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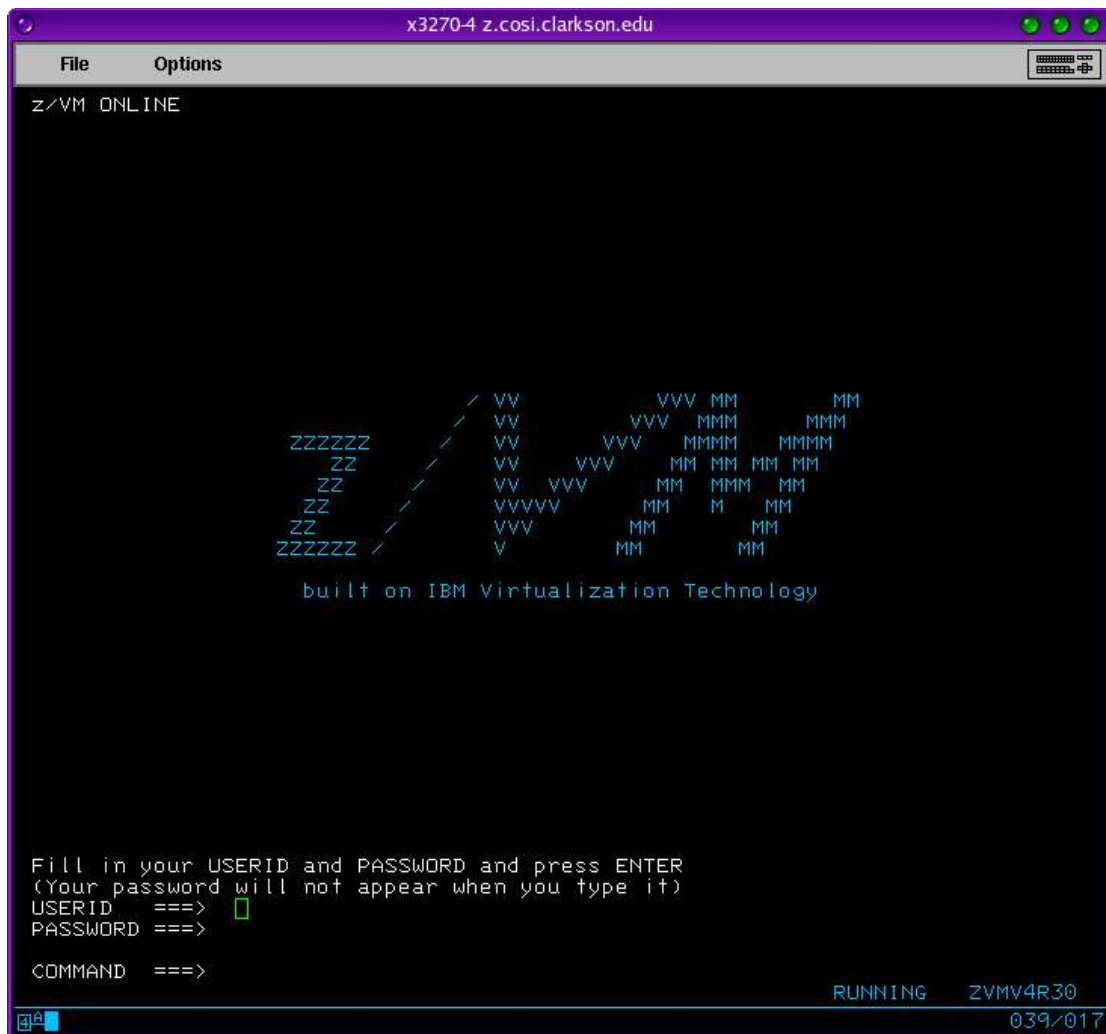
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1. Logging in to VM

Normal Login

Assuming that you already have a 3270 console session open, all you need to do to log on to VM is to specify your guest name and password. A guest name is a name unique to each VM system that defines a specific “guest” virtual machine that is allowed to operate and use system resources. A guest may only be logged on once at any particular time. You cannot have two separate virtual machines without two separate guest names. The z/VM main login screen resembles the image below.



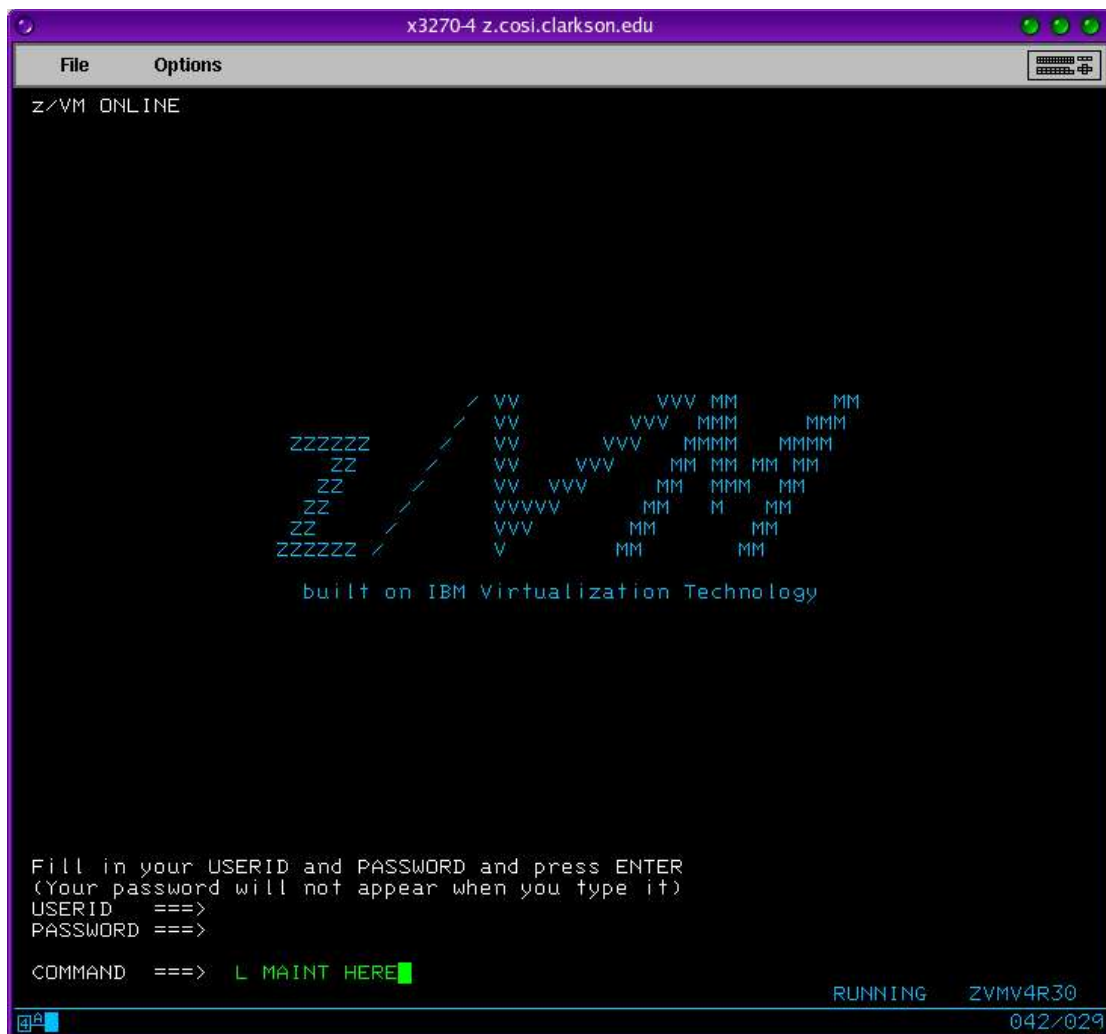
By default, the keyboard cursor is located at the beginning of the USERID field. Just type your guest name and then press tab to move to the password field. Notice that if your guest name is 8 characters long, z/VM will automatically move the cursor to the password field after you've typed your eighth character. z/VM Allows up to 8 alphanumeric to be used for guest names. From here, just type your password and press enter. If your name and password are correct, you will then be logged in to your guest.

