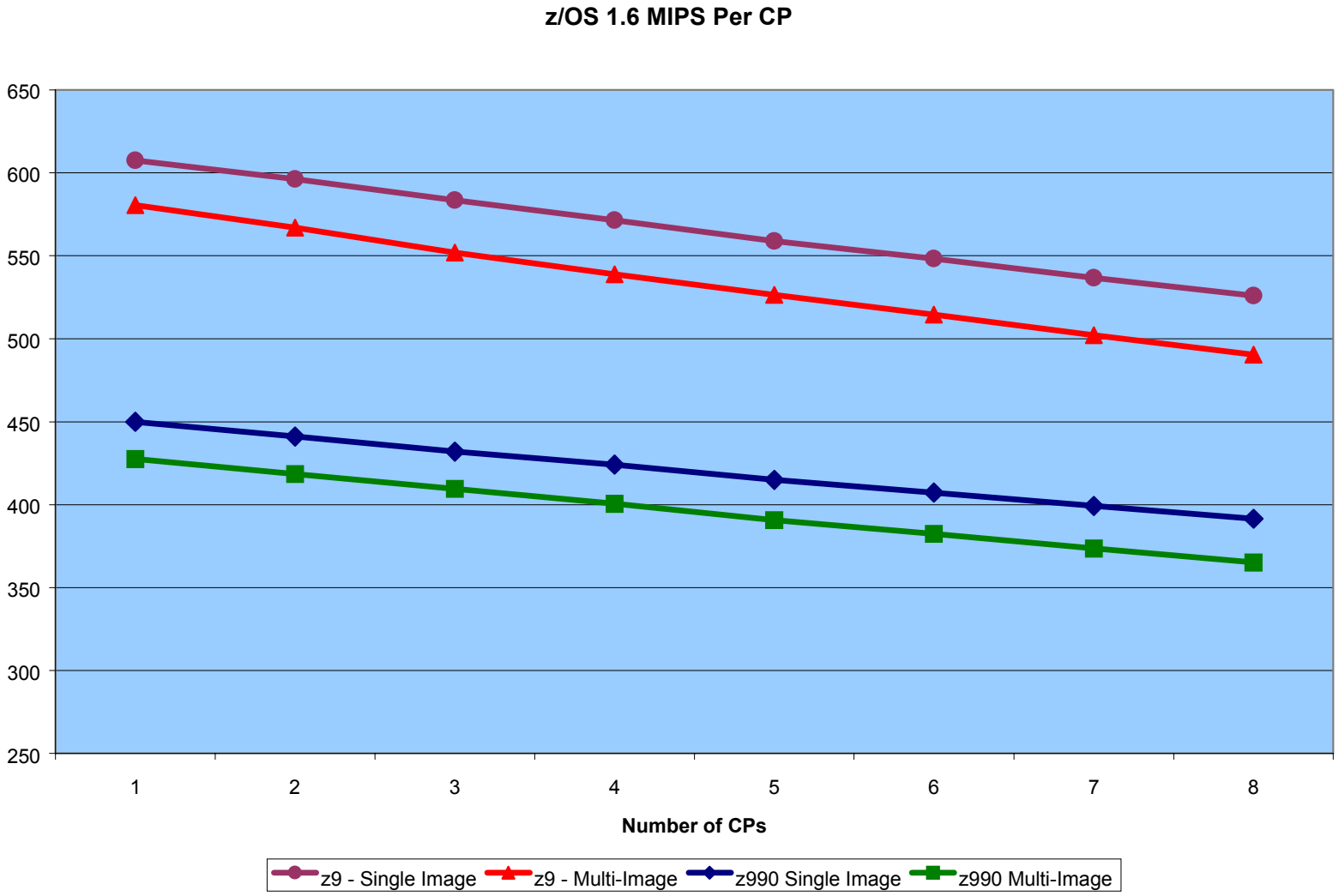
New LSPR Values



New LSPR Values

- Analysis of ‘z990 Low I/O MIPS Per CP’
  - In our analysis, most installations match the profile of the ‘Low I/O’ workload
  - This chart is mainly to show that Low I/O MIPS are fairly consistent
  - Notice that multi- image MIPS are between 20 and 25 MIPS lower than single image
  - That means that you can’t compare your old z/OS 1.4 single image MIPS to the new z/OS 1.6 multi- image MIPS
  - BUT multi- image is closer to what you’ll really see

New LSPR Values



New LSPR Values

- Analysis of 'Average z/OS 1.6 MIPS Per CP'
  - This chart shows the difference in average MIPS per CP between the z9-109 and the z990
  - The z9-109 is about 35% faster than the z990 – that's great!
  - Be aware of the difference between MIPS per CP and total MIPS
    - Example – a 2094-708 varies by **35** MIPS per CP between the single image and multi-image – but that's a total of **280** MIPS
    - If you don't first adjust to multi-image, then you may not get an accurate estimate of capacity
    - As noted before, you'll really experience the multi-image effect
  - Do you see now how important it is to switch to multi-image MIPS or LSPRs at this point in time?

