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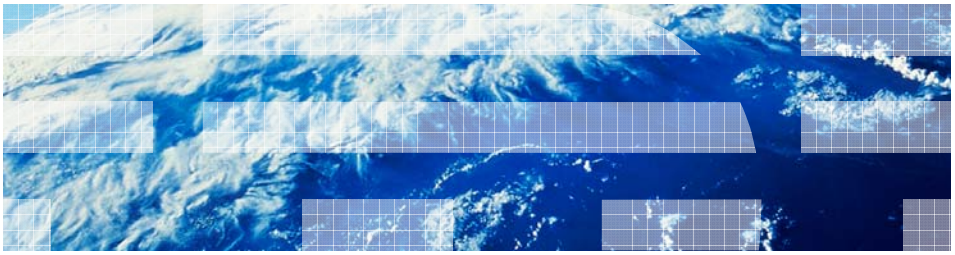
IBM

PowerVM
Virtual I/O Server Configuration Cookbook



This set of charts is the second in a series of cookbooks that discuss the configuration and test of PowerVM technologies.

Before you start

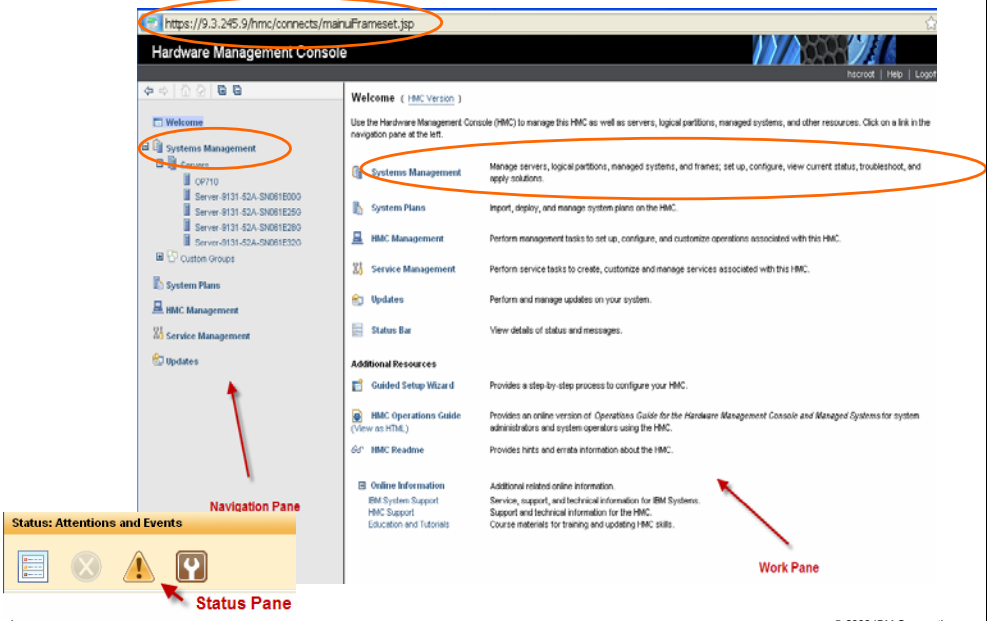
- **Assumptions:**
  - Hardware Management Console (HMC) and Power System are in the rack and correctly cabled
  - HMC has already been installed and configured
  - These charts address walking through a generic set of steps with no errors.
  - Everything in this set of charts is considered basic and addresses one way to do an operation
    - There are multiple ways to configure
    - Nothing is advanced
- **Have the following ahead of time:**
  - Ethernet addresses
    - Virtual IO Server (VIOS)

VIOS Configuration Topics

- Bring the Power Server into the HMC
- Configure Virtual I/O Server (VIOS)
- Partition

- **At the end of this section you will be able to:**
  - Configure and install the VIOS

