Using New CP Features in z/VM 5.4

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

- z/VM® Evolution
- z/VM Version 5 Release 3 (V5.3) Service
- z/VM Evaluation Edition
- z/VM Version 5 Release 4 (V5.4) Enhancements
  - Enhanced scalability and constraint relief
  - Virtualization technology and Linux enablement
  - Network virtualization
  - Miscellaneous
- Statement of Direction
z/VM Evolution

Expand your opportunities with z/VM

Version 3

- z/VM V3.1
- 02/2001

Version 4

- z/VM V4.1
- 07/2001
- z/VM V4.2
- 10/2001
- z/VM V4.3
- 05/2002
- z/VM V4.4
- 08/2003

Version 5

- z/VM V5.1 (CCC)
- 09/2004
- 09/2007

- z/VM V5.2
- 12/2005
- 04/2009

- z/VM V5.3 (CCC)
- 06/2007
- 09/2010

- z/VM V5.4
- 09/2008
- 09/2011

Legend:
- Purple: Withdrawn from marketing and no longer serviced
- Blue: Currently being marketed and serviced
- Orange: Withdrawn from marketing
- Green: On the horizon

XX/XXXX – General Availability (top of box)
XX/XXXX – Service Discontinued (bottom of box)
z/VM Version 5 Terms and Conditions

- **International Program License Agreement (IPLA)**
  - Program Use License
    - One-time charge (OTC) for standard or IFL processors
      - Engine-based Value Units
    - Can be transferred within an enterprise
    - Service by mail, fax, and e-mail only under basic warranty
  - Subscription and Support (S&S)
    - Comparable service to traditional ICA products
    - Not required but highly recommended
    - Must decline when ordering if not desired
    - Annual renewable charge per processor
    - Adds telephone support
    - No additional charges for updates, new versions and releases

- **SoftwareXcel available for an additional charge**

- **IPLA applies to z/VM base code and the optional features**
  - DirMaint, RSCS, RACF Security Server for z/VM, and the Performance Toolkit for VM

- **No-charge upgrade to the Performance Toolkit for VM for:**
  - Customers who purchased z/VM V4 S&S for the RTM, PRF, or Performance Toolkit for VM features
  - Customers who purchased the FCON/ESA program (5788-LGA)
z/VM V5.3 Service

- System z10 Processor Compatibility (VM64180, UM32277/32278)
  - Guest support for Execute-Extensions Facility
- System z10 IOP Subchannel Recovery (VM64242, UM32285/32286)
- Memory Management Improvement (VM64349, UM32250/32251)
- Encryption Re-Key Support – z/VM 5.3 only (VM64260, UM32221)
  - SET TAPE REKEY
- Virtual Switch Port Isolation (VM64281, UM32270) (VM64463, UM32565/32566)
  - Isolate guests on VLAN-unaware virtual switch (DROP inter-guest traffic)
- System z10 Performance Toolkit OMEGAMON Enhancements (VM64337, UM32233/32234)
- System z10 Performance Toolkit Enhancements (VM64369, UM32257/32258)
- System z10 IOCP Support (VM64302, UM32279/32280)
- Missing adapter interruption detection (VM64398, UM32371/UM32372)
- FLASHCOPY SE (VM64449, UMxxxxx)

- DVD-RAM containing z/VM 5.3 (also available via Web download)
  - Boot loader
  - z/VM 5.3 Nucleus
  - RAMdisk – one-pack system
    - CP
    - CMS
    - DIRMAINT
    - Performance Toolkit

- Insert in HMC DVD drive and IPL (“Load from CD-ROM or server”)
  - Requires 3GB or larger logical partition on System z10
  - Automatic invocation of customization script

- Save customizations on DVD
  - New guest definitions
  - Additional DASD allocations
  - System configuration changes

www.vm.ibm.com/eval
z/VM V5.4 CP Enhancements (GA: Sept 12, 2008)

- **Enhanced scalability and constraint relief**
  - System z10 processor instruction exploitation
  - Dynamic memory upgrade
  - DAT Table performance enhancements

