Agenda

• What is Dirmaint?
• Dirmaint Advantages
• Finishing the Install
• Set Up Configuration Files
• Command Entry
• Integration with RACF
• Programming Dirmaint
• Common Tasks
What is Dirmaint?

- Pre-installed, priced, optional feature of z/VM
- CMS application that manages the directory
- Provides multiple interfaces
  - Primarily a command interface
  - Full screen – field entry
  - Program driven
    - REXX
    - SMAPI
Dirmaint Advantages

• Installed and Maintained with z/VM
  – RSU service delivered and installed with service stream

• Most commands to maintain the directory mimic regular directory statements

• Completing the install is simple and well documented

• Automated disk allocation eliminates costly mistakes
  – Not using a current diskmap +
  – Allocating a minidisk = potential disaster
Finishing Dirmaint install

• A few steps remaining before full use
• Chapter 4 in “z/VM: Getting Started With Linux on System z”
  • Enable Dirmaint
  • Change service machine passwords
  • Create/Modify configuration files *
  • Import current user directory
  • Put Dirmaint into production
  • Start Dirmaint
Set up Configuration Files

- Three types of primary configuration files
- `CONFIGxx DATADVH`
  - Configuration control keyword parameters
- `AUTHFOR CONTROL`
  - User command authorization
- `EXTENT CONTROL`
  - Minidisk allocation/boundaries
Set up Configuration Files

• CONFIGxx DATADVH
  • Dirmaint configuration override file(s)
  • xx=one or two EBCDIC characters
  • Processed in reverse EBCDIC sequence
    - Numbers before letters, 99-0 (zero-blank), Z9-AA
    - Standard CMS filemode search used across minidisks
  • CONFIG DATADVH is processed last
    - The default list of all keyword values
    - Should not ever be modified, always use an override
  • Contains keyword values controlling the function of Dirmaint
Set up Configuration Files

• **AUTHFOR CONTROL**

• Contains a list of IDs that can issue Dirmaint commands for other IDs and the privileges available to them
  
  − EG: USERA can issue commands against the directory of USERB

• Resides as a file under Dirmaint's control

• Maintained by AUTHFOR and DROPFOR commands

```
*TARGETI ORIGUSER ORIGNODE CMDL CMDSETS
ALL   MAINT   *    140A ADGHMOPS
ALL   MAINT   *    150A ADGHMOPS
```
Set up Configuration Files

- **AUTHFOR CONTROL**
  - Adding/Removing user authorizations
  - Via command
    - Dirmaint AUTHFOR and DROPFOR

- **Editing the file**
  - Get a copy from Dirmaint
  - Use XEDIT to modify the file
  - Send it back to Dirmaint
  - Load the new version of the file into memory

- “Directory Maintenance Facility Tailoring and Administration Guide”, Chapter 8
  - “Delegating Administrative Authority”
• **EXTENT CONTROL**
  
  – Controls minidisk allocations
  – Divided into a number of sections
    • REGIONS
    • GROUPS
    • EXCLUDE
    • AUTOBLOCK
    • DEFAULTS
Set up Configuration Files

• **EXTENT CONTROL**
  
  – **REGIONS**
  
  – Defines an area on a disk device that is used for minidisk allocation
  
  – Can be one or more parts of a volume
  
  – Typically a full volume

```
:REGIONS.

*RegionId  VolSer  RegStart  RegEnd  Dev-Type  Comments
VM5RES     VM5RES  0         END     3390-03
VM5W01     VM5W01  0         END     3390-03
VM5W02     VM5W02  0         END     3390-03
VM5WK1     VM5WK1  0         END     3390-03
VM5WK2     VM5WK2  0         END     3390-03

:END.
```
**EXTENT CONTROL**

- **GROUPS**
  - Collection of one or more regions
  - Forms a pool of disk space from which to allocate
  - Allocations can be first to last or rotating

```
:GROUPS.

*GroupName RegionList
VMSYSTM   (ALLOCATE ROTATING)
VMSYSTM   VM5RES VM5W01 VM5W02
LNXDSK1   (ALLOCATE ROTATING)
LNXDSK1   VM5WK1 VM5WK2
:END.
```
Set up Configuration Files

- **EXTENT CONTROL**
  - **EXCLUDE** – Defines which minidisks are excluded from extent checking
  - **AUTOBLOCK** – Specifies device architecture values for each type of DASD
    - Taken from AUTOBLK DATADVH
  - **DEFAULTS** – Device capacity table
    - Taken from DEFAULTS DATADVH
Set up Configuration Files

**EXTENT CONTROL**

:EXCLUDE.
* USERID ADDRESS
MAINT 012*
SYSDUMP1 012*
:END.

:AUTOBLOCK.
* IBM supplied defaults are contained in the AUTOBLK DATADVH file.
* The following are customer overrides and supplements.

:DASDType BlockSize Blocks/Unit Alloc_Unit Architecture
3390 512 735 1 CKD
3390 1024 495 1 CKD
3390 2048 315 1 CKD
3390 4096 180 1 CKD

:DEFAULTS.
* IBM supplied defaults are contained in the DEFAULTS DATADVH file.
* The following are customer overrides and supplements.