Disconnected Login

If your guest is disconnected and you wish to login, just use the same procedure as you would to normally login. Note that you will (in some cases) be placed into CP mode when you reconnect at a 3270 terminal. If this is the case, any operating system running in your guest will be halted. If you wish to resume the execution of the guest operating system you need to issue a “BEGIN” command.

Stealing the Session

If you need to log on to a virtual machine but someone else is on it you may force VM to steal the terminal from the other user. You can do this by issuing a special command from the z/VM log in command line. Instead of entering a guest name and a password, just press tab twice to bypass these two fields. You should find that the cursor has jumped to the COMMAND field at the bottom of the terminal. From here issue a “L MYNAME HERE” where MYNAME is replaced by the name of the guest you are trying to log in to.



Logging Off

To log off of your guest you need to be in CP or CMS mode. If you are in Linux you may get back to CP mode by shutting down Linux. In the event that this is not possible, issue a “#CP” command to enter CP mode. Once you are in CP mode the command to log off of your guest is “LOG”. If you are at the 3270 terminal, the # sign on the command line is intercepted by CP and anything after the pound sign is executed as a CP command. this is only the case when the # is the very first character on the command line.

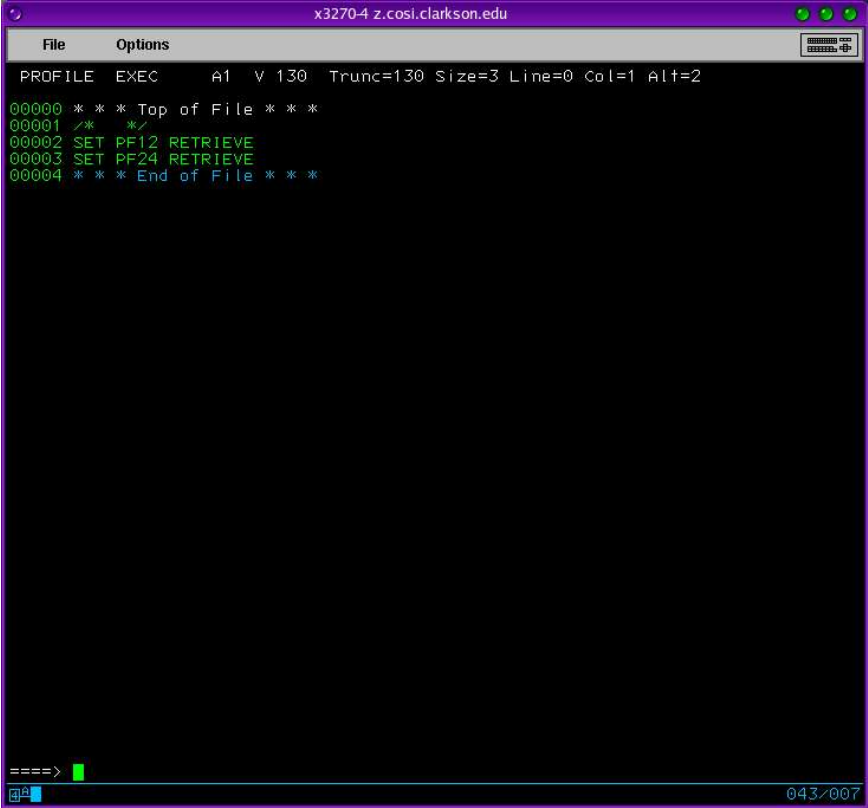
Disconnecting

If you wish to disconnect from a guest you may use the “DISC” command. Disconnecting from a guest is like logging out, only the guest remains active and running. This allows you to get rid of your 3270 terminal connected to your guest but still keep Linux running and doing things.

2. What happens when you log in

Profile Exec

When you first log in to z/VM you will be presented with a CP READ prompt. The next press of enter will cause CP to load CMS. CMS will then execute the guest's PROFILE EXEC script if it exists. This script can do things like IPL Linux (or other operating systems), link minidisks, set VM parameters, or just run CP or CMS commands. Some useful things to have in your PROFILE EXEC are shown in the screen shot below. The two entries in this profile exec allow you to use the keyboard F12 key to access a brief command history within VM. Notice that the first line of the file is “/* */”. The reason for this is that scripts in VM are written in REXX and all REXX scripts must start with a comment. This line represents a comment in REXX.

A screenshot of a z/VM window titled 'x3270-4 z.cosi.clarkson.edu'. The window has a menu bar with 'File' and 'Options'. Below the menu bar, it shows 'PROFILE EXEC A1 V 130 Trunc=130 Size=3 Line=0 Col=1 Alt=2'. The main area is a text editor with a black background and green text. The text contains a REXX script with four lines: '00000 /* */', '00001 /* */', '00002 SET PF12 RETRIEVE', and '00003 SET PF24 RETRIEVE'. The first line is a comment. At the bottom left, there is a prompt '====>' followed by a green cursor. At the bottom right, there is a status bar showing '043/007'.

Provided that your PROFILE EXEC does not cause Linux or any other operating system to start loading, after CMS loads you will be presented with a CMS prompt. This is where you will enter the majority of your commands.

3. CP Mode

Overview

What is CP (Control Program) you ask? Well, as IBM defines it in the z/VM General Information guide, CP is primarily a real-machine resource manager. CP provides each user with an individual working environment known as a virtual machine. Each virtual machine is a functional equivalent of a real system, sharing the real processor function, storage, console, and input/output (I/O) device resources. When you first log on to z/VM, CP controls the working environment. Many of the facilities of z/VM are immediately available to you. For example, you can use CP commands to do various system management tasks. However, most of the work done on z/VM requires the CMS component or a guest operating system, such as z/OS, to help with data processing tasks and to manage work flow.

Some of the commands available to you in CP mode include:

DEFINE
DETATCH
DISCONNECT
FORCE*
IPL
LINK
LOGOFF
LOGON
PURGE
QUERY
SEND
SET
UNDEDICATE*
XAUTOLOG*

* - This command is typically used for system administration

We will go over some of these commands in another section.

