The Basics of Using z/VM
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Agenda

- An Overview of z/VM
- General Concepts
- Using CMS
  - Commands
  - CMS File System
  - XEDIT
  - Tailoring your environment
- For more information …
Overview

- z/VM contains Two Basic Parts
  - CP - Control Program
  - CMS (or Guests LINUX, CP, z/OS, etc.)

<table>
<thead>
<tr>
<th>CMS</th>
<th>CMS</th>
<th>z/OS</th>
<th>LINUX</th>
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Control Program
CMS General Concepts

- CMS: Conversational Monitor System
- An interactive user interface that runs under the control of CP
- Provides an application programming and execution environment
  - Commands
  - EXECs (scripts) and pipelines
  - Xedit
  - Compilers
  - User programs
- Many tools available
  - Productivity Aids
  - REXX
  - Vendor programs
CMS Strengths

- **User-friendly**
  - English-like, extensible command language
  - Easy-to-use file system

- **Cooperates well with CP**
  - Commands to exploit CP function and devices
  - Exploits virtual machine concepts
  - Commands can be automatically passed to CP:
    - If not found in CMS, or directly by issuing #CP command

- **High performance**
  - Single-user orientation
  - Shared CMS Nucleus, DCSS (Discontiguous Saved Segment)
  - File system performance
Environments

- CMS
  - IPL CMS or Begin, run Profile Exec
  - Linemode or Fullscreen mode

- XEDIT Environment
  - XEDIT \textit{fn ft fm}, run Profile Xedit
  - CMS Subset mode

- Unix-like
  - Open Extensions (Posix Shell & Utilities) *
  - Byte File System, Network File System

- z/OS-like or VSE-like
  - OS Simulation *  
  - DOS Simulation *  
  
  * not a full duplication of function
Establishing a VM Session

- **z/VM Logo Screen**
  - One at a time - 3270 emulation (PComm)
  - LOGON ... here - move a signon to another session
  - LOGON ... by ... - signon using another password

- **Using CP to control the Virtual Machine**
  - #CP IPL CMS - restart your entire CMS session
    - PROFILE EXEC exec runs to customize your session
  - #CP LOGOFF - logon xxx - sign off/on
Use Of This System Is For
IBM Management Approved Purposes Only

For help call the Customer Service Center:
888-IBM-HELP
VTAM Customers: To exit screen, enter VMEXIT

Fill in your USERID and PASSWORD and press ENTER
(Your password will not appear when you type it)
USERID ===> 
PASSWORD ===> _ 
COMMAND ===> 

RUNNING GDLVM7

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Enter one of the following commands:

LOGON userid  (Example: LOGON VMUSER1)
DIAL userid   (Example: DIAL VMUSER2)
LOGOFF
Execution Modes

- Status appears at the bottom right of screen
  - **CP Read** (CP is waiting for a command)
  - **VM Read** (CMS is waiting for a command)
  - **Running** (Ready for cmds or working on some)
  - **More...** (More info than can fit on the screen)
    - 50 seconds then beep then 10 seconds
    - Determine setting: Query Term
    - Page without waiting: Term More 0 0
  - **Holding** (Waiting for you to clear the screen)
  - **Not Accepted** (Too many commands in buffer; wait for executing command to complete)
Enter one of the following commands:

LOGON userid  (Example: LOGON VMUSER1)
DIAL userid   (Example: DIAL VMUSER2)
LOGOFF
l hugen2

Enter your password,
or
To change your password, enter: ccc/nnn/nnn
where ccc = current password, and nnn = new password

ICH70001I HUGEN2 LAST ACCESS AT 07:59:00 ON THURSDAY, JUNE 10, 2010
z/VM Version 5 Release 4.0, Service Level 1001 (64-bit),
built on IBM Virtualization Technology
There is no logmsg data
FILES: 0006 RDR, NO PRT, NO PUN
LOGON AT 10:03:16 EDT THURSDAY 06/17/10
z/VM V5.4.0 2010-04-07 15:56

******************************************************************************
* Data classified as IBM CONFIDENTIAL may be processed on this system.  *
******************************************************************************