:DASDType Max-Size
3390-01 1113
3390-02 2226
3390-03 3339
3390-09 10017
3390-084 1084
3390-151 2226
3390-153 4365
3390-455 455
3390-568 1568
3390-32K 32760
3390-64K 65520
3390 1113
Finish Install

• Import USER DIRECT
  • Copy directory from MAINT
• Put into production
• Bring up Dirmaint
  • DVHBEGIN
• Disconnect from Dirmaint
• Logon to MAINT
Cluster operations

- **Single source directory**
  - Managed by DIRMAINT on one member

- **Each member has it's own object directory**
  - Directory changes signaled from DIRMAINT to DIRMSAT
  - DIRMSAT runs on other cluster members
  - Directory management commands on satellite members are routed to DIRMAINT

- **DASD allocation changes**
  - Handled by DATAMOVE virtual machines
  - Each member can have one or more allocated to them
• Commands invoked using the DIRM EXEC
• First parameters can be a modifier
  • TOsys | TOnode – route command to another VM network node
  • ASuser – when used with TO, issue command AS this user
  • BYuser – issue command with auth of this user (like LOGONBY)
  • FORuser – command affects named user (most common)
  • ATsys | ATnode – route command to a node in a multi-system cluster
  • If no modifier is used, command is invoked for the current user at *
• Remainder is a Dirmaint command
Dirmaint Command Entry

- Dirmaint commands are similar to most directory equivalents

```
*DVHAMENG CHVaddr DLink IOPriori NOTAPE Qry SHUTDOWN
*DVHUCENG CLass DMDisk IPL OFFline QUery SPEcial
*UDVH CLEANUP DROPBy IUCV ONline REPlace SPOOL
? CLONEDisk DROPSclf LOADDEV PAValias RLDCode STATus
:ADVH CMDisk DROPFor Link OPtion REView STAG
:HELP CMS DSECuser LOCK POOL RLDDa ta STDevopt
ACCOUNT COMMAND DUMP LOGmsg POSIXFSRo RLDEXtn STorage
ACIgroup CONsole D8ONECMD LOGONBY POSIXGLIs RMDisk SUBscribe
ACNTAdd CP ELink MACHINE POSIXGROu SATellite SUPGLIST
ACNTDel CPU ENable MAIL POSIXINFO SCAN SYSaffin
Add CRYpto EXECDrop MAXSPool POSIXIUPg SCReen Term
AMDisk DASDOPT EXECLoad MAXstoring POSIXIWDi SECuser TESTpw
APPcpass DATamove EXTNchk MAXstore POSIXOPT SEND TMDisk
AUTHBy DATEForma FILE MDAUDit PRIORITY SETAcnt UNLock
AUTHFor DEDicate FREExt MDisk PRIOset SCETClass USEdext
AUTHLink DEFAULTs Get MDPW PRIVclass SETCPU USER
AUTHScif DEFINESTa GETCONsol MINIOPT PURGE SETMach USERMAP
AUTOlog DIRECT GLOBALOpt MMDisk PW SETOp tn USEROptn
BACKUP DIRECTORY GLobalv NAMESave PW? SETPriori WORKUNIT
BATch DIREEDIT HELP NEEDPASS PWGen SETpw XAUTolog
CHECK DIRMAP HISTORY NEWS PWMON SETSTAG XCONfig
CHKsum DISAbles INCLUDE NICDEF QLog SHARE XSTORE
CHngid DISTrib INVen NOPdata
```
Dirmaint Command Entry

• All directory entries now managed by Dirmaint
  • Commands must be used to perform directory maintenance
  • Changes are put online immediately
  • Individual directory entries can be modified
    - GET/REPLACE
  • Wildcards can be used to affect matching virtual machines
    - MULTIUSER prefix option, MULTIUSER_VERIFICATION_EXIT
• Changes can be batched
  - Multiple commands in a file, invoked with one execution
**Command verification**

```bash
dirm for sysadmin get nolock
```

DVHXMT1181R Enter the current logon password of SYSADMIN at RKS2LV for DVHXMT1181R authentication. It will not be displayed on the DVHXMT1181R terminal. To exit without processing the command, just DVHXMT1181R press ENTER.

DVHXMT1191I Your GET request has been sent for processing.

**If the user is not authorized to use Dirmaint**

DVHREQ2283E Userid SYSADMIN at RKS2LV is not authorized to issue the GET DVHREQ2283E command for SYSADMIN at *.
Dirmaint Command Entry

• Password required for each Dirmaint command entered

```
dirm needpass no
DVHXMT1181R Enter the current logon password of SYSADMIN at RKS2LV for
DVHXMT1181R authentication. It will not be displayed on the
DVHXMT1181R terminal. To exit without processing the command, just
DVHXMT1181R press ENTER.

DVHXMT1191I Your NEEDPASS request has been sent for processing.
Ready; T=0.04/0.05 13:08:57
DVHREQ2288I Your USEROPTN request for SYSADMIN at * has been accepted.
DVHBIU3450I The source for directory entry SYSADMIN has been updated.
DVHBIU3456I Object directory update is not required for this source
DVHBIU3456I update.
DVHREQ2289I Your USEROPTN request for SYSADMIN at * has completed;
DVHREQ2289I with RC = 0.
```

• Dirmaint commands now execute without intervention
• Commands typically return data in the RDR

dirm for sysmaint get nolock

DVHXMT1191I Your GET request has been sent for processing.  
Ready; T=0.03/0.03 13:06:51
  DVHREQ2288I Your GET request for SYSMAINT at * has been accepted. 
  DVHGET3305I Entry SYSMAINT sent, no lock attempt was made.
  RDR FILE 0002 SENT FROM DIRMAINT PUN WAS 0354 RECS 0016 CPY 001 A NOHOLD NOKEEP 
  DVHREQ2289I Your GET request for SYSMAINT at * has completed; with RC 
  DVHREQ2289I = 0.

