z/VM 6.3 Upgrade Installation
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Notes:

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

• New installation option with z/VM 6.3
• What are the objectives
• What is different
• Planning
• Stage 1
• Stage 2
• Finish Upgrade Installation
• Mixed Clusters
• APARs and Notes
• Summary
New Installation Option with z/VM 6.3

• Upgrade Installation
  – Documented in Part 5 of the z/VM 6.3 Installation Guide (GC24-6246-01)
  – Only applies to upgrading from z/VM 6.2
    • Traditional methods apply for migrations from z/VM 5.4 or z/VM 6.1.
  – Restrictions
    • Must not have changed identity/subconfig definitions with user entries for all entries in the initial directory shipped by IBM for z/VM 6.2
    • Must not have changed IBM supplied USER or IDENTITY names
    • Must not have changed IBM supplied minidisk addresses
    • Must not have moved IBM supplied minidisks to different virtual machine definitions
    • Must not have changed the default values in VMSESE PROFILE or VMFINS DEFAULTS
Objectives of Upgrade Installation

• Upgrade a z/VM 6.2 system with minimal impact to the current running system.
  – No manual merge of directories
  – Add new userids to current system
  – Upgrade files on existing disks under VMSES control
  – Flag local modifications for review and customized files

• Support upgrading single members of an SSI cluster

• Support upgrading non-SSI systems

• Support notion of mixed SSI clusters
  – Where individual members of the cluster are at different levels
DASD Volumes and Minidisks

Release disks
One set per release per cluster

Cluster-wide disks
One set per cluster
(PMAINT 141) (PMAINT 142)

System disks - One set per member

Member 1
- IPL
- M01RES
  - MAINT CF1
  - CPLOAD
  - Warm start
  - Checkpoint
  - Object Directory
  - MAINT 190 / 193
  - MAINT 19D / 19E
- M01P01
- M01S01

Member 2
- IPL
- M02RES
  - MAINT CF1
  - CPLOAD
  - Warm start
  - Checkpoint
  - Object Directory
  - MAINT 190 / 193
  - MAINT 19D / 19E
- M02P01
- M02S01

(PMAINT 141)
- (when Installing to 3390 Model 3)
- MAINT630
- MAINT630 (when Installing to 3390 Model 3)
- M02P01
- M02S01

(PMAINT 142)
- MAINT CF2
- MAINT CF2
- VMCOM2
- VMCOM2
- M02P01
- M02S01

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### What is Different?

**Traditional Migration**
- New release installed on separate volumes
- Users and Data from current running system migrated to system running new release
- IPL from new volumes
- Keep old system around for backout

**Upgrade Installation**
- Install new release as temporary work system second level
- Move new level of code to current system with minimal impact
- Support upgrade of single member in a cluster
- Create system backup for reversing upgrade

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Workflow

- Plan and prepare
- Backup current system
- Install z/VM 6.3 work system from MIGMAINT userid
- Generate the stage1 changes file
- Execute stage1 changes
- Finish stage1 changes
  - This may involve reworking local modifications and reviewing the user directory, and ESM
- Backup current system again
- Generate the stage2 changes file
- Execute the stage2 changes
- Review SYSTEM CONFIG, USER DIRECT, and Upgrade Warning File
- Shutdown and IPL the upgraded system or member
Planning

• Select installation media type. Supported types are:
  – Tape
  – Physical DVD
  – FTP server with access to content of DVD
  – CMS-formatted minidisk

• Review and Comply with Requirements
  – General
  – Hardware
  – System Software
  – MIGMAINT
  – DVD Installation
  – Other System Requirements such as SFS space, directory and security managers
Planning (cont)

- Complete Worksheets
  - Backup current system before beginning and before Stage2
  - Note location of DVD content (ftp server information, CMS minidisk address)
  - Edit user directory, or use a directory manager?
  - Security manager active?
  - Name and location of SYSTEM CONFIG file
  - Products loaded into VMPSFS filepool?
  - DASD type and model for work system
    - FBA – 5 volumes if each is over 9.5, 6 volumes if each is under 9.5G
    - 3390-03 – 10 volumes (9 if all products loaded to SFS)
    - 3390-09 – 6 volumes
  - Additional member specific space on current (6.2) system
    - New space must be allocated on same device type as used to install 6.2 system
    - 3390 – need total of 6,682 cylinders of space
    - FBA – need total of 9,622,080 FBA blocks of space
    - Space used for ZHCP, XCAT, and SMAPI worker machines (VSMGUARD, VSMWORK1, VSMWORK2, VSMWORK3)
Planning (cont)