HOLDING GDLVM7
Hit [Enter] to continue
HUGEN2 AT GDLVM7 VIA RSCS 06/17/10 10:03:58 EDT THURSDAY

CP LEVEL:
z/VM Version 5 Release 4.0, service level 1001 (64-bit)
Generated at 04/14/10 15:11:35 EDT
IPL at 04/17/10 10:05:57 EDT

CMS LEVEL:
z/VM Version 5 Release 4.0

STORAGE = 32M

Adjunct Status: UNAVAILABLE

FILES: 0006 RDR, 0001 PRT, NO PUN

Ready; T=0.07/0.09 10:03:58

RUNNING GDLVM7

Connected to remote server/host.gdlvm7.pok.ibm.com using port 23
CMS Commands

- Handles a system of files: (create, modify, debug)
- Many language processors/compilers can run under CMS
- Commands are blank-delimited
- Input accepted in ANY case
  - CMS will automatically uppercase and pass to command parser
CMS Commands

▶ General syntax:
  Command name [operand(s)...] [ (options.... [ ) ] ]

▶ Examples:
  copy   Profile Exec A = = C
  LISTFILE ( Date
  Rdrlist

▶ SET DOS ON command simulates a VSE (DOS) environment
CMS Commands

- Command Search Order -- when a command is entered, CMS has to locate it
  - Search for an EXEC with the specified command name
    - EXECs in storage
    - Command name with Filetype EXEC on accessed disk or directory (A-Z)
  - Search for translation or synonym
  - Search for a module with the specified command name
    - Nucleus extension, transient area, nucleus resident, on accessed disk/directory
  - If Command not found in CMS, it will be passed to CP for execution unless SET IMPCP is OFF (Implied CP)
CMS Commands

- Immediate Commands
  - Can be entered while another command is running
  - Interrupts the running command and executes immediately
  - 10 system immediate commands: HB, HI, HO, HT, HX, RT, RO, SO, TE, TS
  - Users can define their own immediate commands
    - IMMCMCD Macro from an Assembler program
    - IMMCMCD Command from an EXEC
    - IMMCMCD option on NUCXLOAD command
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1= Help     2= Refresh  3= Quit     4= Sort(type)  5= Sort(date)  6= Sort(size)
7= Backward 8= Forward  9= FL /n  10=  11= XEDIT/LIST  12= Cursor

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forever

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hx

CMS
This exec will print the same line forever.

hx

CMS

b

Ready; T=0.01/0.01 10:08:18
CMS File System

- CMS files are unique and generally cannot be read or written by other operating systems

- Files are named using a file identifier (file ID) consisting of 3 fields:
  - File name (FN)
  - File type (FT)
  - File mode (FM) or Directory name (dirname)
    - File mode letter A-Z where minidisk or directory resides, established by ACCESS command
    - File mode number 0-6 assigned when file is created or renamed (default = 1), used to identify or operate on a subset of files
CMS File System

- Files can be stored in several ways:
  
  - On Minidisks (fn ft fm)
    - Standard file modes: A - user's disk, S - system disk, Y/S - installed programs
  
  - In an SFS (Shared File System) filesystem: (GPLSRV2:HUGENBRU.REXX.)
  
  - On the BFS (Byte File System) (/home/userid/...)
    - hierarchical file structure
  
  - In NFS (Network File System)
This exec will print the same line forever.