- **Virtualization enhancements for Linux and other guests**
  - Virtual CPU SHARE redistribution
  - Mixed-engine partition enhancements
  - Dynamic memory upgrade virtualization
  - Guest FCP dump
  - DCSS above 2GB

- **Network virtualization**
  - Multi-port OSA
  - Virtual switch networking management

- **Miscellaneous**
  - Persistent FLASHCOPY
  - SHUTDOWN verification
  - OSA, FCP, and Hipersockets MIH support
  - Logical volume expansion compatibility
  - Enable PerfKit Diagnose 4 independence
  - Virtual Switch port isolation
Enhanced Scalability and Constraint Relief

- System z10 processor instruction exploitation
- Dynamic memory upgrade
- DAT Table performance enhancements
System z10 New Instruction Support

- **Execute-Extensions facility**
  - Execute Relative long (EXRL)

- **General-Instruction-Extension Facility**
  - 71 new instructions, 4 new instruction formats, 7-character mnemonics

- **Parsing-Enhancement Facility**
  - Translate and Test Extended, Translate and Test Reverse Extended
Dynamic Memory Upgrade

- **Allow z/VM to dynamically increase amount of real memory**
  - Define partition with Initial and Reserved amounts
  - Enable portion of Reserved amount to be brought online
  - Appropriate planning can enable memory growth to meet demand

- **Does not allow storage to be deconfigured dynamically**
  - Difficult technical challenge
  - May not meet some customer needs

- **Complements existing ability to add processors and I/O resources non-disruptively**
Dynamic Memory Upgrade ...
Dynamic Memory Upgrade …

- Storage defined in increments
- Increment size determines multiples in which storage can be added
- Increment size
  - Is a function of potential storage size (Initial + Reserved)
  - Is expressed in megabytes
  - Must be a power of 2
- Cannot be more than 512 increments

<table>
<thead>
<tr>
<th>Storage Size (s)</th>
<th>Increment Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>s ≤ 512M</td>
<td>1M</td>
</tr>
<tr>
<td>512M ≤ s ≤ 1G</td>
<td>2M</td>
</tr>
<tr>
<td>1G ≤ s ≤ 2G</td>
<td>4M</td>
</tr>
<tr>
<td>2G ≤ s ≤ 4G</td>
<td>8M</td>
</tr>
<tr>
<td>4G ≤ s ≤ 8G</td>
<td>16M</td>
</tr>
<tr>
<td>8G ≤ s ≤ 16G</td>
<td>32M</td>
</tr>
<tr>
<td>16G ≤ s ≤ 32G</td>
<td>64M</td>
</tr>
<tr>
<td>32G ≤ s ≤ 64G</td>
<td>128M</td>
</tr>
<tr>
<td>64G ≤ s ≤ 128G</td>
<td>256M</td>
</tr>
<tr>
<td>128G ≤ s ≤ 256G</td>
<td>512M</td>
</tr>
</tbody>
</table>
Dynamic Memory Upgrade ...

Set
STOrage
STOre
size
AS
+additional
Dynamic Memory Upgrade …

- QUERY STORAGE reports additional information
  
  STORAGE = d  CONFIGURED = c  INC = i  STANDBY = s  RESERVED = r

- Initialization of dynamically added storage above 2G is lazy
  - Immediate if demand exists (may be partial)
  - When idle otherwise

- Monitor records
  - MRMTRMCC (Event) created when partition memory configuration changes
  - MRMTRMEM (Sample) includes standby and reserved storage sizes
  - MRSTOADD (Event) created when memory added via SET STORAGE
DAT Table Performance Enhancements

- **Support 64-bit host Control Registers**
  - CR 1 (Primary Space)
  - CR 7 (Secondary Space)
  - CR 13 (Home Space)

- **Enables Region and Segment tables that describe guest storage to reside above 2G**

- **Mitigates “needle in haystack” problem**
  - Upper-level DAT tables may require multiple contiguous frames
  - Can be difficult to find in constrained below-2G storage
Virtualization Technology and Linux Enablement