• Complete Worksheets (cont).
  – Allocate additional common space
    • Must allocate additional space on DASD type used for original z/VM 6.2 system
    • Only allocate this additional space for first member to be upgraded in a cluster
    • Make sure additional common space available to all members of cluster
      • 3390 – need 731 additional cylinders on a common volume
      • FBA – need 1,052,640 additional FBA blocks on a common volume
    • Allocate this additional space on a volume that will be considered common if upgrading a non-SSI system (in anticipation of future conversion to SSI).
Preparation

• On your existing z/VM 6.2 system
  – Make sure directory manager will allow MIGMAINT to make changes without specifying a password
    • For DIRMAINT ALLOW_ASUSER_NOPASS_FROM= MIGMAINT
  – Make sure directory manager will support disk cleanup and disk operations
    • For DIRMAINT this is DISK_CLEANUP= YES and DATAMOVE_MACHINE= DATAMOVE **
  – Make sure MIGMAINT is authorized to use directory manager
    • For DIRMAINT this is done by adding MIGMAINT to AUTHFOR CONTROL for both 140A and 150A command sets and ADGHMOPS classes.
  – Make sure MIGMAINT is able to link the MAINT620 4CC minidisk if installing from DVD
  – Make sure all of the new volumes created during installation of the work system and the new space added to the z/VM 6.2 system is available for automatic minidisk allocation within your directory manager
    • For DIRMAINT this is done by adding REGION statements in EXTENT CONTROL for all volumes
  – Make sure directory manager excludes MAINT630 013* overlap minidisks from free space calculations.
    • For DIRMAINT this is done by adding MAINT630 013* to EXCLUDE section of EXTENT CONTROL
  – Format, label, allocate and attach to the z/VM 6.2 system volumes designated as additional space allocated to current system
Work System

- Load the install tools (instpipe along with pipe commands to load 2222 and DVDPRIME to load 24CC and 2CF0)
- Run INSTPLAN with dvd or tape and (UPGRADE)
- Upgrade installation panels will be displayed
  - Different from the normal instplan panels
  - Display current z/VM 6.2 information
  - Prompt for license agreement for previously installed optional features that require 6.3 license also
  - Prompt for DASD type and size for installation of work system (DASD type will match DASD type for system being upgraded, e.g. 3390).
  - Specify location of SYSTEM CONFIG, how directory is maintained, and whether RACF or a different security manager is used
  - Specify labels and addresses for z/VM 6.3 work system
  - Specify label of DASD to be used for allocation of additional space on current system
    - Note: these volumes should be attached to the z/VM 6.2 system prior to proceeding)
- Attach DASD devices to be used for the z/VM 6.3 system to MIGMAINT
- Execute INSTALL command
Stage 1

- When the work system has been completely installed, the INSTALL EXEC will end
  - Your work system is still running within the MIGMAINT userid
  - Enter the CP Shutdown command to shutdown the work system
  - Enter IPL CMS to restore the CMS environment to MIGMAINT
  - The work system now exists on the DASD devices attached to MIGMAINT
- The upgrade process is automated and coordinated by a new EXEC named INSTUPGR
- INSTUPGR is used to generate a table of tasks to complete
- INSTUPGR may be used to execute the tasks, or you may choose to manually execute the tasks in the table by hand.
- At each stage, the PRIME option is used to instruct INSTUPGR to generate a table of tasks.
- Tables are written to MIGMAINT’s 2CF0 minidisk
- Warnings issued by INSTUPGR while building the stage1 table will be displayed and written to $STAGE1$ $WRNFILE on MIGMAINT’s 2CF0 minidisk
  - Review any warnings and resolve the problems before continuing
- Errors that occur are written to the INSTUPGR $CONSLOG on MIGMAINT’s 2CF0 minidisk.
  - If errors occur consult this file and resolve any errors before continuing
Stage 1 (Cont)