hx

CMS

b

Ready: T=0.01/0.01 10:08:18

q disk

<table>
<thead>
<tr>
<th>LABEL</th>
<th>VDEV</th>
<th>M</th>
<th>STAT</th>
<th>CYL</th>
<th>TYPE</th>
<th>BLKSZ</th>
<th>FILES</th>
<th>BLKS</th>
<th>USED- (%)</th>
<th>BLKS</th>
<th>LEFT</th>
<th>BLK</th>
<th>TOTAL</th>
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</thead>
<tbody>
<tr>
<td>HUG191</td>
<td>191</td>
<td>A</td>
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<td>4096</td>
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<td>B</td>
<td>R/O</td>
<td>154</td>
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<td>11505-42</td>
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<td>27720</td>
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<td></td>
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</tr>
<tr>
<td>BWHDSK</td>
<td>292</td>
<td>D</td>
<td>R/W</td>
<td>1</td>
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<td>4096</td>
<td>0</td>
<td>7-04</td>
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<td>180</td>
<td></td>
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<tr>
<td>GPL1A1</td>
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<td>P</td>
<td>R/O</td>
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<td>4096</td>
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<td>56082-78</td>
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<td>72000</td>
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</tr>
<tr>
<td>TOOLSU</td>
<td>121</td>
<td>Q</td>
<td>R/O</td>
<td>250</td>
<td>3390</td>
<td>4096</td>
<td>3382</td>
<td>22048-49</td>
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</tr>
<tr>
<td>WWTEST</td>
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<td>R</td>
<td>R/O</td>
<td>75</td>
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<td>4096</td>
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<td>1179-09</td>
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<td></td>
</tr>
<tr>
<td>CMS24</td>
<td>190</td>
<td>S</td>
<td>R/O</td>
<td>130</td>
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<td>4096</td>
<td>701</td>
<td>19880-85</td>
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</tr>
<tr>
<td>USNB0B</td>
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<td>V</td>
<td>R/O</td>
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<td>4096</td>
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<td>14226</td>
<td>18000</td>
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<tr>
<td>WWBOBX</td>
<td>19B</td>
<td>X</td>
<td>R/O</td>
<td>300</td>
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<td>4096</td>
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<td>40624-75</td>
<td>13376</td>
<td>54000</td>
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<td></td>
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<td>YDISK</td>
<td>19E</td>
<td>Y/S</td>
<td>R/O</td>
<td>400</td>
<td>3390</td>
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<td>60617-84</td>
<td>11383</td>
<td>72000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ready: T=0.01/0.01 10:08:46
HGUN2  DIRLIST  A0  V 319  Trunc=319  Size=2  Line=1  Col=1  Alt=0
Cmd  Fm  Directory Name
- GPLSRV2: HUGENBRU.REXX
- GPLSRV2: HUGENBRU.SSL

1= Help  2= Refresh  3= Quit  4= Sort(fm)  5= Sort(dir)  6= Auth
7= Backward  8= Forward  9=  10=  11= Filelist  12= Cursor

====>

Connected to remote server/host gdlsm7.pok.ibm.com using port 23
The Virtual Machine

- You’re logged onto a VM, but where did it come from?
- What defines it? What can it do?
- The USER DIRECTORY is the answer for all of these
  - Defines all the virtual machines on a system
  - Controls access to minidisks
  - Controls what commands a user can issue
Sample User Directory

USER IBMUSER IBMUSER 16M 16M G
ACCOUNT SYSTEMS
MACH XA
IPL CMS

CONSOLE 009 3215
SPOOL 00C 2540 READER *
SPOOL 00D 2540 PUNCH A
SPOOL 00E 1403 A

LINK MAINT 0190 0190 RR * CMS system disk
LINK MAINT 019E 019E RR * Product code disk
LINK 5767002P 29E 29E RR
LINK 5767002P 505 305 RR
LINK 5767002P 191 192 RR
MDISK 191 3390 1535 001 510RES MR READ WRITE MULTIPLE
Sample User Directory

USER IBMUSER IBMUSER 16M 16M G
ACCOUNT SYSTEMS
MACH XA
IPL CMS

CONSOLE 009 3215
SPOOL 00C 2540 READER *
SPOOL 00D 2540 PUNCH A
SPOOL 00E 1403 A

LINK MAINT 0190 0190 RR  * CMS system disk
LINK MAINT 019E 019E RR  * Product code disk
LINK 5767002P 29E 29E RR
LINK 5767002P 505 305 RR
LINK 5767002P 191 192 RR
MDISK 191 3390 1535 001 510RES MR READ WRITE MULTIPLE
Sample User Directory