Connecting the Power Server -- Review



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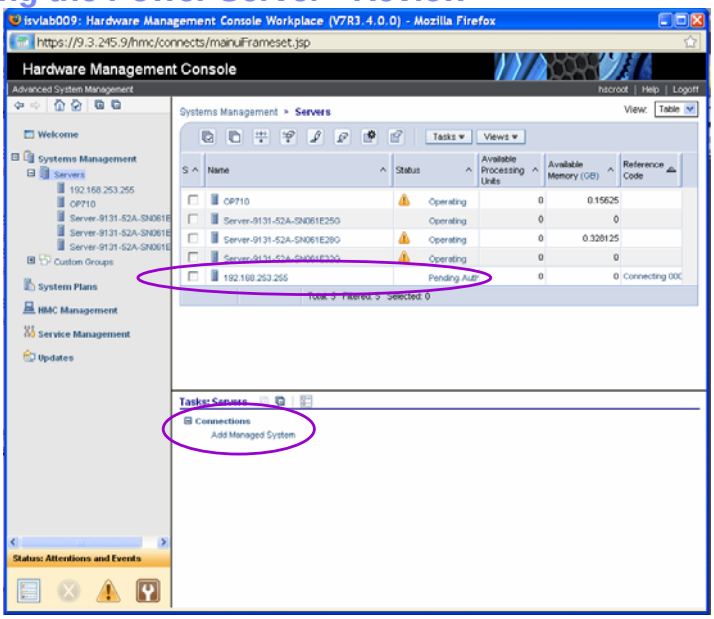
Before you start this set of charts, login to the HMC.

Notice the https at the top of the browser window. It's critical

To configure the power server, select the Systems Management link in the Navigation Pane or in the Work Pane.

Plug in the Power system. Assuming everything is connected correctly, a few minutes after applying power to the Power system, it should appear on the list of systems in the HMC.

Connecting the Power Server - Review



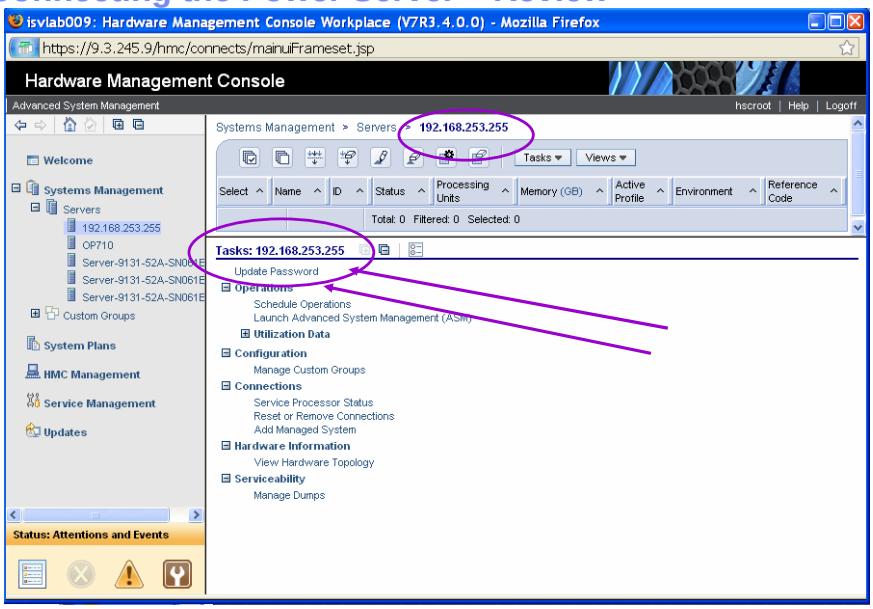
The new system should appear as a new IP address on the list of servers a few minutes after you connect power to the system.

Notice that the system appears in the server list, is identified by it's ipaddress and shows its status as Pending Auth.

Select this system. Then part way down the page, you'll see a field that says ***Tasks:Servers.***

If the new system doesn't appear, you can choose Add Managed System to add it manually.

Connecting the Power Server – Review



Select the IP address of the new system from the list of servers.