New LSPR Values

- IBM has free tools for sizing
  - Marketing representatives can use free internal tools for processor sizing studies (zPCR and CP2000)
  - Three new custom workloads:
    - Online: (OLTP-W + OLTP-T + WASDB) / 3
    - Other: (CB-L + CB-S) / 2
    - Low I/O: (.60 * CB-L) + (.20 * OLTP-W) + (.20 * WASDB)
    - Low I/O is defined as images that have fewer than 30 DASD SSCHs/Second per used MSU
  - Most installations are in a low I/O environment
  - zPCR to be free as of 4Q05 (**WSC Flash10399**)

New LSPR Values

- Last SHARE
  - Cheryl's session 2537 – z990 Performance & Capacity Considerations
    - If you don't use zPCR or CP2000, you may be disappointed
    - IBM representative is required to run CP2000 prior to completing a contract for a z990
    - Our experience – the people at the site who confirm the capacity of a new machine have never heard of these tools
    - It's imperative that you get the tools and understand the results before confirming your hardware order

New LSPR Values

- Thanks to IBM
  - **www-1.ibm.com/servers/eserver/zseries/lspr/**
  - New multi-image LSPR values will provide a much better view of capacity
  - New CB -J workload is much better than CB-S for today's work
  - Free zPCR Tool should become mandatory before any upgrade

- Warning – It may take customers some time to get used to (and fully understand) the new multi-image LSPR values – stay tuned for future analysis

z/OS 1.7
What We Like About It

- IFASMFDP- SMF Dump Program
  - Data Buffers Moved Above the 16MB Line
  - Better Performance / Constraint Relief
  - More Output DD Statements Per Execution
- Integrated Catalog Forward Recovery Utility
  - Former Product 5798-DXQ (ICFRU)
  - Now Included in Base Product
  - Rebuild Catalog from Backup & SMF Records
- JES2
  - Larger SPOOL Data Sets
  - NJE Over TCP/IP (1Q/2006 – OA12364)
  - Exit Enhancements – Exits May Need Reworking!

z/OS 1.7
What We Like About It

- VARY Command Enhancements
  - Faster for a Range of Devices
  - Less Chance of Deadlock Situations
  - Shorter Holds for SYSIEFSD Q4
  - See Session 2848 at Anaheim SHARE
    - Changes in MVS Device Allocation Serialization
- New DEVMAN Address Space
  - Helps Handle CTRACE Events from some DFP Components
    - Common VTOC Access Facility (CVAF)
    - Direct Access Device Storage Management (DADSM)
  - Better Performance and Reliability
  - Easier to Diagnose Control Block Damage
- Increased Limits for VSAM Data Sets
  - Up to 7,257 Extents per VSAM Component (was 255)
  - Make Sure ISV Product Maintenance is Current
  - Test all In-House Applications

z/OS 1.7
What We Like About It

- V SMS,VOLUME Command
  - Change the Status of an SMS-Managed Volume
  - Faster Alternative to ISMF
- Integrated Health Checker
  - Part of Operating System
  - Redesigned with Two Components
    - Framework (Backbone)
    - Checks
  - SDSF Interface (CK Panel)
- Dynamic SRM Processor Speed Adjustment
  - For z890 Processors
  - Rolled Back to z/OS 1.4 – z/OS 1.6 with **OA07510**
  - Test your Performance Applications before Using
- Install z/OS UNIX Kernel Maintenance without an IPL

Important APARs
Obsolete VSAM Attributes

- Obsolete VSAM Attributes
  - IMBED, REPLICATE and KEYRANGE
  - Not Supported for New VSAM Data Sets
  - Open will Fail for EXISTING Data Sets in a Future z/OS Release (sometime after z/OS 1.7)
- **II13894**
  - Describes Free Tool to Identify Existing Data Sets
- **OA10952**
  - Enhancement to IDCAMS EXPORT and IMPORT
  - Removes IMBED and REPLICATE
  - Use to Fix Existing Data Sets