- Virtual CPU SHARE redistribution
- Mixed-engine partition enhancements
- Dynamic memory upgrade virtualization
- Guest FCP dump
- DCSS above 2GB
Virtual CPU Share Redistribution

- SHARE distributed evenly among guest virtual CPUs
- Prevents dynamic accommodation of changes in multiprogramming need

<table>
<thead>
<tr>
<th>CPU 0</th>
<th>CPU 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHARE: 50</td>
<td>SHARE: 50</td>
</tr>
<tr>
<td>Guest SHARE=100</td>
<td></td>
</tr>
</tbody>
</table>

Define two more virtual CPUs due to load increase

<table>
<thead>
<tr>
<th>CPU 0</th>
<th>CPU 1</th>
<th>CPU 2</th>
<th>CPU 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest SHARE=100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

More virtual CPUs, each with fewer resources

- Cannot reduce number of virtual CPUs with DETACH because of associated virtual system reset
- However, guest can start and stop virtual CPUs to control its multiprogramming level
Virtual CPU Share Redistribution …

- Virtual CPU SHARE redistribution eliminates need for DETACH by not distributing SHARE to stopped virtual CPUs

<table>
<thead>
<tr>
<th>CPU 0</th>
<th>CPU 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHARE: 100</td>
<td>STOPPED</td>
</tr>
<tr>
<td>SHARE: 0</td>
<td></td>
</tr>
</tbody>
</table>

Guest SHARE=100

Start second virtual CPU due to load increase

<table>
<thead>
<tr>
<th>CPU 0</th>
<th>CPU 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHARE: 50</td>
<td>SHARE: 50</td>
</tr>
</tbody>
</table>

More active virtual CPUs with same resources

Guest SHARE=100

- Linux CPU hotplug daemon starts/stops CPUs based on Load Average
- Monitor records
  - MRMTRUSR, MRUSEACT, MRUSEINT – Added number of virtual processor starts/stops
Mixed-Engine Partition Enhancements

- System z10 introduced “z/VM-mode” partitions
- Allow CPs, IFLs, zIIPs, zAAPs, and ICFs in a single partition
- z/VM manages guest dispatch appropriately

Add Linux on IFLs

Add z/OS on CPs
Mixed-Engine Partition Enhancements …

- Consolidate partitions
  - Reduce systems management effort
  - Improve processor, memory and I/O utilization
  - Simplify connectivity (Guest LAN, Virtual Switch)

- Run IPLA products on IFLs
- Run MLC products on CPs
- Exploit spare ICF capacity
- Also fully virtualized
Mixed-Engine Partition Enhancements …

- QUERY PROCESSORS EXPANDED reports partition mode
  - ESA/390, LINUX-ONLY, or z/VM

- SET SHARE allows different share settings for each processor type
  - Only applicable if CPUAFFINITY ON
Mixed-Engine Partition Enhancements ...

- Set SHARE userid
  - TYPE
    - ALL
    - CP
    - ZIIP
    - ZAAP
    - IFL
    - ICF

- Set VCONFIG MODE
  - ESA390
    - LINUX
    - VM

- Query VCONFIG
Mixed-Engine Partition Enhancements …

- **Monitor records**
  - MRUSEINT – Virtual configuration mode
  - MRMTRSYS – Real configuration mode
  - MRMTRUSR, MRSCLADL, MRSCLAEL, MRSCLDDL, MRSCLSHR, MRUSELOF, MRUSELON – CPU SHARE settings
  - MRMTRUSR, MRSCLSHR, MRUSEACT, MRUSEATE, MRUSELOF, MRUSELON – Per-CPU type SHARE settings
  - MRMTRUSR – Number of virtual ICFs
  - MRMTRPRP, MRPRCPRP, MRPRCVON, MRSTORSP, MRSTOSXP, MRSYTCOM, MRSYTPRP, MRSYTRSP, MRSYTSACP, MRSYTSXP, MRSYTSYP, MRSYTXSP, MRUSEDFC, MRUSEDTC, MRUSEINT, MRUSEITE, MRUSELOF, MRUSERDC, MRUSETRE – New engine type code for ICF
  - MRSYTUWHT – Dispatch list counts for ICFs
Dynamic Memory Upgrade Virtualization