4. CMS

Overview

CMS (Conversational Monitor System) as defined by IBM in the “z/VM General Information Guide”: CMS provides a high-capacity environment that supports large numbers of interactive users. CMS can help you perform a wide variety of tasks: Write, test, and debug application programs for use on CMS or guest systems, Run application programs developed on CMS or guest systems, Create and edit data files, Process jobs in batch mode, Share data between CMS and guest systems, and Communicate with other system users.

So one way of looking at it is that CMS is like an operating environment that allows you to maintain your virtual machine. CMS goes away the second that you IPL Linux or any other operating system. The operating system actually runs on top of CP. CMS is just another operating system that can run on CP.

If for some reason you drop out of CMS mode and are put back into CP mode you will not be able to use any CMS commands. If CP tells you that a command is not found then just run “I CMS” to get back into CMS mode. keep in mind, however, that doing this will cause the profile exec to be run and it will kill any operating system running on the guest. CMS cannot be running along side of a guest operating system. Only CP can do that.

Some of the CMS specific commands available to you include:

- ACCESS
- COPYFILE
- ERASE
- FLIST
- FORMAT
- LISTFILE
- PUNCH
- QUERY (extended options)
- RDRLIST
- SET (extended options)
- TYPE
- USERID
- XEDIT

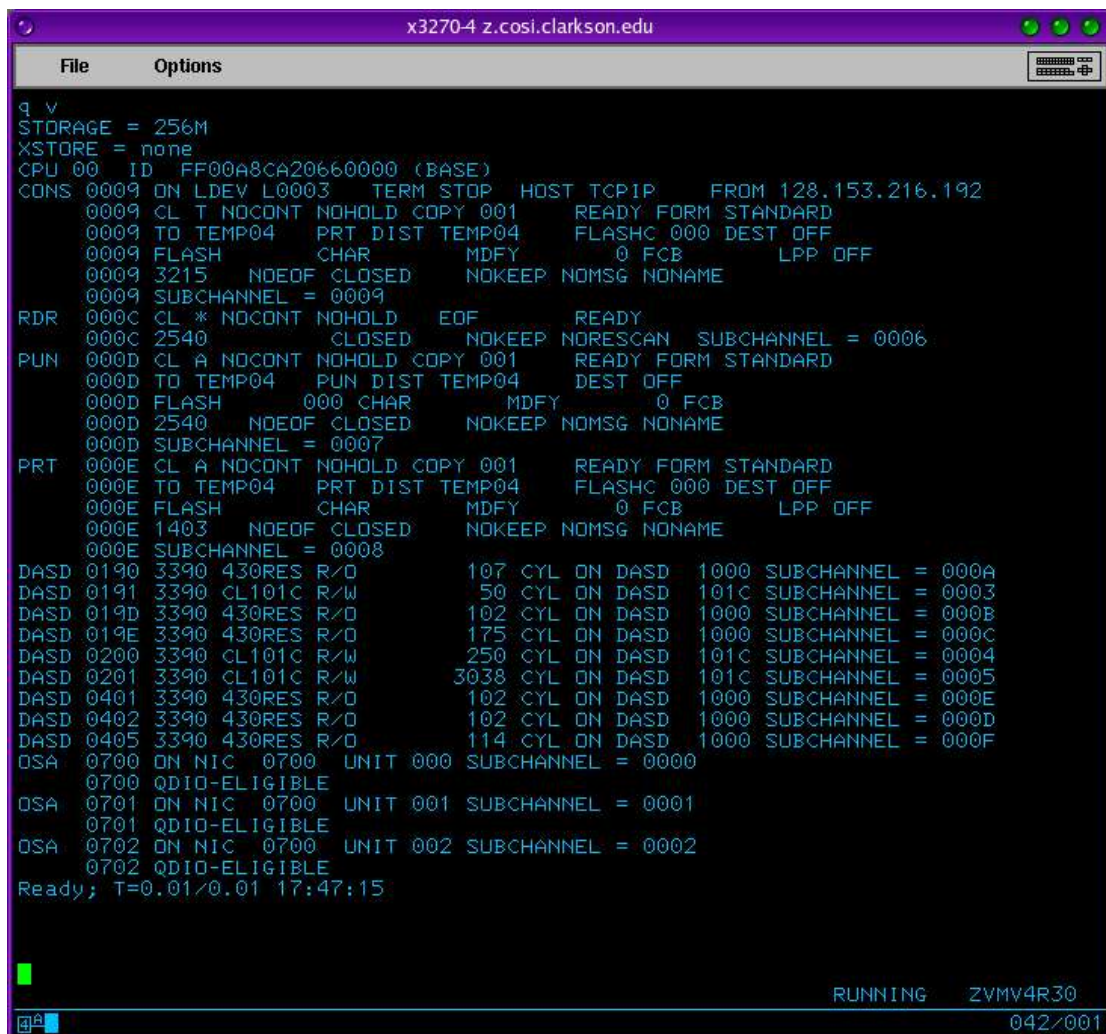
We will go over some of these commands in other sections.

5. Your Guests environment

Virtual Devices

Since you are running a virtual machine, it only makes sense that the devices that you have access to are virtual as well. Every device you use in VM is virtual (for the most part). Each virtual device has a hexadecimal address associated with it ranging from 0000 to FFFF. Each virtual machine running under VM gets its very own virtual address space. This means that you can have two different guests that both have a DASD volume with virtual address 201.

Running the command “Q V” (Q is shorthand for QUERY) will show you a list of all virtual devices currently defined to your guest.