• Use PEEK/RECEIVE to look at the directory
Commands typically return data in the RDR

Use PEEK/RECEIVE to look at the directory

```
0002   PEEK    A0  V 80  Trunc=80  Size=12  Line=0  Col=1  Alt=0
File SYSMAINT DIRECT from DIRMAINT at RKS2LV  Format is NETDATA.
   * * * Top of File * * *
   USER SYSMAINT SYSMAINT 32M 32M ABCDEFG
   INCLUDE IBMDFLT
   AUTOLOG AUTOLOG1 OP1 MAINT
   ACCOUNT 1 SYSPROG
   MACH ESA
   IPL 190
   LINK MAINT 123 123  RR
   LINK MAINT 191 192  RR
   *
   *********************************************
   *
   *DVHOPT LNK0 LOG1 RCM1 SMS0 NPW1 LNGAMENG PWC20110223 CRC*
   * * * End of File * * *
```

1= Help  2= Add line  3= Quit  4= Tab  5= Clocate  6= ?/Change
7= Backward  8= Forward  9= Receive  10= Rgtleft 11= Spltjoin  12= Cursor
Another way to see a directory entry

dirm for sysmaint review
DVHXMT1191I Your REVIEW request has been sent for processing.
Ready; T=0.02/0.03 14:18:18
   DVHREQ2288I Your REVIEW request for SYSMAINT at * has been accepted.
RDR FILE 0004 SENT FROM DIRMAINT PUN WAS 0356 RECS 0034 CPY 001 A NOHOLD NOKEEP
DVHREQ2289I Your REVIEW request for SYSMAINT at * has completed; with RC
DVHREQ2289I = 0.

PEEK the RDR file
Another way to see a directory entry

PEEK the RDR file
dirm for sysmaint review

DVHXMT1191I Your REVIEW request has been sent for processing.
Ready; T=0.02/0.03 14:18:18

DVHREQ2288I Your REVIEW request for SYSMAINT at * has been accepted.
RDR FILE 0004 SENT FROM DIRMAINT PUN WAS 0356 RECS 0034 CPY 001 A NOHOLD NOKEEP

DVHREQ2289I Your REVIEW request for SYSMAINT at * has completed; with RC = 0.

DVHRXV3355I The following records are included from profile: IBMDFLT
PROFILE IBMDFLT
  SPOOL 000C 2540 READER *
  SPOOL 000D 2540 PUNCH A
  SPOOL 000E 1403 A
  CONSOLE 009 3215 T
  LINK MAINT 0190 0190 RR
  LINK MAINT 019D 019D RR
  LINK MAINT 019E 019E RR
  LINK MAINT 0402 0402 RR
  LINK MAINT 0401 0401 RR
  LINK MAINT 0405 0405 RR

DVHRXV3355I The preceding records are included from profile: IBMDFLT

AUTOLOG AUTOLOG1 OP1 MAINT
ACCOUNT 1 SYSPROG
MACH ESA
IPL 190
LINK MAINT 123 123 MR
LINK MAINT 191 192 RR

DVHREV3356I The following are your user option settings:
DVHREV3356I Links DISABLED Logging ON RcvMsg OFF Smsg OFF NeedPW ON
DVHREV3356I Lang AMENG
Dirmaint can call RACF for the following functions

- User add or change
- Password or passphrase change
- LOGONBY change
- POSIX parameter change
- Minidisk commands (AMDISK, DMDISK, etc)

All are optional

Controlled by CONFIGRC SAMPDVH

- Which must be copied to Dirmaint
- Renamed CONFIGRC DATADVH
• **CONFIGRC SAMPDVH**

  USE_RACF= YES|NO ALL|exit_name
  PASSWORD_CHANGE_NOTIFICATION_EXIT= DVHXPN EXEC
  POSIX_CHANGE_NOTIFICATION_EXIT= DVHXPESM EXEC
  LOGONBY_CHANGE_NOTIFICATION_EXIT= DVHXLB EXEC
  USER_CHANGE_NOTIFICATION_EXIT= DVHXUN EXEC
  DASD_OWNERSHIP_NOTIFICATION_EXIT= DVHXDN EXEC
  RACF_ADDUSER_DEFAULTS= UACC(NONE)
  RACF_RDEFINE_VMMDISK_DEFAULTS= UACC(NONE) AUDIT(FAILURES(READ))
  RACF_DISK_OWNER_ACCESS= ACC(ALTER)
  RACF_RDEFINE_VMPOSIX_POSIXOPT.QUERYDB= UACC(READ)
  RACF_RDEFINE_VMPOSIX_POSIXOPT.SETIDS= UACC(NONE)
  RACF_RDEFINE_SURROGAT_DEFAULTS= UACC(NONE) AUDIT(FAILURES(READ))
  RACF_RDEFINE_VMBATCH_DEFAULTS= UACC(NONE) AUDIT(FAILURES(READ))
  RACF_RDEFINE VMRDR_DEFAULTS= UACC(NONE) AUDIT(FAILURES(READ))
  RACF_VMBATCH_DEFAULT_MACHINES= BATCH1 BATCH2
  TREAT_RAC_RC.4= 0 | 4 | 30
  ESM_PASSWORD_AUTHENTICATION_EXIT= DVHXPA EXEC
Integration with RACF