- Virtualized dynamic storage reconfiguration architecture
  - Enables guests to dynamically increase or decrease memory
  - Limited by maximum storage size in User Directory
- Supported by z/OS and z/VM guests
- Linux guest exploitation anticipated
Dynamic Memory Upgrade Virtualization ...
Dynamic Memory Upgrade Virtualization …

- QUERY VIRTUAL STORAGE response enhanced
  - STORAGE = d  MAX = m  INC = i  STANDBY = s  RESERVED = r

- Increment rules same as for real storage

- Initial reserved storage size limited to maximum-defined
Guest FCP Dump

- Enable guest to dump to SCSI device
  - Capacity
  - Performance
- Supported by Linux and z/VSE
Guest FCP Dump ...

1. Set-DUMPDEV
2. PORTname-hhhhhhhh
3. LUN-hhhhhhhh
4. BOOTprog-bootprog
5. BR_LBA-hhhhhhhh
6. SCPdata
7. APPend
8. NEW
9. offset
10. HEX
11. 'text'
12. text

13. Ipl...
14. fcp_vdev...
15. DUMP
DCSS Above 2G

- **Problem exploiting DCSS support (e.g., with XIP)**
  - DCSS below 2G limited machine size and complicated configuration
  - DCSS ≤ 2047M limited size of shared memory

- **Enabling 2047M DCSS above 2G addresses both problems**
  - Some added complexity for exploiters (Linux)
  - New 64-bit interfaces to Diagnose 64
DCSS Above 2G ...

- **DEFSEG** allows page ranges up to X’7FFFFFFF’ (512 GB)
  - SPACE, SECURE, and SC ranges not allowed

- **Number of page ranges for DEFSYS and DEFSEG** reduced to 64 from 128

- **QUERY NSS MAP** response changed for segments above 2G
  
  ```
  FILE  FILENAME  FILETYPE  BEGPAG     ENDPAG   TYPE  CL  #USERS
  spid fn      DCSSG  nnnnnnnnnnnnn  nnnnnnnnnnnnn  type  c  nnnnn
  ```

- **New Diagnose X’64’ subcodes**
  - X’20’ (LOADSHR), X’24’ (LOADNSHR), X’2C’ (FINDSEG), X’38’ (SEGEEXT)
  - Correspond to existing (31-bit) subcodes X’00’, X’04’, X’0C’, and X’18’
  - Subcodes X’20’, X’24’, and X’2C’ produce 64-bit addresses
  - New output area formats for subcode X’38’ accommodate 64-bit addresses
Network Virtualization

- Multi-port OSA
- Virtual switch networking management
Multi-Port OSA

- System z10 OSA-Express3 support
  - Multiple ports per adapter on one CHPID
- Allow port numbers to be specified for Virtual Switch real devices
- Virtualization enables any single port number to be used
- Report port number in QUERY VSWITCH, QUERY PORT, QUERY LAN, QUERY NIC
Multi-Port OSA...

►► ▶ DEFine VSWITCH name... ▶ RDEV nnnn.Pnn... ◄◄

►► ▶ Set VSWITCH name... ▶ RDEV nnnn.Pnn... ◄◄

►► ▶ Set PORT GROup groupname... ▶ JOIN nnnn Pnn... LEAve nnnn.Pnn ◄◄

►► ▶ MODify PORT GROup groupname... ▶ JOIN nnnn Pnn... ◄◄
Multi-Port OSA …

- Report port number in QUERY VSWITCH, QUERY PORT, QUERY LAN, QUERY NIC
- Monitor records
  - Add port number to MRIODVSW, MRIODVSF, and MRIODVSR
- Diagnose X’26C’ Subcode X’20’
  - Add real port number to output
Virtual Switch Management Improvements

- Record Virtual Switch activity counters at either individual VLAN or entire network level
- Improve Virtual Switch/Guest LAN Query selectivity
- Recognize failures of Virtual Switch backup OSA
  - Detect and correct problems when the happen
  - Avoid problems when failover occurs
Virtual Switch Management Improvements ...