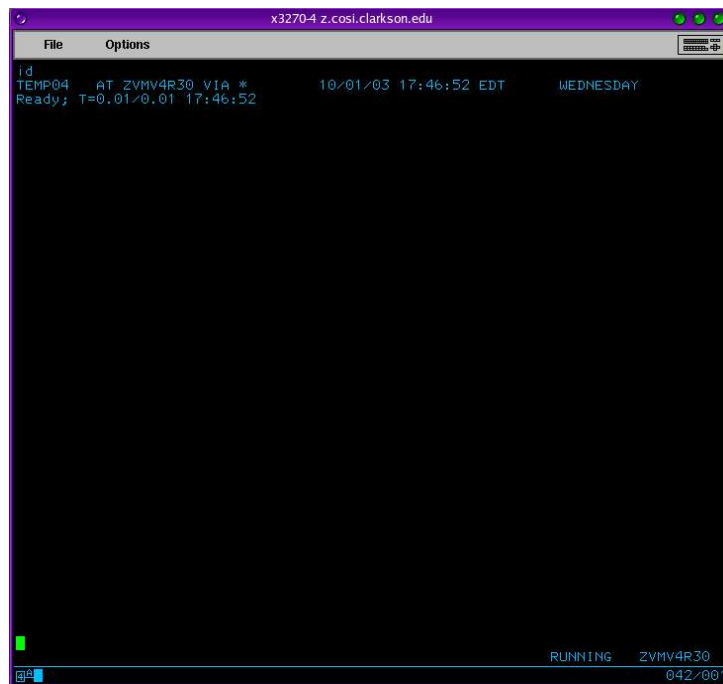
```
q v
STORAGE = 256M
XSTORE = none
CPU 00 ID FF00A8CA20660000 (BASE)
CONS 0009 ON LDEV L0003 TERM STOP HOST TCP/IP FROM 128.153.216.192
0009 CL T NOCONT NOHOLD COPY 001 READY FORM STANDARD
0009 TO TEMP04 PRT DIST TEMP04 FLASHC 000 DEST OFF
0009 FLASH CHAR MDFY 0 FCB LPP OFF
0009 3215 NOEOF CLOSED NOKEEP NOMSG NONAME
0009 SUBCHANNEL = 0009
RDR 000C CL * NOCONT NOHOLD EOF READY
000C 2540 CLOSED NOKEEP NORESCAN SUBCHANNEL = 0006
PUN 000D CL A NOCONT NOHOLD COPY 001 READY FORM STANDARD
000D TO TEMP04 PUN DIST TEMP04 DEST OFF
000D FLASH 000 CHAR MDFY 0 FCB
000D 2540 NOEOF CLOSED NOKEEP NOMSG NONAME
000D SUBCHANNEL = 0007
PRT 000E CL A NOCONT NOHOLD COPY 001 READY FORM STANDARD
000E TO TEMP04 PRT DIST TEMP04 FLASHC 000 DEST OFF
000E FLASH CHAR MDFY 0 FCB LPP OFF
000E 1403 NOEOF CLOSED NOKEEP NOMSG NONAME
000E SUBCHANNEL = 0008
DASD 0190 3390 430RES R/O 107 CYL ON DASD 1000 SUBCHANNEL = 000A
DASD 0191 3390 CL101C R/W 50 CYL ON DASD 101C SUBCHANNEL = 0003
DASD 019D 3390 430RES R/O 102 CYL ON DASD 1000 SUBCHANNEL = 000B
DASD 019E 3390 430RES R/O 175 CYL ON DASD 1000 SUBCHANNEL = 000C
DASD 0200 3390 CL101C R/W 250 CYL ON DASD 101C SUBCHANNEL = 0004
DASD 0201 3390 CL101C R/W 3038 CYL ON DASD 101C SUBCHANNEL = 0005
DASD 0401 3390 430RES R/O 102 CYL ON DASD 1000 SUBCHANNEL = 000E
DASD 0402 3390 430RES R/O 102 CYL ON DASD 1000 SUBCHANNEL = 000D
DASD 0405 3390 430RES R/O 114 CYL ON DASD 1000 SUBCHANNEL = 000F
OSA 0700 ON NIC 0700 UNIT 000 SUBCHANNEL = 0000
0700 QDIO-ELIGIBLE
OSA 0701 ON NIC 0700 UNIT 001 SUBCHANNEL = 0001
0701 QDIO-ELIGIBLE
OSA 0702 ON NIC 0700 UNIT 002 SUBCHANNEL = 0002
0702 QDIO-ELIGIBLE
Ready; T=0.01/0.01 17:47:15

RUNNING ZVMV4R30
042/001
```

Guest Name

Each VM guest is identified to VM via a unique guest name. This guest name is

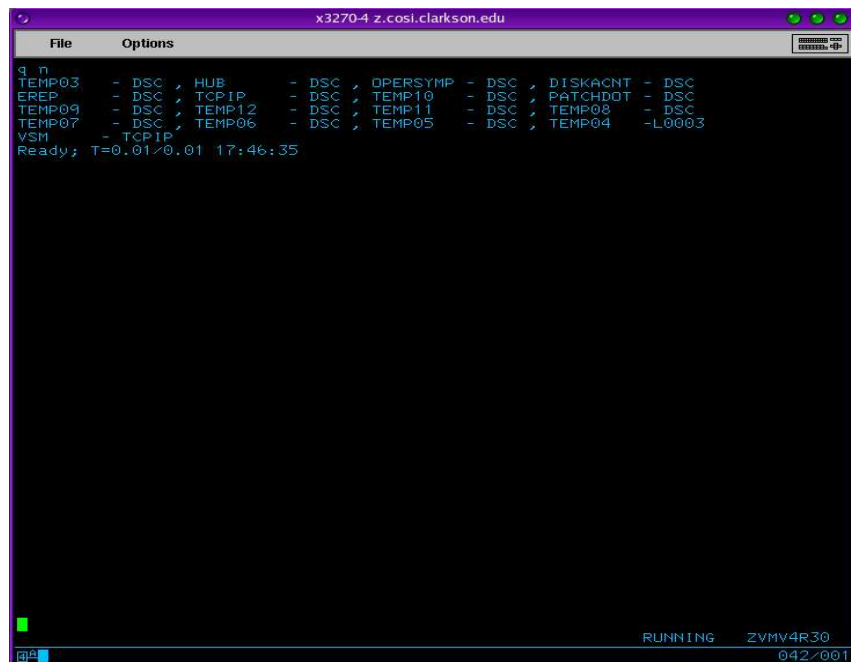
what you use to login to the system. If you need to find out what your guest name is (or what guest name you are currently logged in as) just run “ID” from within CMS.



```
x3270-4 z.cosi.clarkson.edu
File Options
id
TEMP04 AT ZVMV4R30 V1A * 10/01/03 17:46:52 EDT WEDNESDAY
Ready; T=0.01/0.01 17:46:52

RUNNING ZVMV4R30
042/001
```

If you wish to know which guests are logged on issue a “Q N” (N is short for NAMES) command.



```
x3270-4 z.cosi.clarkson.edu
File Options
q n
TEMP03 - DSC > HUB - DSC > OPERSYMP - DSC > DISKACNT - DSC
EREP - DSC > TCP/IP - DSC > TEMP10 - DSC > PATCHDOT - DSC
TEMP09 - DSC > TEMP12 - DSC > TEMP11 - DSC > TEMP08 - DSC
TEMP07 - DSC > TEMP06 - DSC > TEMP05 - DSC > TEMP04 -L0003
VSM - TCP/IP
Ready; T=0.01/0.01 17:46:35

RUNNING ZVMV4R30
042/001
```

Storage

If you want to see how much storage (RAM is called storage in z world) your guest has available to it just run the command “Q STOR”. The amount of storage you have available to you is defined in the user directory.

```

x3270-4 z.cosi.clarkson.edu
File Options
q stor
STORAGE = 256M
Ready; T=0.01/0.01 17:48:00

RUNNING ZVMV4R30
042/001

```

Your DASD

DASD is just a fancy name for disk storage space. If you want to see the DASD assigned to your guest (and their virtual addresses) just run “Q V DASD” and you will get a list much like the one below.