- Start with RACF Program Directory
  - Chapter 5, Step 13
    - “Set Up the DirMaint-RACF Connector if DirMaint is Installed (Optional)”
- CONFIGRC DATADVH values are explained
  - Chapter 3, Step 5
    - DirMaint Tailoring and Administration Guide
- Additional steps
  - Appendix A
  - DirMaint Tailoring and Administration Guide
• Two primary ways to interface with Dirmaint
  – REXX
  • SMAPI
• Systems Management Application Programming Interface (SMAPI)
  – A method for internal or external programs to invoke Dirmaint functions
  – Uses an IP connection to send function requests
• Configuration
  – Appendix B
  – “Dirmaint Tailoring and Administration Guide”
• Programming and more
  – “z/VM Systems Management Application Programming”
• SMAPI allows internal and external programs to drive Dirmaint and z/VM functions
  – Extensively used by zPro
  – Providing a web based front end to Dirmaint, RACF and z/VM
A Few Common Dirmaint Tasks

- Changing Storage
- Adding/Removing a LINK
- Creating a disk map
- Adding a Minidisk
- Adding Logonby entries
- Changing users password
Changing Storage

- The STORAGE command can be used to query or change a STORAGE value on the USER statement.

```plaintext
dirm for sysadmin storage ?
DVHXMT1191I Your STORAGE request has been sent for processing.
Ready; T=0.02/0.03 20:06:57
DVHREQ2288I Your STORAGE request for SYSADMIN at * has been accepted.
DVHSTO3207I SYSADMIN currently has a maxstorage value of 16M and a
default storage value of 16M.
DVHREQ2289I Your STORAGE request for SYSADMIN at * has completed; with
DVHREQ2289I RC = 0.

dirm for sysadmin storage 24m
DVHXMT1191I Your STORAGE request has been sent for processing.
Ready; T=0.02/0.03 20:11:07
DVHREQ2288I Your STORAGE request for SYSADMIN at * has been accepted.
DVHSTO3213E Your current maximum storage size is 16M, your requested
amount was 24M. Your request can not be satisfied.
DVHREQ2289E Your STORAGE request for SYSADMIN at * has failed; with RC =
DVHREQ2289E 3213.
```
### Changing Storage

- **Must change the MAXSTORE value before the STORAGE value**

```plaintext
**dirm for sysadmin maxstor 24m**
DVHXMT1191I Your MAXSTORE request has been sent for processing.
Ready; T=0.02/0.03 20:18:01
DVHREQ2288I Your MAXSTORE request for SYSADMIN at * has been accepted.
DVHBIU3450I The source for directory entry SYSADMIN has been updated.
DVHBIU3423I The next ONLINE will take place via Diagnose 84.
DVHBIU3428I Changes made to directory entry SYSADMIN have been placed
DVHBIU3428I online.
DVHREQ2289I Your MAXSTORE request for SYSADMIN at * has completed;
DVHREQ2289I with RC = 0.

**dirm for sysadmin storage 24m**
DVHXMT1191I Your STORAGE request has been sent for processing.
Ready; T=0.02/0.03 20:20:41
DVHREQ2288I Your STORAGE request for SYSADMIN at * has been accepted.
DVHBIU3450I The source for directory entry SYSADMIN has been updated.
DVHBIU3423I The next ONLINE will take place via Diagnose 84.
DVHBIU3428I Changes made to directory entry SYSADMIN have been placed
DVHBIU3428I online.
DVHREQ2289I Your STORAGE request for SYSADMIN at * has completed; with
DVHREQ2289I RC = 0.
```
• Check the change with the STORAGE and GET commands

```
dirm for sysadmin storage ?
DVHXMT1191I Your STORAGE request has been sent for processing.
Ready; T=0.02/0.03 20:27:43
   DVHREQ2288I Your STORAGE request for SYSADMIN at * has been accepted.
   DVHSTO3207I SYSADMIN currently has a maxstorage value of 24M and a
   DVHSTO3207I default storage value of 24M.
   DVHREQ2289I Your STORAGE request for SYSADMIN at * has completed; with
   DVHREQ2289I RC = 0.

dirm for sysadmin get nolock

USER SYSADMIN SYSADMIN 24M 24M G
   ACCOUNT SYSTEMS
   IPL CMS
   MACH ESA
   CONSOLE 0009 3215
   SPOOL 000C 2540 READER *
```
Add/Remove a LINK

• Specify the LINK command exactly as it is in the directory when adding a LINK

```
dirm for sysadmin link maint 193 193 rr
DVHXMT1191I Your LINK request has been sent for processing.
Ready; T=0.02/0.03 20:48:58
DVHREQ2288I Your LINK request for SYSADMIN at * has been accepted.
DVHBIU3450I The source for directory entry SYSADMIN has been updated.
DVHBIU3424I The next ONLINE will take place immediately.
DVHBIU3428I Changes made to directory entry SYSADMIN have been placed online.
DVHREQ2289I Your LINK request for SYSADMIN at * has completed; with RC = 0.
```
Add/Remove a LINK

• Specify the LINK command exactly as it is in the directory when adding a LINK

dirm for sysadmin link maint 193 193 rr
DVHXMT1191I Your LINK request has been sent for processing.
Ready; T=0.02/0.03 20:48:58
DVHREQ2288I Your LINK request for SYSADMIN at * has been accepted.
DVHBIU3450I The source for directory entry SYSADMIN has been updated.
DVHBIU3424I The next ONLINE will take place immediately.
DVHBIU3428I Changes made to directory entry SYSADMIN have been placed online.
DVHREQ2289I Your LINK request for SYSADMIN at * has completed; with RC = 0.