- Spool Devices: Reader, Printer, Punch
Sample User Directory

<table>
<thead>
<tr>
<th>USER IBMUSER IBMUSER 16M 16M G</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCOUNT SYSTEMS</td>
</tr>
<tr>
<td>MACH XA</td>
</tr>
<tr>
<td>IPL CMS</td>
</tr>
<tr>
<td>CONSOLE 009 3215</td>
</tr>
<tr>
<td>SPOOL 00C 2540 READER *</td>
</tr>
<tr>
<td>SPOOL 00D 2540 PUNCH A</td>
</tr>
<tr>
<td>SPOOL 00E 1403 A</td>
</tr>
</tbody>
</table>

| LINK MAINT 0190 0190 RR       | * CMS system disk |
| LINK MAINT 019E 019E RR       | * Product code disk |
| LINK 5767002P 29E 29E RR      |
| LINK 5767002P 505 305 RR      |
| LINK 5767002P 191 192 RR      |
| MDISK 191 3390 1535 001 510RES MR READ WRITE MULTIPLE |
CMS Minidisks

- CMS User, Link 191 minidisk, Access as A
File system - Minidisks

- A location on real DASD which has been allocated for storage of a user's files

- Three (3) types of minidisks:
  - Permanent
    - lasts across sessions (logons); defined in directory
  - Temporary (T-disks)
    - are destroyed at logoff
    - use CP DEFINE command or attach by operator
  - Virtual disks in storage (V-disks)
    - temporary simulations of minidisks in system storage
    - not allocated on real DASD; avoids I/O overhead
File system – Minidisk Commands

- CP DEFINE, CP LINK, CMS ACCESS
  ▶ Defines a virtual device or virtual disk in storage
  ---- DEFINE T3390 as 291 cyl 10

  ▶ Link to other user's minidisks to share files
  ---- LINK HUGENBRU 191 291 rr

  ▶ Once linked, a disk can be accessed
  ---- ACCESS 291 C

- FORMAT
  ▶ Minidisks must be formatted before using the first time
  ---- FORMAT 291 C
File system – Minidisk Commands

- **RELEASE, CP DETACH**
  - Release frees an accessed disk
    -- Release C
  - Detach removes the device from your VM configuration
    -- Detach 291 -or- Release c (detach

- **CP QUERY DASD**
  - Shows what you have linked; displays status

- **Q ACCESSED, Q DISK, Q SEARCH**
  - Shows various status information for accessed disks/directories

- **LISTFILE, FILELIST**
  - Lists the files on an accessed minidisk or directory
q accessed

<table>
<thead>
<tr>
<th>Mode</th>
<th>Stat</th>
<th>Files</th>
<th>Vdev</th>
<th>Label/Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>R/W</td>
<td>25</td>
<td>191</td>
<td>HUG191</td>
</tr>
<tr>
<td>B</td>
<td>R/O</td>
<td>1024</td>
<td>592</td>
<td>TCP592</td>
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<tr>
<td>D</td>
<td>R/W</td>
<td>0</td>
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<td>BWHDSK</td>
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<tr>
<td>F</td>
<td>R/O</td>
<td>792</td>
<td>1A1</td>
<td>GPL1A1</td>
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<td>P</td>
<td>R/O</td>
<td>4899</td>
<td>19A</td>
<td>IUOGEN</td>
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<tr>
<td>Q</td>
<td>R/O</td>
<td>3382</td>
<td>121</td>
<td>TOOLSU</td>
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<tr>
<td>R</td>
<td>R/O</td>
<td>143</td>
<td>120</td>
<td>WWTEST</td>
</tr>
<tr>
<td>S</td>
<td>R/O</td>
<td>701</td>
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<td>CMS24</td>
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<tr>
<td>V</td>
<td>R/O</td>
<td>544</td>
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<td>R/O</td>
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<td>R/O</td>
<td>1700</td>
<td>19E</td>
<td>YDISK</td>
</tr>
</tbody>
</table>