DASD is usually given to a guest in the form of a minidisk. A minidisk is just a section of a DASD pack that is dedicated to a specific guest. It's almost like a partition. minidisks are defined in the User Directory.

```

x3270-4 z.cosi.clarkson.edu
File Options
q v dasd
DASD 0140 3390 430RES R/O 107 CYL ON DASD 1000 SUBCHANNEL = 000A
DASD 0141 3390 CL101C R/W 50 CYL ON DASD 101C SUBCHANNEL = 0003
DASD 014D 3390 430RES R/O 102 CYL ON DASD 1000 SUBCHANNEL = 000B
DASD 014E 3390 430RES R/O 175 CYL ON DASD 1000 SUBCHANNEL = 000C
DASD 0200 3390 CL101C R/W 250 CYL ON DASD 101C SUBCHANNEL = 0004
DASD 0201 3390 CL101C R/W 3038 CYL ON DASD 101C SUBCHANNEL = 0005
DASD 0401 3390 430RES R/O 102 CYL ON DASD 1000 SUBCHANNEL = 000E
DASD 0402 3390 430RES R/O 102 CYL ON DASD 1000 SUBCHANNEL = 000D
DASD 0405 3390 430RES R/O 114 CYL ON DASD 1000 SUBCHANNEL = 000F
Ready; T=0.01/0.01 17:48:31

RUNNING ZVMV4R30
042/001

```

Your Disks

When you have a bunch of DASD (in minidisk form), it is initially unformatted.

You, or the system administrator must format the minidisk so that VM can store files on it. VM only needs to format the disk if you intend to use the disk for VM related tasks. If you plan on installing Linux to the minidisk then you do not need to format the disk because Linux uses a different disk format than VM.

To format (i.e. Put a VM readable file system on the disk) use the command: “FORMAT VDEV MODE”.

Once a disk is formatted, you can “access” the disk with the command “ACC VDEV MODE” by replacing “VDEV” with the virtual device address of the minidisk you want to access, and “MODE” with the file mode you wish to use.

If you don't know the virtual device address of your minidisk then use the “Q V DASD” command to list all of the DASD you have access to.

The mode of a disk is a single letter (A-Z case insensitive) that tells VM that you want to refer the accessed disk as that letter. It does not matter which letter you use as long as the letter is not already being used by another disk. You can get a list of all of your accessed disks by running the “Q DISK” command.

You may link to other users DASD (provided you have proper permissions) by using the LINK command. The format of this command is:

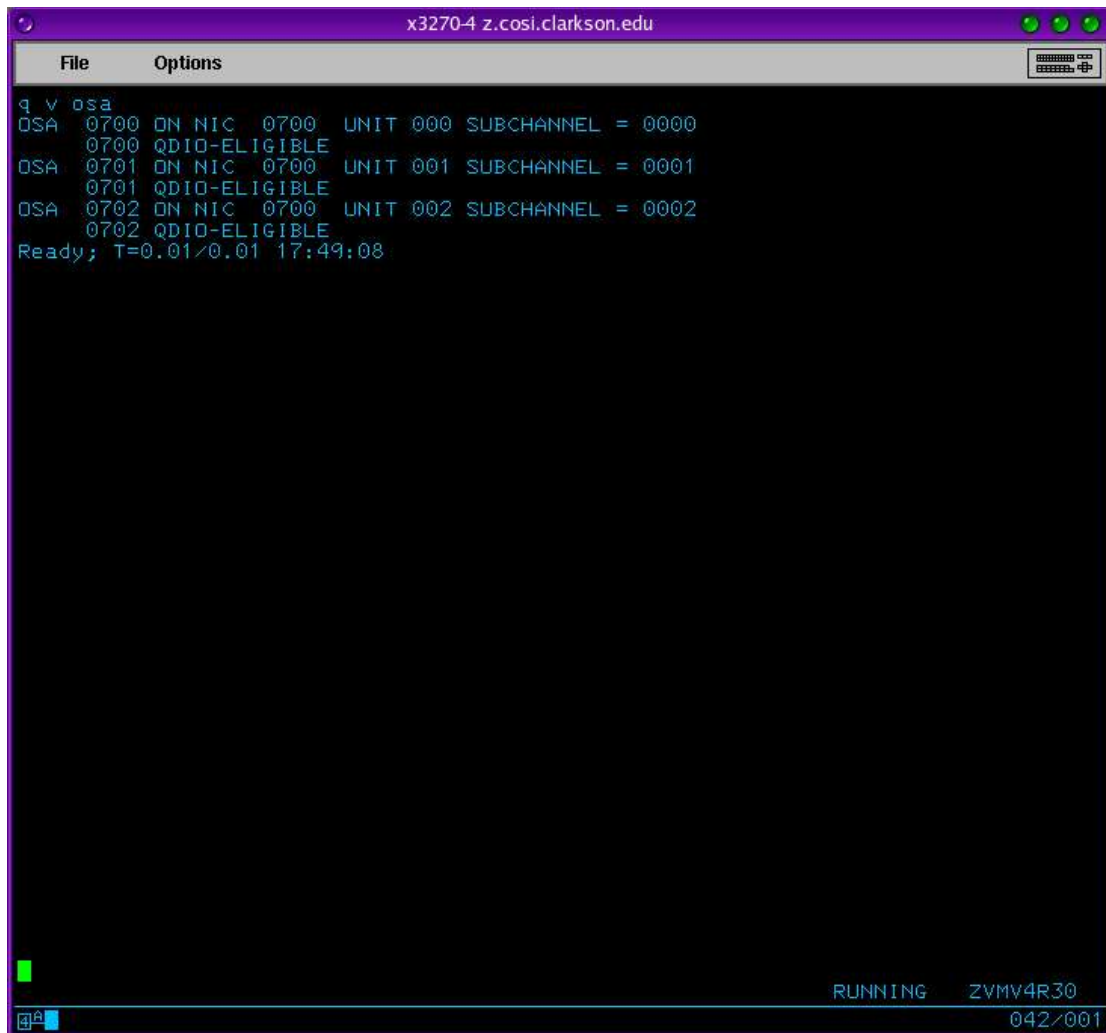
“LINK OWNER OWNER_VDEV MY_VDEV [ACCESS_MODE]”.

OWNER -	The owner of the disk you want to link.
OWNER_VDEV -	The virtual address of the disk you want to link (relative to the owner).
MY_DEV -	Virtual address you would like the disk to have relative to your guest.
ACCESS_MODE -	Optional in most cases, it just specifies what level of access you want to have. Valid parameters are “MW” if you want read/write access, and RR if you want read only access. There are more parameters here but MW and RR are the most widely used.

Your OSA Devices

An OSA (Open Systems Adapter) is what we would normally call a network device. It takes 3 OSA address (these are just virtual addresses) to make one functional network card for your guest.

You can query your OSA devices with “Q V OSA”. This will show you the OSA devices that are dedicated to your guest.

A screenshot of a z/OS console window titled 'x3270-4 z.cosi.clarkson.edu'. The window has a menu bar with 'File' and 'Options'. The main display area shows the following text:

```
q v o s a
OSA 0700 ON NIC 0700 UNIT 000 SUBCHANNEL = 0000
      0700 QDIO-ELIGIBLE
OSA 0701 ON NIC 0700 UNIT 001 SUBCHANNEL = 0001
      0701 QDIO-ELIGIBLE
OSA 0702 ON NIC 0700 UNIT 002 SUBCHANNEL = 0002
      0702 QDIO-ELIGIBLE
Ready; T=0.01/0.01 17:49:08
```

At the bottom right of the window, it says 'RUNNING ZVMV4R30' and '042/001'. There is a small green square icon in the bottom left corner.