USER SYSADMIN SYSADMIN 24M 24M G
ACCOUNT SYSTEMS
IPL CMS
MACH ESA
CONSOLE 0009 3215
SPOOL 000C 2540 READER *
SPOOL 000D 2540 PUNCH A
SPOOL 000E 1403 A
LINK MAINT 0190 0190 RR * CMS SYSTEM DISK
LINK MAINT 019E 019E RR * PRODUCT CODE DISK
LINK 5VMRAC40 029E 029E RR
LINK 5VMRAC40 0505 0505 RR
LINK 5VMRAC40 0191 0192 RR
LINK RACFVM 0305 0305 RR
LINK MAINT 0193 0193 RR
MDISK 0191 3390 2149 001 VM5RES MR READ WRITE MULTIPLE
Add/Remove a LINK

- No 'Change LINK' command
- Any change to the LINK requires it to be deleted and re-added
- Specify DELETE for the link mode to remove the link

```
dirm for sysadmin link maint 193 193 delete
DVHXMT1191I Your LINK request has been sent for processing.
Ready; T=0.02/0.03 21:31:34
DVHREQ2288I Your LINK request for SYSADMIN at * has been accepted.
DVHBIU3450I The source for directory entry SYSADMIN has been updated.
DVHBIU3424I The next ONLINE will take place immediately.
DVHBIU3428I Changes made to directory entry SYSADMIN have been placed
DVHBIU3428I online.
DVHREQ2289I Your LINK request for SYSADMIN at * has completed; with RC =
DVHREQ2289I 0.
```
Creating a Disk Map

- Traditionally used as a way to find available space
  - With the DISKMAP EXEC
- Dirmaint provides a set of commands to produce information related to disk usage
  - DIRM DIRMAP
  - DIRM FREEEXT
  - DIRM USEDEXT
Creating a Disk Map

- DIRM DIRMAP
  - By itself returns a RDR file that contains a map of each minidisk allocated on each volume on the system
  - Additional options
    - link map
    - gap file
    - eliminate excluded extents
    - sorting by device type
### Creating a Disk Map

**DIRM**
- **DIRMAP**
  - By itself returns a RDR file that contains a map of each minidisk allocated on each volume on the system
  - Additional options
    - link map
    - gap file
    - eliminate excluded extents
    - sorting by device type

---

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<th>Minidisk</th>
<th>Start Address</th>
<th>End Address</th>
<th>Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM5WK2</td>
<td>3390</td>
<td>0A05</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RSSERV1</td>
<td>0306</td>
<td>1</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>SFSZVPS</td>
<td>0306</td>
<td>1001</td>
<td>1500</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1501</td>
<td>3338</td>
<td>1838</td>
</tr>
<tr>
<td>$END$</td>
<td>0A05</td>
<td>3339</td>
<td>3339</td>
<td>1</td>
</tr>
</tbody>
</table>
Adding a Minidisk

- Can still perform manual allocation with Dirmaint
  - Defeats one of the major benefits
- **Automatic allocation will look for open disk space**
  - Based on volumes/regions defined in EXTENT CONTROL
  - Proper volume sizing is important
- **To add a minidisk with automatic allocation**

```
DIRM FOR SYSADMIN AMDISK 199 X AUTOG 20 VMSYSTM MR PW RADM WADM MADM
```
Adding a Minidisk

- Can still perform manual allocation with Dirmaint.
  - Defeats one of the major benefits.
  - Automatic allocation will look for open disk space.
    - Based on volumes/regions defined in EXTENT CONTROL.
    - Proper volume sizing is important.

```
   dirm for sysadmin amdisk 199 x autog 20 vmsystm mr pw radm wadm madm
DVHXMT1191I Your AMDISK request has been sent for processing.

   Ready; T=0.02/0.03 08:06:08
   DVHREQ2288I Your AMDISK request for SYSADMIN at * has been accepted.
   DVHSCU3541I Work unit 27080609 has been built and queued for processing.
   DVHSHN3541I Processing work unit 27080609 as MAINT from RKS2LV,
   DVHSHN3541I notifying MAINT at RKS2LV, request 200 for SYSADMIN sysaffin
   DVHSHN3541I *; to: AMDISK 0199 XXXX AUTOG 20 VMSYSTM MR PWS XXXX XXXX
   DVHSHN3541I XXXX
   DVHBIU3450I The source for directory entry SYSADMIN has been updated.
   DVHDRC3428I Changes made to directory entry SYSADMIN have just been
   DVHDRC3428I placed online.
   DVHSHN3430I AMDISK operation for SYSADMIN address 0199 has finished
   DVHSHN3430I (WUCF 27080609).
   DVHREQ2289I Your AMDISK request for SYSADMIN at * has completed; with RC
   DVHREQ2289I = 0.
```
Adding a Minidisk

- **From EXTENT CONTROL**

<table>
<thead>
<tr>
<th>Extent</th>
<th>Address</th>
<th>Page</th>
<th>Page Offset</th>
<th>Length</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM5PG1</td>
<td>3390</td>
<td>0A03</td>
<td>*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>.PAGE.</td>
<td>0127</td>
<td>1</td>
<td>3338</td>
<td>3338</td>
<td>1</td>
</tr>
</tbody>
</table>

