z/VM 6.4 Upgrade Installation

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Agenda

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

• Upgrade Installation
  • Documented in Part 4 of the z/VM 6.4 Installation Guide (GC24-6246-02)
  • Only applies to upgrading from z/VM 6.2 or 6.3
    • 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
  • 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
  • Upgrading from a mixed-release SSI cluster is not allowed.
Objectives of Upgrade Installation

- Upgrade a z/VM 6.2 or 6.3 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
- z/VM 6.4 Upgrade Installation with SSI Cluster
  - All members must be at z/VM 6.2 or all members must be at z/VM 6.3
- 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

Cluster-wide disks
One set per cluster

(PMAINT 141)
- VMCOM1
  - PDR
  - PMAINT CF0
    - System Config
  - PMAINT 41D
  - VMSES/E
  - PMAINT 2CC
    - Source Directory

(PMAINT 142)
- VMCOM2
- (when Installing to 3390 Model 3)

System disks - One set per member

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

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

Release disks
One set per release per cluster

- 620RL1
  - MAINT6
    - MAINT6 490 / 492
    - MAINT6 490 / 493
    - MAINT6 51D
    - MAINT6 CF2
- 630RL1
  - MAINT6
    - MAINT6 490 / 492
    - MAINT6 490 / 493
    - MAINT6 51D
    - MAINT6 CF2
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
Workflow

- Plan and prepare
- Backup current system
- Install z/VM 6.4 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:
  • Physical DVD
  • FTP server with access to content of DVD
  • CMS-formatted minidisk

• Review and Comply with Requirements
  • General
  • Hardware
    • 6.4 Architecture Level Set to z196/z114 or later
  • System Software
  • MIGMAINT
  • DVD Installation
  • Other System Requirements such as SFS space, directory and security managers
  • If service was begun on a member in the cluster, then all members must have completed put2prod before upgrade begins
  • IDENTIFY command must return a system name which matches the system being upgraded
  • If upgrading from 6.2 or 6.3 LE 6.2.0 APAR VM65718 must be applied before upgrading
  • If upgrading from 6.2 DirMaint APAR VM65297 must be applied before upgrading
  • If sharing RACF database with other z/OS or z/VM systems see RACF Program Directory for converting database templates
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 9.7, 6 volumes if each is under 9.7G
    • 3390-03 – 11 volumes (9 if all products loaded to SFS)
    • 3390-09 – 6 volumes
    • 3390-27 – 5 volumes (6.4 only)
  • Additional member specific space
    • 3390 – 7,127 cylinders for 6.3 to 6.4, 7,147 for 6.2 to 6.4. Minimum 3390-09
    • FBA – 10,262,880 FBA blocks for 6.3 to 6.4, 10,291,680 FBA blocks for 6.2 to 6.4
    • Space used for SMAPI worker machines (VSMGUARD, VSMWORK1, VSMWORK2, VSMWORK3 6.2 to 6.4 only), DTCVSW3, DTCVSW4, TCPMAINT, PERFSVM, and OPN CLOUD
• Complete Worksheets (cont).
  • Allocate additional common space
    • Must allocate additional space on DASD type used for original z/VM 6.2 or z/VM 6.3 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 212 additional cylinders for upgrade to z/VM 6.4
    • FBA – 305,280 for upgrade to z/VM 6.4
    • 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 or z/VM 6.3 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 MAINTvrm 4CC minidisk
  • 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 or 6.3 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 MAINT640 013* overlap minidisks from free space calculations.
    • For DIRMAINT this is done by adding MAINT640 013* to EXCLUDE section of EXTENT CONTROL
  • Format, label, allocate and attach to the z/VM 6.2 or 6.3 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 and (UPGRADE
- Upgrade installation panels will be displayed
  - Different from the normal instplan panels
  - Display current z/VM 6.2 or 6.3 information
  - Prompt for license agreement for previously installed optional features that require 6.4 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 6.4 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 or 6.3 system prior to proceeding)
- Attach DASD devices to be used for the z/VM 6.4 system to MIGMAINT
- Execute INSTALL command
Stage 1