- Set-VSWITCH-switchname...-VLAN_counters ON ...
  - OFF

- MODify-VSWITCH-switchname...-VLAN_counters ON ...
  - OFF

- Query-LAN-lanname...-VLAN ANY ...
  - VLAN-vlanid
  - VLAN-NONE
  - USERid-userid

- Query-VSWITCH-switchname...-VLAN ANY ...
  - VLAN-vlanid
  - VLAN-NONE
  - USERid-userid
  - RDEV-nnnn
Miscellaneous

- Persistent FLASHCOPY
- SHUTDOWN verification
- Adapter MIH support
- Logical volume expansion compatibility
- Enable Performance Toolkit Diagnose 4 independence
- Virtual Switch port isolation
Persistent FLASHCOPY

- **Persistent FLASHCOPY**
  - Source-target relationship preserved by DASD subsystem
    - Across z/VM IPL and DASD subsystem reset
    - Can be established by any operating system connected to subsystem
  - Four possible access patterns
    - Read from source
    - Write to source
      - Read original and copy to target first
    - Read from target
      - Read from source if not yet copied to target
    - Write to target
      - Avoid copying source if not yet copied

- **z/VM allows copy relationships between**
  - Full-pack Minidisk/Dedicated <--> Dedicated/Full-pack Minidisk
  - Partial-pack Minidisk <--> Partial-pack Minidisk
Persistent FLASHCOPY ...

- **Relationship established in a few seconds**
  - Copy proceeds in background based on resource availability

- **Avoid background copy**
  - Copy on-demand (only when source written)
  - Good for point-in-time backups

- **Change recording option**
  - Good for test data creation
  - Copy on-demand (only when source written)
  - Can decide later to either discard changes or harden them to target

- **Space-efficient volumes**
  - No background copy
  - Target backed only as required (write to source or target)
  - Withdrawing relationship can release allocated space
Persistent FLASHCOPY …

- **Multiple copies from a single source**
  - Allows cylinder rearrangement
    - Can specify multiple extents for a single target device
  - Sum of each target device extent sizes must equal number of cylinders on source device
Persistent FLASHCOPY ...

q flashcopy hardware 5101

<table>
<thead>
<tr>
<th>SEQUENCE</th>
<th>FLGS</th>
<th>RDEV</th>
<th>VOLSER</th>
<th>CCCC/HH</th>
<th>RDEV</th>
<th>VOLSER</th>
<th>CCCC/HH</th>
<th>REMAINING/TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>4A20BAC2</td>
<td>8800</td>
<td>5100</td>
<td>PACK01</td>
<td>100/00</td>
<td>5101</td>
<td>PACK02</td>
<td>100/00</td>
<td>0/150</td>
</tr>
<tr>
<td>4A20BAC2</td>
<td>8800</td>
<td>5100</td>
<td>PACK01</td>
<td>120/00</td>
<td>5101</td>
<td>PACK02</td>
<td>120/00</td>
<td>309/450</td>
</tr>
<tr>
<td>4A20BAC2</td>
<td>8800</td>
<td>5100</td>
<td>PACK01</td>
<td>150/00</td>
<td>5101</td>
<td>PACK02</td>
<td>170/00</td>
<td>0/150</td>
</tr>
</tbody>
</table>

q flashcopy tabled

<table>
<thead>
<tr>
<th>SEQUENCE</th>
<th>---DATE---</th>
<th>--TIME--</th>
<th>RDEV</th>
<th>VOLSER</th>
<th>CREATOR</th>
<th>OWNER</th>
<th>VDEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>4B145C34</td>
<td>2008-04-30</td>
<td>15:19:55</td>
<td>5100&gt;</td>
<td>PACK01</td>
<td>RWS</td>
<td>RWS</td>
<td>0200</td>
</tr>
<tr>
<td>4B145C34</td>
<td>2008-04-30</td>
<td>15:19:55</td>
<td>&gt;5101</td>
<td>PACK02</td>
<td>RWS</td>
<td>RWS</td>
<td>0300</td>
</tr>
<tr>
<td>4B14700A</td>
<td>2008-04-30</td>
<td>15:20:00</td>
<td>5100&gt;</td>
<td>PACK01</td>
<td>RWS</td>
<td>RWS</td>
<td>0210</td>
</tr>
<tr>
<td>4B14700A</td>
<td>2008-04-30</td>
<td>15:20:00</td>
<td>&gt;5101</td>
<td>PACK02</td>
<td>RWS</td>
<td>RWS</td>
<td>0310</td>
</tr>
</tbody>
</table>
Persistent FLASHCOPY ...