Important APARs
LISTCAT and INVALID Output

- User Was Using LISTCAT for VSAM Production KSDS
  - Passing SYSPRINT Output to a Program
  - Determine Data Set Health Based on Statistics
  - Generate Re-organization JCL as Needed
  - Stopped Working After z/OS 1.5 Migration
- LISTCAT Output Contains the Word “INVALID” for some Items
  - *REC-TOTAL, REC-DELETED, REC-INSERTED,*
  - *REC-UPDATED, REC-RETRIEVED,*
  - *SPLITS-CI, SPLITS-CA, FREESPC, EXCPS*
- **OA06499** Caused this Change
  - ABEND in Program with Open-for-Update VSAM Data Sets
  - Updated In-Memory Statistics not Copied to Catalog Entry
  - Implemented for Catalogs in z/OS 1.3
  - Implemented for Other VSAM Data Sets in z/OS 1.5

Important APARs
LISTCAT and INVALID Output

- To Fix Problem for Broken Catalogs
  - Apply **OA08508** to All Images Sharing Catalogs
  - Set SHAREOPTIONS(3,4) for Catalog
  - Place Catalog on a Shared Volume
  - Add “Some Number” of Catalog Entries
- To Fix Problem for Broken VSAM Data Sets
  - Apply **OA09038** and **OA10952**
  - Re-organize the Data Set
    - EXPORT then IMPORT
    - REPRO, DELETE, DEFINE then REPRO
  - Other Functions (VERIFY, EXAMINE) will NOT Correct
- A Number of Complaints to IBM about this Solution

Important APARs
LISTCAT and INVALID Output

- We Worked with the User and IBM
  - Thanks to **Stephen Branch** and **Mark Thomen** of IBM
- Resulting APAR **OA11927** Changes LISTCAT Again
  - Previous Numeric Values are Back; No More INVALID Messages
  - Warning Message if Statistics May Be Incorrect
  - Asterisk Identifies Suspect Values
- See also Information APAR **II14008**
- Philosophical Issue When Using Suspect Data
  - Show Data with no Warning (pre-OA06499)
  - Suppress Data (OA06499)
  - Show Data with Warning (OA11927)
- Thanks to **Steve Mawhinney** (Wells Fargo)

Important APARs
Large Numbers of Processors

- Support Increased from 24 to 32 Processors per Image
  - June, 2005
  - Support for z/OS 1.6 and z/OS 1.7
- Performance Fixes for z/OS 1.6 Only (in z/OS 1.7 base)
  - **OA09688** – Performance Improvements for GRS ENQ Processing
    - Reduces Contention for CMSEQDQ Lock
    - Environments with 16+ CPs will Benefit
  - **OA09340** – Performance Enhancement for Catalog
    - Reduces Contention for Catalog Serialization Mechanisms
    - Environments with 16+ CPs will Benefit
- See **Flash10401**
  - *Support for 32 CPs in z/OS 1.6 and z/OS 1.7*
- z/OS 1.6 Users with Many CPs Should Consider

Important APARs
Accounting for zAAP Processors

- APAR **OA10901**
  - Adds a zAAP Normalization Factor to the SMF Type 30 Record
    - SMF30ZNF
    - Two Bytes (Halfword)
    - Binary Format
  - Applies to z/OS 1.6+
  - Important When Comparing IFA and CP Times
    - (IFA Time * SMF30ZNF) / 256
- References
  - ***TUNING* Letter** 2004 Number 4, pages 14-23
  - ***TUNING* Letter** 2004 Number 5, pages 32-46

Important APARs
RMF Monitor I Options

- APAR **OA06476** for RMF
  - Added Support for DS6000 and DS8000
  - Added New ESS/NOESS Keywords for Monitor I
  - Introduced Problems During Options Processing
    - Some Options Ignored and Defaults Used Instead
    - Options In Secondary Members Override Earlier Members
    - Both Problems Relate to Coding of ESS/NOESS Keywords
- Solution
  - Install **OA10992**
  - Local Fix: Place ESS/NOESS in First Member
- RMF Documentation Appears to be Wrong
  - Option in ***Earlier*** Members will Override ***Later*** Members
- Thanks to **Lawrence Jermyn** (Fidelity Investments)