- **Minidisk confirmed with DIRMAP**

<table>
<thead>
<tr>
<th>Extent</th>
<th>Address</th>
<th>Page</th>
<th>Page Offset</th>
<th>Length</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM5RES</td>
<td>3390</td>
<td>0A01</td>
<td>*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MAINT</td>
<td>0123</td>
<td>0</td>
<td>3338</td>
<td>3338</td>
<td>1</td>
</tr>
<tr>
<td>SYSDUMP1</td>
<td>0123</td>
<td>0</td>
<td>3338</td>
<td>3338</td>
<td>1</td>
</tr>
<tr>
<td>.DRCT.</td>
<td>0123</td>
<td>1</td>
<td>20</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>$DIRECT$</td>
<td>0A04</td>
<td>1</td>
<td>20</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>$SYSCKP$</td>
<td>0A06</td>
<td>21</td>
<td>29</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>$SYSWRM$</td>
<td>0A07</td>
<td>30</td>
<td>38</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>MAINT</td>
<td>0CF1</td>
<td>39</td>
<td>158</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>MAINT</td>
<td>0CF2</td>
<td>159</td>
<td>278</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>MAINT</td>
<td>049B</td>
<td>899</td>
<td>1298</td>
<td>400</td>
<td>0</td>
</tr>
<tr>
<td>MAINT</td>
<td>051D</td>
<td>1299</td>
<td>1324</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td>SYSADMIN</td>
<td>0199</td>
<td>1325</td>
<td>1344</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>MAINT</td>
<td>0990</td>
<td>1925</td>
<td>1984</td>
<td>60</td>
<td>0</td>
</tr>
</tbody>
</table>
• This method has one huge problem
  – Parameter overload!
• An easier way is to start the command:
  DIRM FOR SYSADMIN AMDISK
Adding a Minidisk

- This method has one huge problem – Parameter overload!
- An easier way is to start the command:
  ```
  DIRM FOR SYSADMIN AMDISK
  ```

To add a new minidisk to a user definition, fill in the following:

- Minidisk Address ===> 199
- Device Type ===> 3390

Fill in one of the following rows:

- Explicit Start ===> Size ===> Volser ===> 
- AUTOV Size ===> Volser ===> 
- VBLK Blksize ===> Blocks ===> Volser ===> 
- AUTOG Size ===> Volser ===> 
- GBLK Blksize ===> Blocks ===> Grpname ===> VMSYSTM
- AUTOR Size ===> Region ===> 
- RBLK Blksize ===> Blocks ===> 
- T-DISK Size ===> Region ===> 
- TBLK Blksize ===> Blocks ===> 
- V-DISK Size ===> 
- VDBS Blksize ===> Blocks ===> 
- DEVNO Real Device Number ===> 

Optionally fill in:

- Link Mode ===> MR
- BLKSIZE ===> LABEL ===> 
- PWS Read ===> Write ===> Multi ===> (passwords)

---

5741-A05 (c) Copyright IBM Corporation 1979, 2008.
• Regardless of the method chosen
  – Directory is updated
  – Minidisk can be optionally formatted
**Adding a Minidisk**

- Regardless of the method chosen,
  - Directory is updated
  - Minidisk can be optionally formatted

```plaintext
USER SYSADMIN SYSADMIN 24M 24M G
ACCOUNT SYSTEMS
IPL CMS
MACH ESA
CONSOLE 0009 3215
SPOOL 000C 2540 READER *
SPOOL 000D 2540 PUNCH A
SPOOL 000E 1403 A
LINK MAINT 0190 0190 RR * CMS SYSTEM DISK
LINK MAINT 019E 019E RR * PRODUCT CODE DISK
LINK 5VMRAC40 029E 029E RR
LINK 5VMRAC40 0505 0505 RR
LINK 5VMRAC40 0191 0192 RR
LINK RACFVM 0305 0305 RR
MDISK 0191 3390 2149 001 VM5RES MR READ WRITE MULTIPLE *

******************************************************************************

******************************************************************************

*

MDISK 0199 3390 1325 20 VM5RES MR RADM WADM MADM
```
Adding LOGONBY Entries

• LOGONBY is different than other commands
  – Values specified are ADDed or DELETEd from the LOGONBY statement
  – Use '?' to see current LOGONBY setting

  DIRM FOR SYSADMIN LOGONBY ADD USER1
  DIRM FOR SYSADMIN LOGONBY ADD USER2

USER SYSADMIN SYSADMIN 24M 24M G
ACCOUNT SYSTEMS
IPL CMS
MACH ESA
LOGONBY USER1 USER2
CONSOLE 0009 3215
SPOOL 000C 2540 READER *
Changing User's Password

- **Change another user's logon password**
  
  `dirm for tcpmaint pw tcpboss`

- **Users can also change their own password**
  
  `dirm pw tcpboss1`

- **Both take effect immediately**
Changing User's Password

- Change another user's logon password

  dirm for tcpmaint pw tcpboss
  DVHXMT1191I Your PW request has been sent for processing.
  Ready; T=0.03/0.03 14:39:33
  DVHREQ2288I Your PW request for TCPMAINT at * has been accepted.
  DVHBIU3450I The source for directory entry TCPMAINT has been updated.
  DVHBIU3423I The next ONLINE will take place via Diagnose 84.
  DVHBIU3428I Changes made to directory entry TCPMAINT have been placed
  DVHBIU3428I online.
  DVHREQ2289I Your PW request for TCPMAINT at * has completed; with RC =
  DVHREQ2289I 0.
Changing User's Password