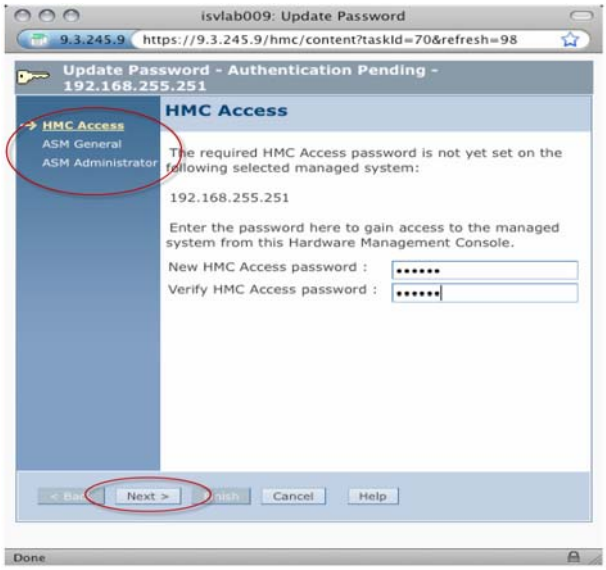
When the new system has been selected, you see its Ethernet address in the task bar and work pane

Notice in the task pane at the bottom, it shows the new server's identification and a list of tasks.

Select Update password

- Note: If the server has ever been configured before, you will need to know hmc access password for the service processor.

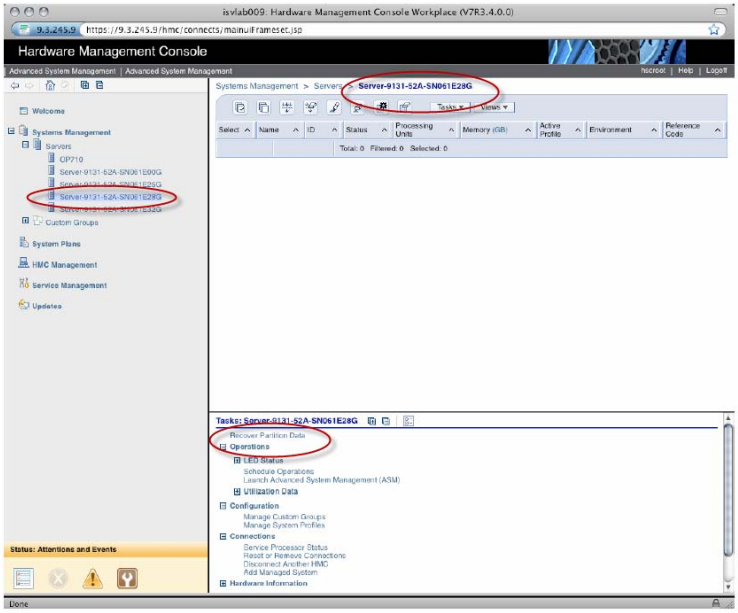
Connecting the Power Server -- Review



If the server has NEVER been configured before, then set new passwords for:

- HMCaccess –does not have a default. This charts shows the interface if no HMC access password has been set. If one has been previously set, you will need to know.
- Admin – default password is admin
- General – default password is general

Configuring the VIO Server – Recover Partition Data



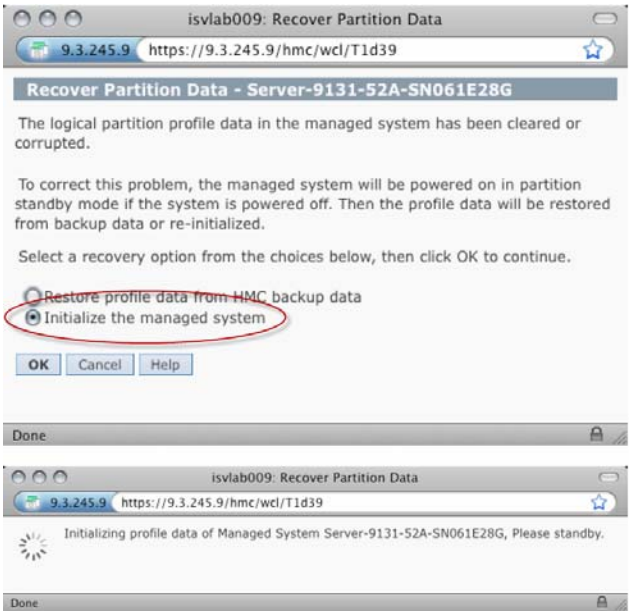
Once the passwords have been set, the server is identified by its serial number rather than it's ip address so the name you see here is different than the other slides.