Note that in this example there are 3 OSA devices: 700,701 and 702. At first it may seem as though this guest has three network cards available to him but remember, it always takes three addresses to create a single working device.

Your A Disk

When you first log on to VM, CP attempts to automatically access your guests 191 disk as disk mode A. Obviously this will only succeed if your guest has DASD with a virtual address of 191. When CMS is loaded, it looks for a file named PROFILE EXEC on your A disk and attempts to execute that file. See section 2 for more info on PROFILE EXEC. The A disk is also where you will store files that you need to install Linux.

If you have logged on to your guest for the first time, chances are that your 191 disk has not been formatted. So format it with the following command:
"FORMAT 191 A".

This Format command will put a VM readable file system on your A disk.

Network Access

To gain network access for your VM guest you will need to link to the disk with the networking tools on it. This disk is owned by TCPIP and has a virtual address of 592. The command to link to this disk is

“LINK TCPIP 592 592”.

This will link TCPIP's 592 (the first 592 in the command) disk to your guest as virtual device 592 (the second 592 in the command). From here you will have access to network utilities like FTP, PING, NETSTAT, ROUTE, RPCINFO and others. Don't forget to access the disk before you try to use these commands:

“ACC 592 Q”

6. z/VM File Access Information

Filename Structure

VM names files in three parts, each separated by a space.

FILENAME FILEEXTN M

FILENAME - This is the name of the file. It's limited to 8 case insensitive alphanumerics.

FILEEXTN - This is the file extension (or type). It's basically just an extension of the filename. It is also limited to 8 case insensitive alphanumerics.

M - This is the single letter that represents which accessed disk the file lives on. This is not something you “choose” for the file, rather, it is chosen based on which currently accessed disk you would like the file to reside on. If you copy a file to your A disk and then later access that disk as the F disk then the file you originally wrote would have a mode of F.

Listing Files

To see a simple list of files that are on an accessed disk (like your A disk) use the command:

“L * * A”.

This tells VM you want to see a list of all files on the A disk. The “*” is a wild card that can be used to match everything. The “*” is valid in all three filename fields (name, extension, and mode).

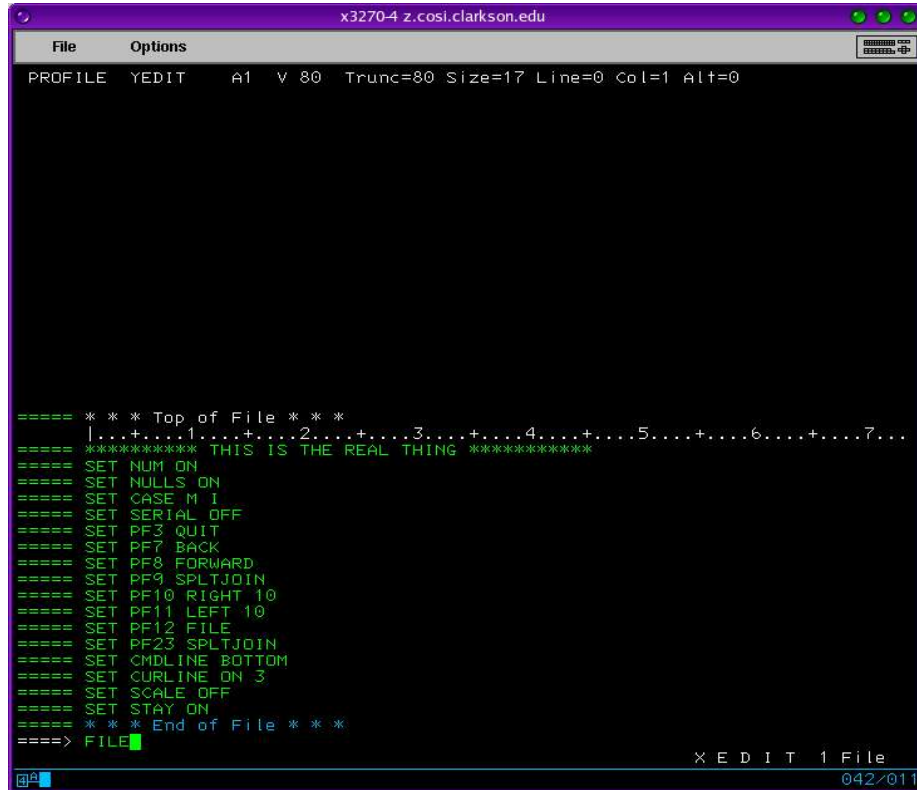
Want something a little fancier? Try

“FLIST * * A”.

This will bring up a more advanced file management interface.

Editing Files

The command used to edit a file is “X” followed by the file name. Example: ”X PROFILE EXEC”. The X editor looks a little something like this:



Note that this interface to X is somewhat limited. The basic controls are as follows: You have two regions, a command region and an edit region. The command region is in a single line at the bottom of the terminal. Here you can issue commands like “SAVE”, “FILE”, and “QUIT”. If you type anything into the edit region (most of the rest of the screen) you will be modifying the loaded file.

X Commands:

- SAVE - Save the file you're working on.
- FILE - Save the file you're working on and quit X.
- QUIT - Quit X (only works if you are looking at an unmodified file).
- QQUIT - Quits regardless of file modification status.
- U## - Causes X to scroll ## lines up.
- D## - Causes X to scroll ## lines down.
- TOP - Scrolls all the way to the top of the file.
- BOT - Scrolls all the way to the bottom of the file.

You can actually make the X interface a little better by creating a PROFILE XEDIT file on you A disk. This file should like something like the one in the image above.

```

x3270-4 z.cosi.clarkson.edu
File Options
USER DIRECT C1 F 80 Trunc=72 Size=1872 Line=0 Col=1 Alt=0
00000 *** Top of File ***
00001 *****
00002 * z/VM 4.3.0 SYSTEM DIRECTORY *
00003 *****
00004 *
00005 * THE ADDRESSES 123 THROUGH 133 ARE VIRTUAL ADDRESSES. *
00006 *
00007 * NOTES: *
00008 * REMEMBER THESE ARE ONLY VIRTUAL ADDRESSES NOT REAL *
00009 * ADDRESSES, SO THERE IS NO NEED TO CHANGE THEM TO MATCH *
00010 * YOUR HARDWARE ADDRESSES. *
00011 *
00012 *
00013 *****
00014 *
00015 * FOR A DESCRIPTION OF DIRECTORY STATEMENTS SEE: *
00016 * VM ENTERPRISE SYSTEM ARCHITECTURE *
00017 * PLANNING AND ADMINISTRATION MANUAL. *
00018 *
00019 *****
00020 *
00021 *
00022 *
00023 DIRECTORY 123 3390 430RES
00024 *
00025 *****
00026 *
00027 GLOBALDEFS
00028     POSIXGROUP system 0
00029     POSIXGROUP staff 1
00030     POSIXGROUP bin 2
00031     POSIXGROUP sys 3
00032     POSIXGROUP adm 4
00033     POSIXGROUP mail 6
00034     POSIXGROUP security 7
00035     POSIXGROUP nobody 4294967294
00036 *
00037 *****
00038 *
00039 PROFILE IBMDFLT
====>
043/007

```

With this cool new interface you get a few new features. First, you now have line numbers to look at. Second, those line numbers can be used for some command entry. Try moving the cursor to one of them and typing “I2” over top one of the line numbers (don't type past the last column of line numbers) and press enter. notice that two empty lines are inserted where your cursor was? You may also delete a single line by putting a “D” in the line number column and pressing enter. Want to delete a whole section of lines? Type a “DD” at the beginning of the section and another “DD” at the end of the section, then press enter.