- When the work system has been completely installed, the INSTALL EXEC will end
  - CP Shutdown command to shutdown the work system executed after prompt for GO satisfied
  - 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 stage 1 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 (e.g. 640RL1-3 for 3390-03)
  - Updating SYSTEM CONFIG to automatically attach these new volumes to the system during IPL
  - Add MAINT640 to the directory, and update links defined in the MAINT subconfig for this system to link to the new MAINT640 disks
  - Add 6VMPTK40, 6VMRAC40, 6VMRSC40, 6VMTCP40, and 6VMDIR40
  - DDR minidisks for new 6VMDIR40 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 6VMPTK40 instead of 6VMPTK20, or 6VMPTK30)
  - Enable 6VMDIR40 on z/VM 6.2 or 6.3 system
  - Add enable records to SYSTEM CONFIG file
  - Add OPNCLOUD, DTCVSW3, and DTCVSW4 to current system
  - Add new minidisks and update directory entries for SMAPI Worker Servers along with other SMAPI environment changes (migrate from 6.2 only)
  - Enroll MAINT640 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
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 or 6VMDIR30 to 6VMDIR40 (491, 492, 11F, and 41F).
    - Copy DVHPROFA DIRMSAT * files from 6VMDIR20 or 6VMDIR30 491 and 492 to 6VMDIR40 491 and 492
    - Make sure new userids such as MAINT640 are in AUTHFOR CONTROL if needed
    - Recycle all DIRMAINT servers (i.e. DIRMAINT, DIRMSATx, DATAMOVE, DATAMOVx) to begin using the 6.4 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 MAINT640 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
    - OPN CLOUD, MAINT640, 6VM DIR40, 6VMPTK40, 6VMRAC40, 6VMRSC40, 6VMTCP40, DTCVSW3, DTCVSW4
  - Make sure that the userids above have same disk access as the corresponding z/VM 6.2 or 6.3 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 or 6.3 counterparts
  - Review table of indirect links in the z/VM 6.4 Installation Guide Chapter 21 to ensure that necessary ESM changes are made.
  - If your ESM manages SFS administrator authorizations make sure that MAINT640 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 MAINT640 and 6VMxxx40 userids are properly authorized
Stage1 (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 6.4 service disks
  - 6.4 VM SYSLMOD table was updated with the local modifications copied to the 6.4 service disks
  - Review and update status of each local modification
  - This step must be performed from MAINT640
  - 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
  - Logoff service machines such as OPERSYMP, EREP, DISKACNT, TCPIP (and client servers), VSWITCH controllers such as DTCVSW1 and 2, SMAPI virtual machines
    - Logon MIGMAINT from OSA ICC, or integrated 3270 icon to run stage 2
  - 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 (6.2 to 6.4 only)
- Delete DHCPD, LPSERVE (6.2 to 6.4 only)
- Erase 6.2 or 6.3 content from minidisks with VMFERASE, then VMFCOPY from 6.4 minidisks
  - 190, 193, 19E, 19D
  - Copy from 6.4 alternate minidisks
- Erase 6.2 or 6.3 content from TCPMAINT 591, 592 and copy from 6VMTCP40 491 and 492
- Erase 6.2 or 6.3 content from PERFSVM 201 and copy from 6VMPTK40 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 6.4 file to new name on target alternate minidisk
  - For example copy 6.4 sample file to 6.2 or 6.3 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
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)
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 or 6.3 system before upgrade began are in appropriate User_VOLUME statement
    • New volume for OPNCLOUD
    • New common volume for 6VMDIR40

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

- Delete obsolete saved segments (migration from 6.2 only)
  - 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 6.4 program
  - Use the new utility SDINST to dump to DASD
  - z/VM 6.2 release stand alone dump should not be used with z/VM 6.4
- Review links in directory for non-IBM virtual machines that might link to release specific minidisks
  - E.G. links to 6VMPTK20 or 6VMPTK30 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, or 6VMDIR30)
  - If this is first member of an SSI cluster consider manually moving the 630 or 640 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 or 6.3 system or completed upgrading last member of an SSI cluster
- Remove old release level userids no longer used on the 6.4 system
  - MAINT620, 6VMDIR20, 6VMPKT20, 6VMRAC20, 6VMRSC20, 6VMTCP20 or corresponding xxxxxx30 userids
  - Do not delete 6VMLEN20 or 6VMHCD20 these continue to be used in the 6.4 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
  - 6VMPKT20, 6VMRAC20, 6VMRSC20 or xxxxxx30 versions
  - Set old features to DISABLED on the system
  - Note: DIRMAINT (if used) was already disabled
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
    • http://www.vm.ibm.com/service/tips/vm65317.pdf (for pubs changes)
  • VM65318 - CP
    • UM34029 – on RSU 1302
  • VM65319 - CMS
    • UM34030 – on RSU 1302
  • VM65320 – RACF VM
    • UV61196 – not currently on any RSU
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 or z/VM 6.3 systems to z/VM 6.4
• Minimal downtime of production workload