Important APARs
VSAM Tuning

- APAR **OA11334**
  - Adds New Messages to IDCAMS EXAMINE INDEXTEST
    - IDC11773I
      - Number of Keys on Each Index Level
      - Average Key Length After Compression
    - IDC11774I
      - Current CI Size
      - Recommended Minimum CI Size
    - IDC11775I
      - Number of Unreachable CI Blocks (if any)
  - Should be Useful for VSAM KSDS Tuning
    - Values Difficult to Obtain Elsewhere
  - Bad News: Currently Only Available for z/OS 1.6+

Important APARs
IOS Storage Relief

- APAR **OA09050**
  - Adds Option to Move IOS Control Blocks into 31-bit Storage
  - Applies to z/OS 1.4 – z/OS 1.6
  - New IECIOSxx Option in SYS1.PARMLIB
    - **`STORAGE IOSBLKS=xx`** (where xx = 24 or 31; default 24)
  - New Operator Commands
    - **`SETIOS STORAGE,IOSBLKS=xx`** (where xx = 24 or 31)
    - **`DISPLAY IOS,STORAGE`**
  - Errors Against OA09050
    - **OA11654** and **OA11776**
  - Option Removed as of z/OS 1.7
    - IOS Control Blocks will ALWAYS be in 31-bit Storage
    - Use APAR Now to Test Applications Before z/OS 1.7 Migration
    - Use APAR Now for IOS Storage Relief
- Thanks to **Brian Currah** (BDC Computer Services)

Important APARs
Catalog Problems #1

- User Installed System with UCBs Moved Above 31-bit Line
  - Implemented and Ran Fine for Several Weeks
  - IPL Failed Because of Repeated Catalog Address Space (CAS) ABENDs
  - UCB for Catalog Volume Had Been Moved Above the Line
- APAR **OA10995** Corrected Problem
  - Applies to All Levels of DFSMS
  - Local Fix is to Return to Old Configuration
- See Also
  - **OA11212**
  - **OA10213**
  - **OA10458**
  - **OA09237**
- Thanks to **Dan Schwarz** (University of Wisconsin Hospital and Clinics)

Important APARs
Catalog Problems #2

- User Had Installed Catalog Level Set Maintenance
  - OA11087 (DFSMS for z/OS 1.3 – 1.4)
  - OA11088 (DFSMS for z/OS 1.5)
  - OA11089 (DFSMS for z/OS 1.6)
- Problem Appeared for Generation Data Sets (GDSs)
  - Only Affected GDSs Created After Level Set Applied
  - Job Creating GDS Ran Without Error
  - Job Attempting to Access GDS Failed
  - Only Some GDSs Affected (One Catalog)
- APAR OA11898 Solved the Problem
  - Applies to All DFSMS Levels 1.3 – 1.6
  - Corrects Invalid Pointer to GDG Extension Record
  - User Had to Correct Invalid GDS Entries Manually (1+ Day)
- Thanks to **Yvonne Zemotel** (State Street Bank)

Important APARs
SAS Time Values and Leap Seconds

- Leap Seconds
  - Adjust Time to Account for Earth's Rotation
  - One Added Approximately Every 18 Months
  - There Have Been 22 Since January, 1972
  - Next One in December of 2005
  - Hardware Clock – TAI Uses Leap Seconds; GMT Does Not
  - Stored in CVTLSO
- SAS Date/Time Values Wrong When Leap Seconds Used
  - Code was ADDING Leap Seconds instead of SUBTRACTING
  - Date/Time Values will be Off by 44 Seconds
  - No Effect on SMF Record Processing or Stored Date/Time Values
  - Only Happens When Date/Time Values are *Displayed*

Important APARs
SAS Time Values and Leap Seconds

- Do I Have the Problem?
  - Run this SAS Code on each Image

```
//   EXEC SAS
//SYSIN   DD *
  DATA _NULL_;
 dt=datetime();
 put dt= datetime22.3;
 RUN;
```

  - Check Displayed Time Against JOBLOG Times
- How Do I Correct It?
  - **support.sas.com**
  - Search for **Note 15716**
  - Corrected in a SAS 9.1.3 post SP3 HOTFIX
  - Included in SP4
- Thanks to **Rich Anderson** (SAS Institute)

Useful Resources
Downloads & Enhancements

- Download z/OS 1.6 PDF Files
  - **www.ibm.com/servers/eserver/zseries/zos/bkserv/r6pdf/mvs.html**
  - Several Useful Documents
    - **z/Architecture Principles of Operation (SA22-7832)**
    - **z/Architecture Reference Summary (SA22-7871)**
- Recent SDSF Enhancements
  - Command Extension Pop-Up Improvements (z/OS 1.4)
  - Suppress “LPAR CPU Busy” on DA Screen (z/OS 1.5)
  - Support for Multilevel Security; MLS (z/OS 1.5)
  - Support for zAAP Processors (PQ93310)
  - See Anaheim session 2671 (SDSF Futures & Recent Tips)