- The stage1 changes add new maintenance userids and updated versions of service and installation userids to your system.
- Changes include:
  - Attaching the new release disks to the current system (630RL1 and 630RL2 if 3390-03)
  - Updating SYSTEM CONFIG to automatically attach these new volumes to the system during IPL.
  - Add MAINT630 to the directory, and update links defined in the MAINT subconfig for this system to link to the new MAINT630 disks.
  - Add 6VMPTK30, 6VMRAC30, 6VMRSC30, 6VMTCP30, and 6VMDIR30.
  - DDR minidisks for new 6VMDIR30 to the additional space volume designated during INSTPLAN.
  - Update LINKs for current service machines to the new install and service userids (for example PERFSVM linking to 6VMPTK30 instead of 6VMPTK20).
  - Enable 6VMDIR30 on z/VM 6.2 system.
  - Add enable records to SYSTEM CONFIG file.
  - Add ZHCP and XCAT to current system.
  - Add new minidisks and update directory entries for SMAPI Worker Servers along with other SMAPI environment changes.
  - Enroll MAINT630 as ADMIN in shared filepool servers.
Stage 1 (Cont.)

- The stage 1 table is named $STAGE1$ $TABLE$ and it is stored on MIGMAINT’s 2CF0
  - The table is an ordered list of actions to be taken against the current system.
  - Each entry is described by comments such that the change can be manually performed
- Execute the stage1 changes
  - Use INSTUPGR with the COMMIT option
    - INSTUPGR will generate a back out file that will allow you to reverse these changes
    - If a directory manager is being used that provides an exit to work with the IBM upgrade code the exit will be called to perform directory functions.
    - INSTUPGR is able to change the user direct file if you do not use a directory manager
  - Manually update your system with the stage1 changes
    - You must perform the changes in the order specified in the stage1 table
    - You will not have an automated back out capability
    - You must edit the stage1 table to mark each change as completed when you finish each change
- Combination of automatic and manual changes
  - Perform the manual changes first and update the stage1 table
  - Run INSTUPGR with COMMIT to complete all changes not marked finished
  - Be careful of dependencies when following this path

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Stage 1 (Cont.)

• All stage1 changes must be successfully completed before moving to Stage2.
• After completing all stage1 changes manually:
  – Run INSTUPGR stage1 (commit done
• Post stage1 directory considerations
  – Updating a member of a cluster and directory manager is not used
    • Bring changed directory online to all cluster members with DIRECTXA command
    • Run DIRECTXA on all cluster members if directory manager did not provide an exit for INSTUPGR
  – For non-SSI, or one member SSI cluster, or first member of an SSI cluster
    • Copy configured DIRMAINT files from 6VMDIR20 to 6VMDIR30 (491, 492, 11F, and 41F).
    • Copy DVHPROFA DIRMSAT * files from 6VMDIR20 491 and 492 to 6VMDIR30 491 and 492
    • Make sure new userids such as MAINT630 are in AUTHFOR CONTROL if needed
    • Recycle all DIRMAINT servers (i.e. DIRMAINT, DIRMSATx, DATAMOVE, DATAMOVx) to begin using the 6.3 DIRMAINT code.
Stage1 (Cont.)

- Post stage1 ESM considerations
  - Only applies if you are running an ESM
  - If running ESM perform these steps prior to preceding DIRMAINT copy steps.
  - Ensure MAINT630 is authorized to:
    - Link to any minidisk on the system without a password
    - Perform security authorizations on behalf of other users
    - Perform all SFS admin functions
  - Define to ESM new userids added to directory
    - ZHCP, XCAT, MAINT630, 6VMDIR30, 6VMPTK30, 6VMRAC30, 6VMRSC30, 6VMTCP30
    - Make sure that the userids above have same disk access as the corresponding z/VM 6.2 userids.
    - Make sure userids such as RACMAINT, TCPMAINT, DIRMAINT, and MAINT are authorized to link to the new userid minidisks above instead of the 6.2 counterparts
  - Review table of indirect links in the z/VM 6.3 Installation Guide Chapter 25 to ensure that necessary ESM changes are made.
  - If your ESM manages SFS administrator authorizations make sure that MAINT630 and the SMAPI workers are authorized as admins for VMPSFS, VMSYS, VMSYSR, and VMSYSU
  - If your ESM manages CP command authorizations and access to other CP resources
    - Ensure that MAINT630 and the 6VMxxx30 userids are properly authorized
Stage 1 (Cont.)