Ready; T=0.01/0.01 10:12:03

release d

Ready; T=0.01/0.01 10:12:06

detach 292

DASD 0292 DETACHED

Ready; T=0.01/0.01 10:12:09

RUNNING GDLVM7

DOC ↓ 23/001
q disk

LABEL  VDEV  M  STAT  CYL  TYPE  BLKSZ  FILES  BLKS  USED-(%)  BLKS  LEFT  BLK  TOTAL
HUG191  191  A  R/W  100  3390  4096  25  172-01  17828  18000
TCP592  592  B  R/O  154  3390  4096  1024  11505-42  16215  27720
GPL1A1  1A1  F  R/O  100  3390  4096  792  14339-80  3661  18000
IUOGEN  19A  P  R/O  400  3390  4096  4899  56082-78  15918  72000
TOOLSU  121  Q  R/O  250  3390  4096  3382  22048-49  22952  45000
WWTEST  120  R  R/O  75  3390  4096  143  1179-09  12321  13500
CMS24   190  S  R/O  130  3390  4096  701  19880-85  3520  23400
USNBOB  19F  V  R/O  100  3390  4096  544  3774-21  14226  18000
WWBOBX  19B  X  R/O  300  3390  4096  4368  40624-75  13376  54000
YDISK   19E  Y/S R/O  400  3390  4096  1700  60617-84  11383  72000

Ready; T=0.01/0.01 10:12:41

vdisk

DASD 0021 DEFINED

DMSFOR603R FORMAT will erase all files on disk C(021). Do you wish to continue?
Enter 1 (YES) or 0 (NO).
DMSFOR605R Enter disk label:
DMSFOR733I Formatting disk C
DMSFOR732I 100000 FB-512 blocks formatted on C(021)

Ready; T=0.01/0.01 10:12:44
<table>
<thead>
<tr>
<th>LABEL</th>
<th>VDEV</th>
<th>M</th>
<th>STAT</th>
<th>CYL</th>
<th>TYPE</th>
<th>BLKSZ</th>
<th>FILES</th>
<th>BLKS USED- (%)</th>
<th>BLKS LEFT</th>
<th>BLK TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUG191</td>
<td>191</td>
<td>A</td>
<td>R/W</td>
<td>100</td>
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<td>4096</td>
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<td>172-01</td>
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<tr>
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<td>B</td>
<td>R/O</td>
<td>154</td>
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<td>CMS24</td>
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<tr>
<td>YDISK</td>
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<td>Y/S</td>
<td>R/O</td>
<td>400</td>
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<td>4096</td>
<td>1700</td>
<td>60617-84</td>
<td>11383</td>
<td>72000</td>
</tr>
</tbody>
</table>

Ready; T=0.01/0.01 10:13:21
link hugenbru 191 291 rr

RPIMGR032E YOU ARE NOT AUTHORIZED TO LINK TO HUGENBRU.191
HCPLNM298E HUGENBRU 0191 not linked; request denied

Ready(00298); T=0.01/0.01 10:13:53
Developing Programs

- Creating and Compiling
  - Use XEDIT to create the program like any other file
  - Filetype indicates name of programming language you are using
    - Assemble, Fortran, C, Cobol, PLI, etc.
  - Invoke the compiler by typing compiler name followed by File name of the program

- LISTING and TEXT files are produced
  - example: ASSEMBLE ASM1  result: ASM1 LISTING
              ASM1 TEXT
XEDIT

- Command: `Xedit fn ft fm`
- Each line is a record
- Screen Layout:

```
TEST FILE A1 F 80 Trunc=80 Size=45 Line=0 Col=1 Alt=0
```

Current Line

```
===== * * * Top of File * * *
|...+....1....+....2....+....3....+....4....+....5....+....6....+....7...
=====
=====
=====
=====
=====
=====
=====
=====
=====
=====>
```

Prefix Area

Command Line

Scale

Data Area
XEDIT

- Prefix Commands (subset)
  - m, mm mm - move
  - c, cc cc - copy
  - f - following
  - p - preceding
  - a - add
  - si - sequential insert
  - d, dd dd - delete
  - ","," "" - repeat
**Command-line commands**

- screen format
- change /xxx/yyyy/ * *
- /zzz/ (find zzz in text)
- all /zzz/ (find all zzz at once)

**Exiting the program**

- QQuit - leave and doesn't save changes
- SAVE - doesn't leave, but does save changes
- FILE - leave and save changes
XEDIT