“/STRING” at the X command entry line will search for the first occurrence of “STRING” relative to the cursor position (exclusive).

Basic File Commands

Just like any operating environment, VM (CP/CMS) has commands for working with files. Here is a brief list.

COPY FN1 FE1 M1 FN2 FE2 M2

The copy command copies a file from one location to another. Just specify the source and destination filenames file extensions and file modes.

Example:

```
COPY USER DIRECT C USER DIRECT A
```

This will copy the file USER DIRECT from the C disk to the A disk.

```
ERASE FN FE M
```

The erase command erases a file. Just specific the filename, extension and mode.

Example:

```
ERASE USER DIRECT A
```

```
RENAME FN1 FE1 M1 FN2 FE2 M2
```

The rename command renames a file.

Example:

```
RENAME USER DIRECT A USER BACKUP A
```

7. Formatting disks

We've already discussed the concept of DASD and minidisks. before you can use either of them they need to be formatted. There are several levels of formatting in VM.

If you are the system administrator, your z/server will be setup and connected to some DASD and all you will have is a bunch of pack addresses. These packs initially just contain raw data, just like a brand new hard drive would. As the administrator, its your just to format (we'll call this "CP format") these pack addresses and give them to the users of the system. You will do this with the "CPFMTXA" command.

Here are the steps required to CP format a disk.

1. Attatch the disk to yourself (as MAINT).
2. Run the CPFMTXA command
3. Respond to the first prompt with "FORMAT"
4. Respond to the second prompt with the disk address you want to format.
5. Respond to the third prompt with "0-END"
6. Enter the volume label at the fourth prompt. (Limited to 6 alphanumeric).
7. "YES" to the "do you want to continue" message.
8. After the formatting is done, enter "END" for allocation information.
See the example in the image below.
9. Detach the disk from MAINT.
10. Attach the disk to SYSTEM.

[IMAGE]

After the disk has been CP formatted, it is ready for the administrator to carve it up

into minidisks. This is discussed in the User Directory section. After this is done, the user that gets access to one (or all) of the minidisks on the pack will have to format them again before using them. If the disk must be formatted for VM use then use the “FORMAT VDEV M” Replacing VDEV with the virtual device number of the minidisk you wish to format, and M with the file mode you would like to access the disk as. The only reason you need to specify M is because VM will automatically access the formatted disk for you.

8. The administrators VM environment

The Administrators (MAINT) environment is slightly different from the other users. MAINT gets special privileges and access to information that the rest of the users cannot see. This section outlines some of these features.

Storage

When MAINT issues the “Q STOR” command, he sees a list of all the storage that that VM has access to.

Devices

MAINT's “Q DASD” shows all of the DASD currently attached to any user. The “Q DASD FREE” command shows all DASD that VM has access to that is not attached. The same is true of “Q OSA” and “Q OSA FREE”.

Spool vols

Spool volumes are used to hold console information, system logs and the contents of the virtual punch card reader used to install Linux. It is the administrators responsibility to ensure that the system does not run out of spool space. You can check the amount of spool space with “Q ALLOC SPOOL”. This will show you all of the spool volumes, as well as how much of that space is used.

[IMAGE]

If you need to ADD spool space, here is how it's done.

1. Format a new spool pack.
2. Specific in the SYSTEM CONFIG that you want the new pack to be CPOWNERD.
3. Reboot VM.

Formatting the pack is described in the CP Format section. The only thing different is the allocation info. When prompted you need to allocate the pack for SPOOL space instead of regular disk space. This is done by entering “SPOOLSTUFF GOES HERE!!!”.

please see the section on the SYSTEM CONFIG file for more info on step two.

Page vols

Page volumes are used as virtual memory space for VM. With a limited amount of storage, not all guests can all fit into storage at a single time so some data is moved out to disk when not in use to make room for other guests data. It is the administrators responsibility to ensure that the system does not run out of spool space. You can check the amount of page space with “Q ALLOC PAGE”. This sill show you all of the page volumes, as well as how much of that space is currently being used.

[IMAGE]

If you need to ADD page space, here is how it's done.

1. Format a new page pack.
2. Specific in the SYSTEM CONFIG that you want the new pack to be CPOWNED.
3. Reboot VM.

Formatting the pack is described in the CP Format section. The only thing different is the allocation info. When prompted you need to allocate the pack for PAGE space instead of regular disk space. This is done be entering “PAGESTUFF GOES HERE!!!”.

please see the section on the SYSTEM CONFIG file for more info on step two.

The User Directory

The User Directory (USER DIRECT) is a file containing all of the information about all of the systems guests. The administrator modifies this file to make/delete guests, give/deny them access to devices. See the “User Directory” section for more information.

SYSTEM CONFIG

The SYSTEM CONFIG file, also edited by MAINT, is a system wide configuration file. It is the administrators responsibility to ensure proper upkeep of this file. For more information see the “SYSTEM CONFIG” section.

Scheduling management

[incomplete]

Channel Paths

As the administrator, you can use special commands to get specific information

about how the hardware is physically attached to the system. Hardware attached to the system to physical ports. Each one of the ports on the system has a unique identifier know as a channel path ID (CHPID).

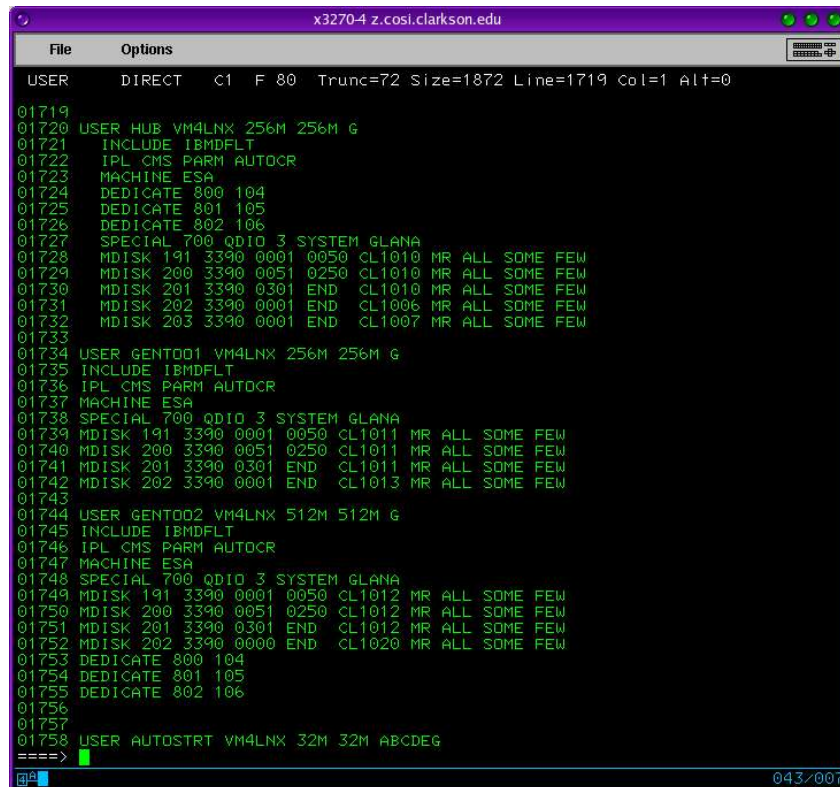
You can find out which channel path(s) a device is connected to by running the “Q PATHS VDEV” comand. Replace VDEV with the address of the device you want to query.