q cu dasd 0101 selc
SSID 0101: TYPE=002107 MODEL=921 SN=0000004191
SSID 0101: POOLID RPOSWARN POOLWARN STATUS...
SSID 0101: 0 0% 0% CKD RPOSCONF REPWARN REPFULL
SSID 0101: 1 0% 0% CKD RPOSCONF REPWARN REPFULL
SSID 0101: 3 0% 0% FBA RPOSCONF REPWARN REPFULL
SSID 0101: 4 0% 0% FBA RPOSCONF REPWARN REPFULL

q cu dasd 0101 selc details
SSSID 0101: TYPE=002107 MODEL=921 SN=0000004191
SSID 0101: POOLID RPOSWARN POOLWARN STATUS...
SSID 0101: 1 0% 0% CKD RPOSCONF REPWARN REPFULL
SSID 0101: POOL=1639449/1943298 84%
SSID 0101: RPOS=0/0
SSID 0101: GUAR=0/0
Persistent FLASHCOPY ...

q dasd space-efficient
DASD FCE0 RWSCE0 POOL 1 SIZE 1263286 CYLS
VOLUME CAPACITY LIMIT 0 CYLS, 0%
VOLUME GUARANTEED CAPACITY 0 CYLS, 0%
VOLUME SPACE 30 CYLS USED OF 3339 CYLS DEFINED, 1%
DASD FCE1 RWSCE0 POOL 1 SIZE 1263286 CYLS
VOLUME CAPACITY LIMIT 0 CYLS, 0%
VOLUME GUARANTEED CAPACITY 0 CYLS, 0%
VOLUME SPACE 0 CYLS USED OF 3339 CYLS DEFINED, 0%

q v dasd details
DASD 019E 3390 PACK03 R/O 355 CYL ON DASD 5C81 SUBCHANNEL = 0011 CACHE
DASD 0200 3390 PACK01 R/W 100 CYL ON DASD 5100 SUBCHANNEL = 0002 CACHE SEF
Persistent FLASHCOPY ...

srcfull:

```
SOURCE vdev

0-EN
0-endcylinder
0.numcylinders
```

srcmini:

```
SOURCE vdev

0-EN
startcylinder-endcylinder
startcylinder.numcylinders
```
Persistent FLASHCOPY ...

tgtfull:

```
0-END
0-endcylinder
0.numcylinders
```

(12 times)

tgtmini:

```
0-END
startcylinder-endcylinder
startcylinder.numcylinders
```

(110 times)
Persistent FLASHCOPY ...

-FLASHCOPY-vdev-scyl ecyl END
  \(\rightarrow\)
  vdev-scyl ecyl END

SYNChronous

-FLASHCOPY-ESTABLISH
  srcfull-tgtfull
    \(\rightarrow\)
    srcmini-tgtmini

-CHGRECORD
-NOTWRITE
-REVERSIBLE

-NOCOPY
-FAILNOSPACE
-NOSETARGET

LABEL volser
SAVELABEL
Persistent FLASHCOPY ...

- FLASHCOPY WITHDRAW
  - srcfull
  - tgtfull
  - Force
  - Release
  - srcmini
  - tgtmini

- FLASHCOPY BACKGNDCOPY
  - srcfull
  - srcmini

- FLASHCOPY RESTORE
  - srcfull
  - tgtfull
  - Reverse

- FLASHCOPY TGTWRITE
  - tgtfull
Persistent FLASHCOPY ...

```
----- Query FLASHCOPY -----
| HARDWARE |
|   | rdev |
|   | rdev-rdev |
|   | TABLEd |
| TABLEd | CREATed userid |
| TABLEd | OWNER userid |
| TABLEd | SEQUENCE hhhhhhhh |
| TABLEd | VOLume volser |
| TABLEd | DEVice rdev |

----- Query DASD -----
| SPACE-EFFicient |
| rdev |
| rdev-rdev |
| other Query DASD options |
```
Persistent FLASHCOPY ...