- Write your own XEDIT commands
  - Name: yourcmdn XEDIT
  - Write using REXX
  - Can use Pipelines
Default Program Function Keys

- PF1  BEFORE  HELP MENU
- PF2  BEFORE  SOS LINEADD
- PF3  BEFORE  QUIT
- PF4  BEFORE  TABKEY
- PF5  BEFORE  SCHANGE 6
- PF6  ONLY  ?
- PF7  BEFORE  BACKWARD
- PF8  BEFORE  FORWARD
- PF9  ONLY  =
- PF10 BEFORE  RG TLEFT
- PF11 BEFORE  SPL TJOIN
- PF12 BEFORE  CURSOR HOME
PROFILE XEDIT runs when XEDIT is invoked

Sample: PROFILE XEDIT

/* PROFILE XEDIT */
'SET VERIFY OFF 1 72'
'SET NUMBER ON'
'SET PREFIX NULL'
'SET CASE MIXED IGNORE'
'SET CURLINE ON 4'
'SET SCALE OFF'
'SET AUTOSAVE 1'

Note: Xedit is very tailorable!
<table>
<thead>
<tr>
<th>Cmd</th>
<th>Filename</th>
<th>Filetype</th>
<th>Fm</th>
<th>Format</th>
<th>Lrecl</th>
<th>Records</th>
<th>Blocks</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PROFILE</td>
<td>XEDIT</td>
<td>A1</td>
<td>V</td>
<td>72</td>
<td>14</td>
<td>1</td>
<td>4/29/10</td>
<td>13:26:01</td>
</tr>
<tr>
<td></td>
<td>PROFILE</td>
<td>XEDIT</td>
<td>V1</td>
<td>V</td>
<td>70</td>
<td>26</td>
<td>1</td>
<td>4/26/07</td>
<td>18:20:45</td>
</tr>
<tr>
<td></td>
<td>PROFILE</td>
<td>XEDIT</td>
<td>P1</td>
<td>V</td>
<td>76</td>
<td>138</td>
<td>3</td>
<td>8/01/94</td>
<td>14:06:40</td>
</tr>
</tbody>
</table>

1= Help  2= Refresh  3= Quit  4= Sort(type)  5= Sort(date)  6= Sort(size)
7= Backward  8= Forward  9= FL /n 10= Share  11= XEDIT/LIST  12= Cursor
PROFILE XEDIT A1 V 255 Trunc=255 Size=14 Line=0 Col=1 Alt=0

0 ** Top of File **
1 /* PROFILE XEDIT */
2 'SET VERIFY OFF 172'
3 'SET NUMBER ON'
4 'SET PREFIX ON LEFT' /* Place prefix area at left side of screen */
5 'SET PREFIX NULL'
6 'SET NULLS ON'
7 'SET CASE MIXED IGNORE'
8 'SET CURLINE ON 4'
9 'SET SCALE OFF'
10 'SET AUTOSAVE 1'
11
12 'SET COLOR PREFIX BLUE' /* To make Pref area distinct from filearea */
13 'SET COLOR ARROW WHITE' /* Color of command line arrow is white */
14 'SET COLOR FILEAREA GREEN' /* To ensure filearea is diff from prefix */
15 ** End of File **

====> _

XEDIT 1 File

Connected to remote server/host gdl/m7.pok.ibm.com using port 23
ISPF prefixes - PROFILE XEDIT

/* to mimic ISPF */
'SET PREFIX SYNONYM B P '
'SET PREFIX SYNONYM A F '
'SET PREFIX SYNONYM R "'
'SET PREFIX SYNONYM RR "" '
REXX and EXECs

- File types: EXEC, EXEC2, and REXX

- Quick notes on REXX:
  - /* always starts with a comment */
  - Contains Variables and Stemmed Arrays
    - Stores Strings and Numbers as strings
  - Has 'flow control'
    - do and do...while
    - If...then, else, select
  - Allows Functions and Procedures
  - Allows for Pipelines
  - Issues CP/CMS commands (in quotes)
REXX and EXECs

- PROFILE EXEC runs when you sign on
- Contains all the tailoring and configuration desired for this virtual machine
- Can also issue commands at start-up
** * Top of File **