If you select a server in server list (which is not shown here) or in the list in the left hand title bar, you see the name of the server in top panel and a list of operations in the bottom pane.

If this is the first time that you are accessing this machine, you have the opportunity to recover the partition data or reconfigure the system.

You won't see Recover Partition Data unless it's an available option . This example assumes that you are going to totally reinitialize the system.

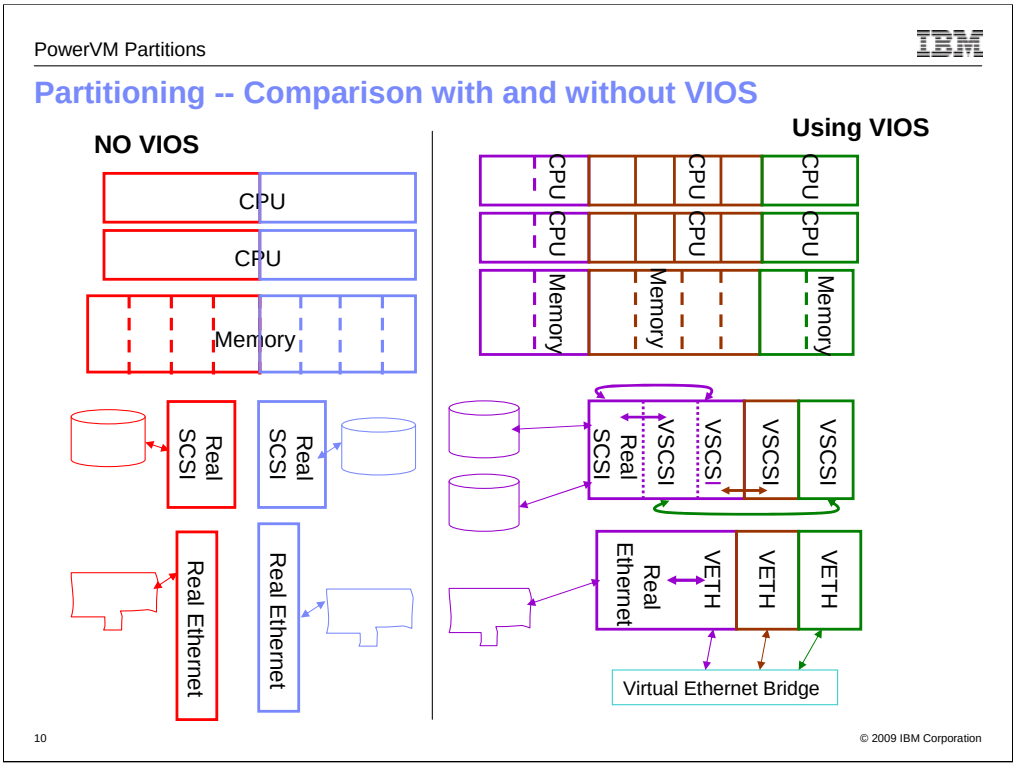
Initializing the managed system



Once you select recover data , you have the option of restoring the system from existing profile data or reinitializing the system.

Note: We'll discuss profiles in the advanced section

This slide shows that we will reinitialize the system (aka wipe the system clean).



What Is Logical Partitioning? *Logical partitioning* is the ability to make a server run as if it were two or more independent servers. When you logically partition a server, you divide the resources on the server into subsets called logical partitions. Each logical partition (LPAR) has a partition ID, which is a whole number used by the system to identify the partition.