- **Change another user's logon password**

```plaintext
dirm pw tcpboss1
DVHXMT1181R Enter the current logon password of TCPMAINT at RKS2LV for
DVHXMT1181R authentication. It will not be displayed on the
DVHXMT1181R terminal. To exit without processing the command, just
DVHXMT1181R press ENTER.

DVHXMT1191I Your PW request has been sent for processing.
Ready; T=0.04/0.04 14:47:15
DVHREQ2288I Your PW request for TCPMAINT at * has been accepted.
DVHBIU3450I The source for directory entry TCPMAINT has been updated.
DVHBIU3423I The next ONLINE will take place via Diagnose 84.
DVHBIU3428I Changes made to directory entry TCPMAINT have been placed
DVHBIU3428I online.
DVHREQ2289I Your PW request for TCPMAINT at * has completed; with RC =
DVHREQ2289I 0.
```
• Systems Management Application Programming Interface
  – Set of callable functions
  – Used to manipulate the user directory
  – Control a z/VM system
  – Requires a directory manager
• SMAPI functions
  – Create a new virtual image
  – Allocate and manage resources
    • Disk, Network, Memory
    • DASD volumes and groups
    • LAN access lists
  – Activate/Deactivate image(s)
  – Query image configuration information
  – Manage directory profiles
  – Cluster functions
    • Image relocation
    • Test relocation
• SMAPI servers
  – Request servers
    • VSMREQIN – IPv4 (AF_INET)
    • VSMREQI6 – IPv6 (AF_INET6)
    • VSMREQIU – IUCV (AF_IUCV)
    • VSMPROXY – SE communications (AF_SCLP)
    • VSMEVSRV – Handles *VMEVENT (AF_EVNT)
  – Worker servers
    • VSMWORK1 – Short call requests
    • VSMWORK2, VSMWORK3 – Other requests
    • VSMGUARD – Controller, “guard”, for other workers
• Dirmaint changes

  – Create the following file on Dirmaint

    CONFIGSM DATADVH D

    ALLOW_ASUSER_NOPASS_FROM= VSMGUARD *
    ALLOW_ASUSER_NOPASS_FROM= VSMWORK1 *
    ALLOW_ASUSER_NOPASS_FROM= VSMWORK2 *
    ALLOW_ASUSER_NOPASS_FROM= VSMWORK3 *
    ASYNCHRONOUS_UPDATE_NOTIFICATION_EXIT.TCP= DVHXNE EXEC
    ASYNCHRONOUS_UPDATE_NOTIFICATION_EXIT.UDP= DVHXNE EXEC

  – Modify AUTHFOR CONTROL

    ALL VSMGUARD * 140A ADGHMOPS
    ALL VSMGUARD * 150A ADGHMOPS
    ALL VSMWORK1 * 140A ADGHMOPS
    ALL VSMWORK1 * 150A ADGHMOPS
    ALL VSMWORK2 * 140A ADGHMOPS
    ALL VSMWORK2 * 150A ADGHMOPS
    ALL VSMWORK3 * 140A ADGHMOPS
    ALL VSMWORK3 * 150A ADGHMOPS
• **SMAPI configuration**
  
  – **Modify SMAPI authorization list**
  
  – **From MAINT**

```bash
access vmsys:vsmwork1. z (forcerw
xedit vsmwork1 authlist z
```

![Image of SMAPI setup screen](image)
• SMAPI configuration
  – For non-ensemble systems, SMAPI needs an additional step
  – From MAINT

```
acc 193 f
acc vmsys:vsmwork1.data g (forcerw
copy dmssisvr names f = = g
xedit dmssisvr names g
```

– Comment out all lines under this banner

```
******************************************************************************
*** the following machines are only available in ensembles ***
******************************************************************************
```

– Then...

```
file
rel g
```
• Bring up the SMAPI servers
  – VSMGUARD brings up everything else
  – From MAINT

  `xautolog vsmguard`
**SMAPI Setup**

- **Bring up SMAPI servers**
  - **Verify the SMAPI servers are listening**

```
vmlink tcpmaint 592
netstat
```

Active IPv4 Transmission Blocks:

<table>
<thead>
<tr>
<th>User Id</th>
<th>Conn</th>
<th>Local Socket</th>
<th>Foreign Socket</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTSPERVE</td>
<td>1001</td>
<td>*..FTP-C</td>
<td><em>..</em></td>
<td>Listen</td>
</tr>
<tr>
<td>INTCLIEN</td>
<td>1000</td>
<td>*..TELNET</td>
<td><em>..</em></td>
<td>Listen</td>
</tr>
<tr>
<td>INTCLIEN</td>
<td>1003</td>
<td>192.168.5.185..TELNET</td>
<td>192.168.5.73..56808</td>
<td>Established</td>
</tr>
<tr>
<td>SNMPD</td>
<td>UDP</td>
<td>192.168.5.185..161</td>
<td><em>..</em></td>
<td>UDP</td>
</tr>
<tr>
<td>SNMPD</td>
<td>1002</td>
<td>*..1024</td>
<td><em>..</em></td>
<td>Listen</td>
</tr>
<tr>
<td>ZTCP</td>
<td>UDP</td>
<td>*..1024</td>
<td><em>..</em></td>
<td>UDP</td>
</tr>
<tr>
<td>ZADMIN</td>
<td>1005</td>
<td>*..81</td>
<td><em>..</em></td>
<td>Listen</td>
</tr>
<tr>
<td>ZWEB01</td>
<td>1006</td>
<td>*..80</td>
<td><em>..</em></td>
<td>Listen</td>
</tr>
<tr>
<td>ZWEB04</td>
<td>1007</td>
<td>*..80</td>
<td><em>..</em></td>
<td>Listen</td>
</tr>
<tr>
<td>ZWEB03</td>
<td>1008</td>
<td>*..80</td>
<td><em>..</em></td>
<td>Listen</td>
</tr>
<tr>
<td>ZWEB05</td>
<td>1009</td>
<td>*..80</td>
<td><em>..</em></td>
<td>Listen</td>
</tr>
<tr>
<td>ZWEB02</td>
<td>1010</td>
<td>*..80</td>
<td><em>..</em></td>
<td>Listen</td>
</tr>
<tr>
<td>VSMREQIN</td>
<td>1011</td>
<td>*..44444</td>
<td><em>..</em></td>
<td>Listen</td>
</tr>
<tr>
<td>VSMEVSRV</td>
<td>1012</td>
<td>*..55555</td>
<td><em>..</em></td>
<td>Listen</td>
</tr>
</tbody>
</table>
/* SMAPI function Image_Activate accepts one or multiple */
/*   userids to autolog                                     */
Parse value Image_Activate('SUSE017 SUSE003')