You may also find out which devices connect over a certain channel path by using the “Q CHPID ADDR” command. Replace ADDR by the CHPID you want to query.

[IMAGE]

9. The User Directory

The User Directory (USER DIRECT) is a file containing all of the information about all of the systems guests. The administrator modifies this file to make/delete guests, give/deny them access to devices. Below is a screen shot of a typical entry.



```
USER      DIRECT    C1  F 80  Trunc=72 Size=1872 Line=1719 Col=1 Alt=0
01719
01720 USER HUB VM4LNX 256M 256M G
01721 INCLUDE IBMDFLT
01722 IPL CMS PARM AUTOGR
01723 MACHINE ESA
01724 DEDICATE 800 104
01725 DEDICATE 801 105
01726 DEDICATE 802 106
01727 SPECIAL 700 QDIO 3 SYSTEM GLANA
01728 MDISK 191 3390 0001 0050 CL1010 MR ALL SOME FEW
01729 MDISK 200 3390 0051 0250 CL1010 MR ALL SOME FEW
01730 MDISK 201 3390 0301 END CL1010 MR ALL SOME FEW
01731 MDISK 202 3390 0001 END CL1006 MR ALL SOME FEW
01732 MDISK 203 3390 0001 END CL1007 MR ALL SOME FEW
01733
01734 USER GENT001 VM4LNX 256M 256M G
01735 INCLUDE IBMDFLT
01736 IPL CMS PARM AUTOGR
01737 MACHINE ESA
01738 SPECIAL 700 QDIO 3 SYSTEM GLANA
01739 MDISK 191 3390 0001 0050 CL1011 MR ALL SOME FEW
01740 MDISK 200 3390 0051 0250 CL1011 MR ALL SOME FEW
01741 MDISK 201 3390 0301 END CL1011 MR ALL SOME FEW
01742 MDISK 202 3390 0001 END CL1013 MR ALL SOME FEW
01743
01744 USER GENT002 VM4LNX 512M 512M G
01745 INCLUDE IBMDFLT
01746 IPL CMS PARM AUTOGR
01747 MACHINE ESA
01748 SPECIAL 700 QDIO 3 SYSTEM GLANA
01749 MDISK 191 3390 0001 0050 CL1012 MR ALL SOME FEW
01750 MDISK 200 3390 0051 0250 CL1012 MR ALL SOME FEW
01751 MDISK 201 3390 0301 END CL1012 MR ALL SOME FEW
01752 MDISK 202 3390 0000 END CL1020 MR ALL SOME FEW
01753 DEDICATE 800 104
01754 DEDICATE 801 105
01755 DEDICATE 802 106
01756
01757
01758 USER AUTOSTRT VM4LNX 32M 32M ABCDEG
====>
```

The USER Line

This line defines a new user. Any line after this line but before another User line applies specifically to this user. The format of this line is:

USER GUESTNAME PASSWORD INIT-STOR MAX-STOR PERMISSIONS

GUESTNAME - This is the name you want to use for the guest (limited to 8 alphanumerics).

PASSWORD - The logon password used for the guest. (limited to 8 alphanumerics).

INIT-STOR - The initial amount of storage given to the guest when he logs on.

MAX-STOR - The Maximum amount of storage a guest can request.

PERMISSIONS - Different letters representing different commands that can be used by this guest,

CPUS

You may omit CPU statements if you want the guest to have only 1 CPU. Otherwise, you should a CPU # (starting from 0) for every CPU you want to guest to have access to. For example, a two CPU guest would have the following lines in his directory entry:

CPU 0
CPU 1

Misc stuff

IPC CMS PARM AUTOOCR - This line tells VM to load CMS when the guest logs on.

MACHINE ESA - This line defines one of a number of machine types that VM can model. ESA is the standard and the others are mostly older and used for compatibility.

MDISKS

MDISK statements define the minidisks that this guest has access to. These minidisks are just chunks of DASD packs. If a minidisk is defined to be the full size of a dasd pack it is known as a "full pack minidisk". The format is as follows:

MDISK VDEV MODELSTART SIZE VOL-LABEL ACCESS-MODE P1 P2 P3

VDEV -	This is the virtual device number you want to assign to this minidisk.
MODEL -	The hardware type of disk. We will be using 3390 disks which have a cylinder size of 3338.
START -	The start cylinder of the minidisk. Note: NEVER start at 0. Always start at 1.
SIZE -	How big (in cylinders) the minidisk is.
VOL-LABEL -	This is the VM volume label of the system attached pack that will be used to house this minidisk.
ACCESS-MODE -	What permissions (read/write, read only) will be given to the guest? MW is used for read/write and RR is used for read only.
P1 P2 P3 -	Passwords that another guest must enter to get access (via the LINK command) to this minidisk. Each password corresponds to a different type of access.

Virtual OSA's

You can define virtual network cards within VM so that you can have a completely virtual network that does not even use your network hardware. Provided you have a guest lan defined you can create virtual network cards and connect them to a guest lan. Heres the directory syntax entry for creating a virtual network card.

SPECIAL VDEV-START TYPE NUMBER OWNERID GLAN

VDEV-START -	The base virtual address to use for the device.
TYPE -	The type of device to create. We will mostly use QDIO.
NUMBER -	The number of virtual devices to create. Remember that it takes three devices to make a complete network card.
OWNERID -	The owner of the virtual card. We will mostly use SYSTEM.
GLAN -	The guest lan to connect to.

DEDICATEs

Dedicate statements are used to dedicate hardware to an individual guest. We will

use them primarily for dedicating OSA hardware (network card addresses) to a guest. Remembering that it takes 3 addresses to make a complete network card, here is the format:

```
DEDICATE VADDR1 ADDR1  
DEDICATE VADDR2 ADDR2  
DEDICATE VADDR3 ADDR3
```

This will dedicate an OSA card with addresses ADDR1, ADDR2, ADDR3 to the guest. The guest will see the card as VADDR1, VADDR2 , VADDR3.

Updating the directory

Once you have modified the directory, you may update it with the following command: "DIRECTXA".

10. Services

AUTOLOG1

TCPIP

DIRMAINT

PORTMAP

11. SYSTEM CONFIG

PAGE /SPOOL owned

System Owned packs

12. Performance monitoring