Useful Resources
Software

- RACFICE Tool
  - Uses the ICETOOL Function of DFSORT
  - Contains JCL, ICETOOL Control Statements and Documentation
  - Has Been Around for a Decade / But Still New to Some
  - Creates RACF Security Reports Based Upon:
    - IRRDBU00 Output (RACF Database Unload)
    - IRRADU00 Output (RACF SMF Data Unload)
  - Over 30 Sample Reports
    - 18 Based Upon Database Records
    - 13 Based Upon Event Data (SMF)
  - Use Samples to Design Your Own Reports
  - **www.ibm.com/servers/eserver/zseries/zos/racf/racfice.html**

Useful Resources
Publications

- Redbooks
  - **www.redbooks.ibm.com**
  - **SG24-6472-00** (6Jul2005)
    - **System Programmer's Guide to: Workload Manager**
  - **SG24-6374-00** (18Jul2005)
    - **GDPS - An Introduction to Concepts and Capabilities**
  - **SG24-6651-00** (3Aug2005)
    - **z/OS V1R6 DFSMS Technical Guide**
  - **SG24-6983-01** (2Aug2005)
    - **ABCs of System Programming Volume 3**

Useful Resources
Publications

- Techdocs – The Technical Sales Library
  - **www.ibm.com/support/techdocs**
  - **WP100402** (29Jul2005)
    - Generating WTO Messages from RMF Exceptions
  - **TD102183** (8Jun2005)
    - New SMF Support for zAAPs and SMF Accounting
  - **WP100417** (1May2005)
    - Capacity Planning for zAAP Processors
  - **Flash10354** (21Jun2005)
    - WLM Classification of the ICSF Address Space

Useful Resources
Publications

- UNIX for MVS People (IBM)
  - **z/OS V1Rx UNIX System Services Planning (GA22-7800)**
  - **z/OS V1Rx UNIX System Services User's Guide (SA22-7801)**
- UNIX for MVS People (non-IBM)
  - **www.oreilly.com**
    - Learning the UNIX Operating System, 5th Edition; A Concise Guide for the New User
    - UNIX Power Tools, 3rd Edition
    - UNIX in a Nutshell
  - **www.amazon.com**
    - UNIX for the Mainframer: The Essential Reference for Commands, Conversions, TCP/IP
  - **Bob Johnson** (**BJohn913@erols.com**)
    - UNIX as a Second Language

Useful Resources
Publications

- Watson & Walker Web Site (All Free!)
  - **www.watsonwalker.com**
  - Articles
    - *Cheryl's Quickstart Service Policy*
    - *Processor Upgrades*
    - *Why Tune?*
  - Presentations
    - *Hot Flashes #5 through #13*
    - *WLM Quickstart Policy Update*
    - *z990 Performance & Capacity Planning Issues*

Useful Resources
Publications

- Watson & Walker Web Site (All Free!)
  - Sample ***TUNING* Letter** Issues
    - Currently Five Issues Available
    - Last Issue was 2004 Number 2
      - z990 Performance
      - Free I/O Density Program
        - **www.watsonwalker.com/lowio.txt**
  - Cheryl's List
    - Subscribe
    - Read Past Issues

- Useful Tools Our Readers May Not Know About
  - Web site Index to Past TUNING Letters
  - Web site Description of Latest CPU Chart
  - Searchable CD-ROM with Materials from 1991 to Present

Just for Fun

- T-Shirts and Related Merchandise
  - **www.thinkgeek.com**
- Computer History on T-Shirts
  - **www.geekt.org**
- **Barry Merrill's** Button Collection
  - **www.mxg.com/thebuttonman/**
- Google Maps
  - **maps.google.com**
  - Check out the satellite option

Just for Fun

- Photos to Postage Stamps
  - **www.photostamps.com**
- Color Test (Left versus Right Brain)
  - **www.njagyouth.org/colortest.swf**
- Institute for Backup Trauma (John Cleese)
  - **www.backuptrauma.com/video/default2.aspx**
- Making Learning Fun
  - **www.sheppardsoftware.com**
- Revenge of the Organic Produce
  - **www.storewars.org**

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