==============================================

Image_Activate:
Parse arg target_id
/* Build the plist, supplying the function to be called */
/*   and the list of userids to xautolog                  */
Call plist_Init 'Image_Activate', target_id
/* Compute the length of entire plist and prepend         */
plist = (d2c(length(plist),4)) || plist
/* Convert the response values from ASCII to EBCDIC       */
/* First two INT4 are the total length of response returned */
/* Followed by a hexadecimal request ID                   */
/* Then return code and lastly reason code                */
Parse value zparsers('(INT4 HEX4 INT4 INT4)',response) with resplen
  request_id ,
  return_code reason_code RESPONSE
/* return code of 200 and reason code of 28 means some of  */
/*   userids supplied were not successfully activated      */
If response <> '' & (return_code = 0 | (return_code = 200 & reason_code = 28))
/* More response to be translated                        */
/* 1) number of images activated                         */
/* 2) number of images failed to activate                */
/* 3) array of failure details(one per count in 2)        */
/* name of image, return code and reason code            */
Parse value zparsers('(INT4 INT4 ARRAY{STR INT4 INT4})', response) with elements RESPONSE
End

Return resplen request_id return_code reason_code elements

Call plist_Init 'Image_Activate', target_id

/* Build parmlist with common parms plus those supplied by the caller */
Parse arg func, target_id
plist = ''
/* SMAPI function */
Parse value toAscii(func) with func_l func
plist = plist || func_l || func
/* auth user */
Parse value toAscii(auth_userid) with authid_l authid
plist = plist || authid_l || authid
/* auth user password */
Parse value toAscii(auth_password) with passwd_l passwd
xlstr = toAscii(auth_password)
Parse var xlstr passwd_l passwd
plist = plist || passwd_l || passwd
/* target id */
Parse value toAscii(target_id) with target_id_l target_id
plist = plist || target_id_l || target_id
Return

Send_server:
/* Initialize for receiving lines sent by the server */
Parse value RSocket('Socket') with src smapi_Socket
If src<>0 then Call logmsg 'E', 32, 'SOCKET(SOCKET) rc='src
Call RSocket 'Connect', smapi_Socket, 'AF_INET' smapiport ipaddress
If src<>0 then Call logmsg 'E', 32, 'SOCKET(CONNECT) rc='src
/* Send the requested data and get responses */
  x = RSocket('Write', smapi_Socket, plist)
Parse value RXRead_Check(smapi_Socket,120) with .
/* Get the request_id */
Parse value S_Receive(smapi_Socket) with src response_l response
  PIPE var response | >> response data d'
If response_l > 4 then do
/* Got an error */
End
Else
  req_id = c2x(response)
  PIPE var response | >> response data d'
/* Get the output plist */
Parse value RXRead_Check(smapi_Socket,120) with .
Parse value S_Receive(smapi_Socket) with src response_l response
  PIPE var response | >> response data d'
Return
SMAPI Programming

/* SMAPI function Image_Activate accepts one or multiple userids to autolog */
Parse value Image_Activate('SUSE017 SUSE003')

==============================================

Image_Activate:
Parse arg target_id
/* Build the plist, supplying the function to be called and the list of userids to xautolog */
Call plist_Init 'Image_Activate', target_id
/* Compute the length of entire plist and prepend */
plist_l = d2c(length(plist),4)
plist = plist_l || plist
Call Send_server
/* convert the response values from ASCII to EBCDIC */
/* First two INT4 are the total length of response returned */
/* Followed by a hexadecimal request ID */
/* Then return code and lastly reason code */
Parse value zparsers('(INT4 HEX4 INT4 INT4)',response) with resplen request_id , return_code reason_code 'PIPE var response | >> response data d'
If response <> '' & (return_code = 0 | (return_code = 200 & reason_code = 28))
/* More response to be translated */
/* 1) number of images activated */
/* 2) number of images failed to activate */
/* 3) array of failure details(one per count in 2) */
/* name of image, return code and reason code */
Parse value zparsers('(INT4 INT4 ARRAY{STR INT4 INT4})', response) with elements 'PIPE var response | >> response data d'
End

Return resplen request_id return_code reason_code elements
### zPRO System Status - User Display

<table>
<thead>
<tr>
<th>Action</th>
<th>Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>USER</td>
<td>0.000</td>
</tr>
<tr>
<td>USER</td>
<td>0.000</td>
</tr>
<tr>
<td>USER</td>
<td>0.000</td>
</tr>
<tr>
<td>USER</td>
<td>0.000</td>
</tr>
<tr>
<td>USER</td>
<td>0.000</td>
</tr>
</tbody>
</table>

#### Select Operation

Select the action you wish to perform:

- [ ] Stop Immediate
- [ ] Stop with System Default Wait
- [ ] Stop Within [ ]
- [ ] Stop By [ ]
- [ ] Start
- [ ] Set SECUSER to [ ]
- [ ] Set OBSERVER to [ ]
- [ ] Send a Message [ ]

**Go**

**Clear**

**Cancel**
References

• z/VM Directory Maintenance Facility Commands Reference
  - SC24-6188

• z/VM Directory Maintenance Facility Tailoring and Administration Guide
  - SC24-6190

• z/VM Getting Started With Linux on System z
  - SC24-6194
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