Diagram:

- Query → CU → DASD
- ssid
- ssid-ssid
- ALiases
- DEVices
- PAVMode
- SELC
- poolid
- DETAILS

- Query → Virtual → FLASHCopy → ALL
- vdev
- vdev-vdev
- CREATEd
- *userid
- OWNer
- *userid
SHUTDOWN Verification

- System configuration option to require system name on SHUTDOWN command
- May prevent inadvertent SHUTDOWN of first-level system
  - Better to not give second-level guest Class A privileges
SHUTDOWN Verification ...

►►SHUTDOWN... ────► SYSTEM-systemid

►►FEATURES... ────► DISABLE ENABLE VALIDATE_SHUTDOWN

...
Adapter MIH Support

- Detect and attempt to correct missing interruptions on OSA, FCP, and Hipersockets adapters
- Allow reasonable period of time (five seconds) for expected interruptions to be presented
- Attempt to recover up to ten times
- APAR VM64398 for z/VM 5.2 and 5.3
Adapter MIH Support ...

- New Operator message issued
  
  HCPVAP2154E Missing adapter interruption

- Monitor data
  
  - New fields in MRSYTSYG
    
    - Number of missing adapter interruptions detected
    
    - Number of unrecoverable missing adapter interruptions
Logical Volume Expansion Compatibility

- **DS8000 added support to allow volumes to be expanded dynamically**
  - ECKD: 3390-3 and 3390-9, SCSI
  - Up to 65,520 cylinders

- **z/VM compatible with this feature**
  - Recognizes when expansion has occurred
    - Dedicated: Reflects interrupt to guest
    - Non-dedicated: Prevents use of expanded area until device varied off/on
  - Device model number may change
    - Expand 3390-3 beyond 3339 cylinders => 3390-9

- **APAR VM64305 (PE: VM64354)**
Logical Volume Expansion Compatibility ...

- QUERY DASD DETAILS reports pending expansion
  PENDING EXPANSION DETAILS: DEVTYPE = 3390-0C, CYLS = 65535

- QUERY EDEVICE DETAILS reports pending expansion
  PENDING EXPANSION NUMBER OF BLOCKS: 147483640
Enable PerfKit Diagnose 4 Independence

- Performance Toolkit used Diagnose 4 to obtain fields not in Monitor Data
- Monitor data enhanced to eliminate that dependency
  - MRPRCPRP – CPU operating state
  - MRSTOXSG – Additional page migration counters
  - MRSYTPRP – Additional fast-path function counters
  - MRSYTXSG – Additional Minidisk Cache counters
  - MRUSEACT – Number of Minidisk Cache inserts
Virtual Switch Port Isolation

- Prevent CP from switching packets between guests on same Virtual Switch
  - Allows sharing of OSA(s) without enabling inter-guest communication
  - Drops packets addressed to other guests
Virtual Switch Port Isolation ...

```
▶▶ Set-VSWITCH-switchname...ISOLation OFF...▶▶

▶▶ MODIFY-VSWITCH-switchname...ISOLation OFF...▶▶
```
Statement of Direction

- MMC (Mainframe to Micro Channel) card
  IBM intends to withdraw support in a future z/VM release for the MMC card, which enabled communication between the PS/2 (PWSCS) and VM (PWSCF or ISFC).

✓ z/VM Flashcopy enhancements
  IBM intends to enhance z/VM FlashCopy capabilities to support the FlashCopy SE function of the IBM DS8000 with the PTF for APAR VM64449 in fourth quarter 2008. FlashCopy SE offers a space-efficient snapshot capability that reduces the storage capacity needed for point-in-time copies. This function is especially useful for short-lived testing or backups, such as flash to intermediate volume for backup to tape.
Questions?