/* profile exec for HUGEN2 at GDLVM7 */

Signal on NOVALUE

'SYNONYM HUGEN2 SYNONYM A'

'spool console to * start'

'CP SCREEN CPOUT WHITE '

'CP SCREEN VMOUT BLUE '

'CP SCREEN INREDISPD GREEN '

'CP SET LINEDIT ON'

'CP SET RETRIEVE MAX'

'CP TERM HILIGHT ON'

'CP SET EMSG ON'

'globalv init'

'EXEC PFSET'

====>  _
'EXEC RAC PWQ' /* query password expiration */
'EXEC BRACKET'
say 'Hit [Enter] to continue'
pull .
'VMFCLEAR'
/* */
/* Start-Up User Information */
/* */
'ID'
say 'CP LEVEL:'
'Q CPLEVEL'
say 'CMS LEVEL:'
'Q CMSREL'
'Q V STOR'
say 'Adjunct Status: ' adjstatus
'CP QUERY FILES'
Exit
** End of File **
0 * * * Top of File * * *
1 /* creates a tdisk */
2
3 'DEFINE T3390 AS 0292 CYL 1'
4
5 queue '1'
6 queue 'BWHDSK'
7 'FORMAT 0292 D'
8 * * * End of File * * *
FOREVER  EXEC      A1   V 130  Trunc=130  Size=4  Line=0  Col=1  Alt=0

0   * * * Top of File * * *
1   /* */
2   do forever
3    say 'This exec will print the same line forever.'
4   end
5   * * * End of File * * *
Debugging

- **Record your console**
  - `spool console to * start` (to start recording)
  - `...` (do work here)
  - `spool console stop close` (punch console to reader)
  - `query reader all` (to get the spool id)
  - `rdrlist`
    - `peek {spool id} (for *` (to look at the console)
    - `receive {spool id} fn ft fm` (to save console in a file)
Ready; T=0.01/0.01 10:18:21
SPOOL CONSOLE STOP CLOSE
RDR FILE 0079 SENT FROM HUGEN2 CON WAS 0079 RECS 0151 CPY 001 T NOHOLD NOKEEP
Ready; T=0.01/0.01 10:18:32
0079 PEEK A0 V 133 Trunc=133 Size=151 Line=48 Col=1 Alt=0

File [none] [none] from HUGEN2 at GDLVM7 Format is CONSOLE.
This exec will print the same line forever.
This exec will print the same line forever.
This exec will print the same line forever.

hx
CMS
b

Ready; T=0.01/0.01 10:08:18
q disk

<table>
<thead>
<tr>
<th>LABEL</th>
<th>VDEV</th>
<th>M</th>
<th>STAT</th>
<th>CYL</th>
<th>TYPE</th>
<th>BLKSZ</th>
<th>FILES</th>
<th>BLKS</th>
<th>USED-(%)</th>
<th>BLKS</th>
<th>LEFT</th>
<th>B</th>
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<tbody>
<tr>
<td>HUG191</td>
<td>191</td>
<td>A</td>
<td>R/W</td>
<td>100</td>
<td>3390</td>
<td>4096</td>
<td>25</td>
<td>172</td>
<td>0-01</td>
<td>178</td>
<td>28</td>
<td></td>
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<tr>
<td>TCP592</td>
<td>592</td>
<td>B</td>
<td>R/O</td>
<td>154</td>
<td>3390</td>
<td>4096</td>
<td>1024</td>
<td>115</td>
<td>05-42</td>
<td>162</td>
<td>15</td>
<td></td>
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<tr>
<td>BWHDSK</td>
<td>292</td>
<td>D</td>
<td>R/W</td>
<td>1</td>
<td>3390</td>
<td>4096</td>
<td>0</td>
<td>7</td>
<td>0-04</td>
<td>173</td>
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<td>GPL1A1</td>
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<td>F</td>
<td>R/O</td>
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<td>339-80</td>
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<td>19A</td>
<td>P</td>
<td>R/O</td>
<td>400</td>
<td>3390</td>
<td>4096</td>
<td>4899</td>
<td>560</td>
<td>08-78</td>
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<tr>
<td>TOOLSU</td>
<td>121</td>
<td>Q</td>
<td>R/O</td>
<td>250</td>
<td>3390</td>
<td>4096</td>
<td>3382</td>
<td>220</td>
<td>48-49</td>
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<td>WWTEST</td>
<td>120</td>
<td>R</td>
<td>R/O</td>
<td>75</td>
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<td>4096</td>
<td>143</td>
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<td>9-09</td>
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<tr>
<td>CMS24</td>
<td>190</td>
<td>S</td>
<td>R/O</td>
<td>130</td>
<td>3390</td>
<td>4096</td>
<td>701</td>
<td>198</td>
<td>80-85</td>
<td>352</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1= Help  2= Add line  3= Quit   4= Tab   5= Locate  6= ?/Change
7= Backward 8= Forward  9= Receive 10= Rtleft 11= Sp LJ 12= Cursor