• Rework local modifications
  – This step is not required for the 2nd – 4th member of an SSI cluster to be upgraded
  – Local modifications to components were copied to 6.3 service disks
  – 6.3 VM SYSLMOD table was updated with the local modifications copied to the 6.3 service disks
  – Review and update status of each local modification
  – This step must be performed from MAINT630
  – Use VMFUPDAT SYSLMOD
    • To see if any local modifications need rework
    • To mark local modifications as complete when reworked
Stage2

- The changes implemented in stage2 might affect your production workload
  - Best to stop your production workload
  - Also logoff PERFSVM and other users of MONDCSS
  - Backup the system prior to executing stage2
  - SFS servers should still be running along with directory manager and/or security manager servers
- Stage2 moves the new release code into production
  - Replaces content on minidisks such as 190, 193, etc.
- Back out of stage2 requires restoring system backup
- INSTUPGR stage2 (prime
  - Creates the $STAGE2$ $TABLE$
  - Table resides on MIGMAINT’s 2CF0
  - Warnings placed in $STAGE2$ $WRNFILE$ on MIGMAINT’s 2CF0
  - Errors placed in INSTUPGR $CONSLOG$ on MIGMAINT’s 2CF0
Stage2 (Cont.)

- Move and copy mdisks for 6MVHCD20 to new common volume
- Delete DHCPD, LPSERVE
- Erase 6.2 content from minidisks with VMFERASE, then VMFCOPY from 6.3 minidisks
  - 190, 193, 19E, 19D
  - Copy from 6.3 alternate minidisks
- Erase 6.2 content from TCPMAINT 591, 592 and copy from 6VMTCP30 491 and 492
- Erase 6.2 content from PERFSVM 201 and copy from 6VMPTK30 200
- Copy customized files for VMSES, CP, DVF, REXX, AVS, GCS, TSAF, CMS, TCPIP, RSCS, DIRM, RACF, PERFKIT
  - If file has been customized copy new 6.3 file to new name on target alternate minidisk
  - For example copy 6.3 sample file to 6.2 TCPMAINT 491
- Copy updated VMSES inventory files
- VMFINS BUILD (SERVICED
  - REXX, CMs, CP, GCS, DVF, AVS, TSAF, TCPIP, RSCS, DIRM, RACF, PERFTK
- BLDNUC
  - CMS, GCS, CP, RACF
- PUT2PROD
- PUT2PROD SEGMENTS ALL

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Stage2 (Cont.)

• Implement stage2 changes
• Automatically
  – INSTUPGR stage2 (COMMIT)
• Manually
  – Follow implementation steps written as comments in stage2 table
  – Order of items in table must be followed
  – Update table items when complete
• Manual and Automatic
  – Manually implement some tasks in table
  – Must follow order of table
  – INSTUPGR stage2 (COMMIT to automatically process all entries not marked complete

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Finish Upgrade Installation

• Directory
  – If upgrading a member of an SSI cluster make sure directory is put online on all other members
  – Verify definitions added to directory comply with your local standards (i.e. minidisk passwords, etc)

• SYSTEM CONFIG
  – Review changes under “Upgrade Statements” comment at end of file
    • User_Volume statements
    • Product enable records
  – Make sure new volumes added to the 6.2 system before upgrade began are in appropriate User_Volume statement
    • New volumes for xCAT and zHCP
    • New common volume for 6VMDIR30

• $WRNFILE Messages
  – Created on MIGMAINT 2CF0 minidisk by INSTUPGR
  – Edevice warnings
  – Customizable file warnings
  – Warnings for parts residing on PMAINT 551
Finish Upgrade Installation (Cont).

- **Delete obsolete saved segments**
  - helpseg
  - nslameng
  - These were shipped with 6.2 and are no longer used
  - Use purge nss name helpseg and purge nss name nslameng commands

- **Shutdown and IPL upgraded system**
  - If running ESM other than RACF consult vendor documentation prior to shutdown for any special requirements before IPLing
  - If using RACF
    - Test disks updated with new level of code
    - On IPL bring up test RACF/VM server (RACMAINT)
    - Move updated code to production RACF server

- **Use MIGR51D for licensed products that are not preinstalled on the system DDR**
  - E.g. High Level Assembler
  - System software inventory files not updated for these products
  - Involves also merging segmap information and rebuilding segments
Finish Upgrade Installation (Cont).