You can install software, including an operating system, on a logical partition. The logical partition then runs as an independent logical server with the resources that you have allocated to the logical partition. You can assign resources such as processors, memory, and input/output adapters to a logical partition.

The logical partitions and the server firmware on a server managed by a Hardware Management Console (HMC) are required to manage the system.

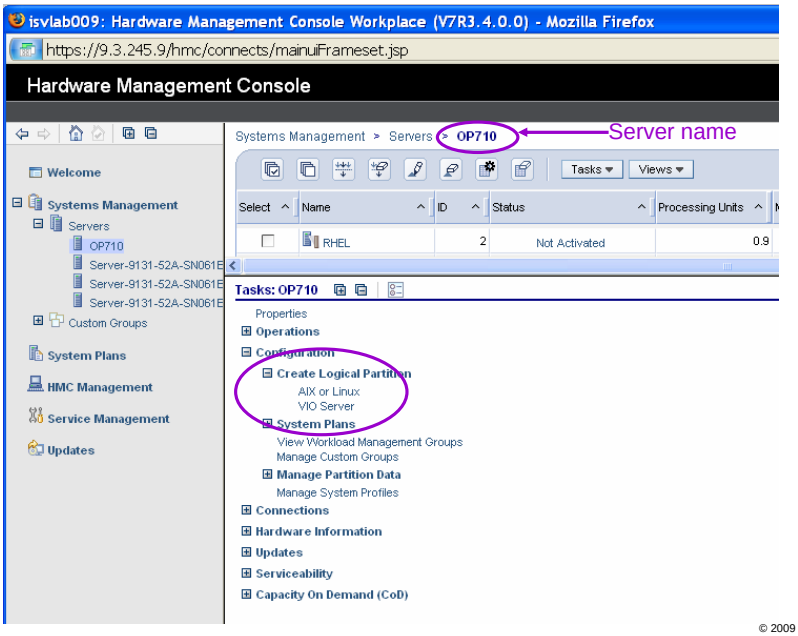
Server firmware is code that is stored in system flash memory on the server. It directly controls the resource allocations on the server and the communications between logical partitions on the server.

Before we discuss the mechanics of partitioning, let's discuss an LPAR and a Virtual I/O Server partition Virtual I/O is a broad term that refers to a set of storage and network virtualization features:

- virtual Ethernet
- shared Ethernet adapter (SEA)
- virtual storage.

Virtual Ethernet. Without requiring additional hardware or external cables, a virtual

Partitioning -- Creating the logical partition



Select a server

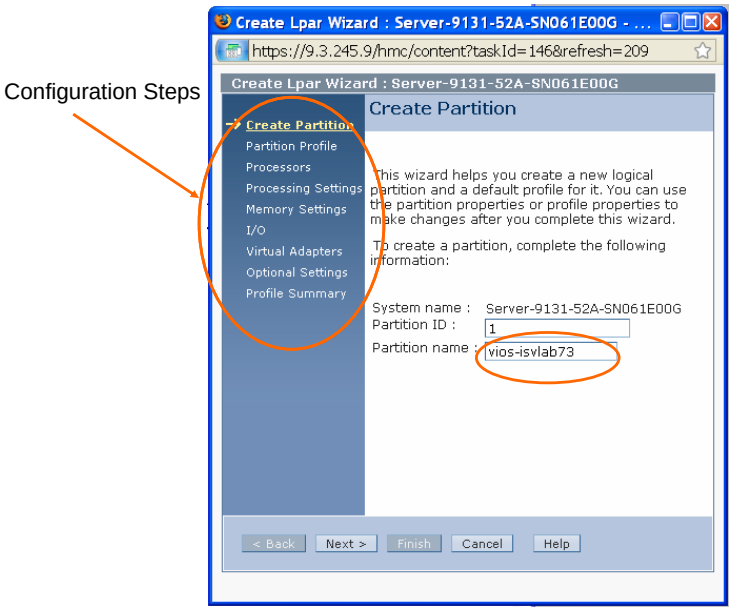
Select ***Create Logical Partition***

Subcategories of the Create Logical Partition button are AIX/Linux and VIO Server. If your system is a system built after fall of 2008, you will also see i/os in this list.