=====> _
0079  PEEK  A0  V 133  Trunc=133  Size=151  Line=136  Col=1  Alt=0
File (none) (none) from HUGEN2 at GDLVM7 Format is CONSOLE.
CMS24  190  S  R/O  130  3390  4096  701  19880-85  3520
USNB0B  19F  V  R/O  100  3390  4096  544  3774-21  14226
WWBOBX  19B  X  R/O  300  3390  4096  4368  40624-75  13376
YDISK  19E  Y/S R/O  400  3390  4096  1700  60617-84  11383

Ready; T=0.01/0.01 10:13:21
link hugelybru 191 291 rr
RPIMGR032E YOU ARE NOT AUTHORIZED TO LINK TO HUGENBRU.191
HCPLNM298E HUGENBRU 0191 not linked; request denied
Ready(00298); T=0.01/0.01 10:13:53
filel profile xedit *
filel profile exec *
filel * exec a
Ready; T=0.01/0.01 10:18:21
SPPOOL CONSOLE STOP CLOSE
* * * 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= Splitjoin  12= Cursor

====> _

XEDIT 1 File

Connected to remote server/host gdlv7.pok.ibm.com using port 23
Debugging

- Tracing
  - trace i r12345.10
  - trace instructions @ location 12345 for x'10' bytes
  - display g (display general registers)
  - d t12345.20 (display translated storage for x20)
  - b (begin execution)
  - trace end (end tracing)

- Dumps
  - VMDUMP
  - VM Dump Tool
Help!

- HELP Facility
  - HELP command
  - HELP msg DMSxxxE
  - CP Link MAINT 19D 19D rr
    - link for HELP disk
The LINK command lets you look at another person's files.

**FORMAT:** LINK userid vdev1 vdev2 mode password

**EXAMPLE:** To link to Pat’s 191 disk as your 196 disk, enter:

```
link pat 191 196 rr share
```
LINK

```bash
>>>-LINK--.--.--.--.-userid|--vdev1|--.--.--vdev2|--+--|--+-RR---.
    '-TO-'   '*-------'    '-AS-'    '-mode-

---------- password
    '-PASS=-'
```

**Note:**
(1) The password operand is not accepted if password suppression is active.

**Authorization**

PF1= Brief    2= Top    3= Quit    4= Return    5= Locate    6= ?
PF7= Backward 8= Forward 9= PFkeys 10=    11=    12= Cursor

Macro-read 1 File
Further Reference

- **Speaker**: Brian Hugenbruch  
  - E-mail: bwhugen at us.ibm.com  
  - Web: http://www.vm.ibm.com/devpages/hugenbru  
  - Phone: USA 607.429.3660

- **Web sites**:  
  - http://www.vm.ibm.com/library -- the online zVM Library  
  - http://www.vm.ibm.com/education -- presentations, classes and information

- **Via mailing lists**:  
  - IBMTCP-L@VM.MARIST.EDU  
  - IBMVM@LISTSERV.UARK.EDU  
  - LINUX-390@VM.MARIST.EDU

- **Special Thanks to**: John Franciscovich, Will Roden (retired), Chris Casey (retired)