- Change default passwords for new virtual machine definitions added to directory
- If you have created stand alone dump in the past it will need to be recreated
  - Create a tape using the z/VM 6.3 program
  - Use the new utility SDINST to dump to DASD
  - Previous release stand alone dump should not be used with z/VM 6.3
- Review links in directory for non-IBM virtual machines that might link to release specific minidisks
  - E.G. links to 6VMPTK20 200 and 29D for perfkit usage
- Review new program directories for any additional configuration steps needed for new levels of the enabled pre-installed features
- Return work volumes to DASD pool
- If DIRMAINT is used disable old level (i.e. 6VMDIR20)
  - If this is first member of an SSI cluster consider manually moving the 630 level of DIRMAINT help files to other members not yet upgraded
- Create final backup of system
Remove Old Release

- Only do this step if upgraded non-SSI 6.2 system or completed upgrading last member of an SSI cluster
- Remove old release level userids no longer used on the 6.3 system
  - MAINT620, 6VMDIR20, 6VMPTK20, 6VMRAC20, 6VMRSC20, 6VMTCP20
  - Do not delete 6VMLEN20 or 6VMHCD20 these continue to be used in the 6.3 system
  - Remove from the user directory and shared filepool servers (if applicable)
- When old release volumes no longer contain minidisks they can be returned to DASD pool
- Update SYSTEM CONFIG
  - Remove product enable records for old pre-installed features no longer used
  - 6VMPTK20, 6VMRAC20, 6VMRSC20
  - Set old features to DISABLED on the system
  - Note: DIRMAINT (if used) was already disabled

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Life In a Mixed Release Cluster

- Need to make sure that common utilities are at the highest release level in the cluster
  - Utilities maintained on PMAINT 550/551 mdisks
- Install new service on z/VM 6.2 members to support highest release level processing
  - VM65317 - VMSES
    - UM34006 – not currently on any RSU
  - VM65318 - CP
    - UM34029 – on RSU 1302
  - VM65319 - CMS
    - UM34030 – on RSU 1302
  - VM65320 – RACF VM
    - UV61196 – not currently on any RSU
z/VM 6.3 Upgrade Installation APARs and PSP

Notes

• VM65297 – closed on RSU 1301
  – Problems with DVHSAPI (the Dirmaint synchronous programming interface) hanging on purge of identity and subconfig.

• VM65384 – closed on RSU 1302
  – Problem with instupgr stage2 (prime processing. Invalid data detected in the SYSSUF file. Problem involves parsing lines properly in the SYSSUF file.

• Installation media has been refreshed to include 6302 RSU which includes the fixes above and other important fixes for upgrade installation
  – Orders fulfilled after 9/6/13 will receive the refreshed media
  – Use Shopz to reorder your media if you received it prior to 9/6/13
• PSP Upgrade ZVM630 subset CP section Installation Information contains important notes for upgrade installation
  – Corrections to Installation Guide
    • Use VMFERASE and VMFCOPY to copy files from 6VMRAC30 505 to 6VMRACF30 305 instead of DDR
    • If have ESM perform Chapter 25 Step 2 before Step 1
  – Correction to problem with RACF files on the MAINT 19E
  – Manually copy LOHCOST SAMPROF from MAINT630 493 to LOHCOST 191 as PROFILE EXEC
    • Shutdown LOHCOST with: signal shutdown lohcost within 2
Summary

• SSI clusters with more than one member represent a challenge for upgrading using traditional methods.
• New Upgrade Installation path provides capability to upgrade an existing member of a cluster
  – Minimal disruption to existing system
  – Ensures that cluster wide utilities and directory manager are at new release level for entire cluster.
• Upgrade Installation path provides a quick and easy method of upgrading non-SSI and single member SSI clusters as well.
• Upgrade Installation currently only applies to upgrading z/VM 6.2 systems to z/VM 6.3.
• Minimal downtime of production workload.

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