If VIO doesn't show up on list, then the machine is not activated for PowerVM. You need the required code to activate.

You can check if your system is PowerVM enabled here: *http://www-912.ibm.com/pod/pod*. Just enter the machine type and serial number and if a VET code is returned then the system can be used for PowerVM. It still may be necessary to install the code in the system.

Partitioning -- Creating the partition



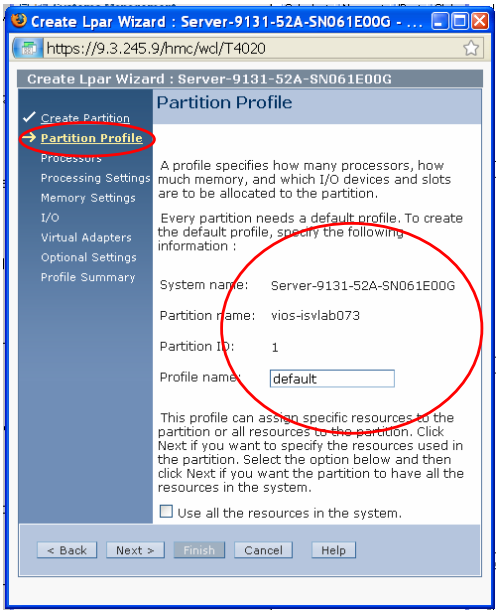
You are shown this popup when you select EITHER

- ***AIX or Linux***
- ***VIOS***

The pane on the left contains a list of the steps that you will walk through to configure the VIO server

A word about partition names – in our lab we use the scheme of **systemName-OSNAME** as a partition name plus we use the scheme of isvlab[number] where number is the last digits of the systems ipaddress. It makes identifying easy. You can create any scheme that you desire.

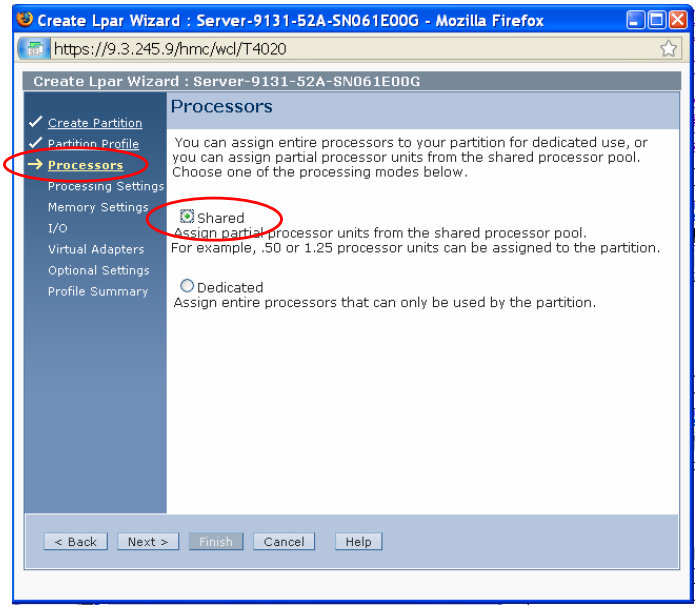
Partitioning - Initializing the partition profile



This chart requires you to enter a profile name. Something meaningful is always appropriate.

Notice that the system name and partition name are already filled in.

Partitioning -- Specifying the processors



This popup is asking if you want to create static LPARs or micro-partitioned LPARS. For static LPARs you will select Dedicated. To change a static LPAR you will have to reboot the LPAR.

For Dynamic LPARS (DLPARs) and Micro partitioning, you will select shared. Shared gives you more flexibility. Use shared if you plan to use macro partitioning in the future.

This set of charts only illustrates shared processors. There are more charts in a subsequent class that provide explanation about micro partitioning concepts.

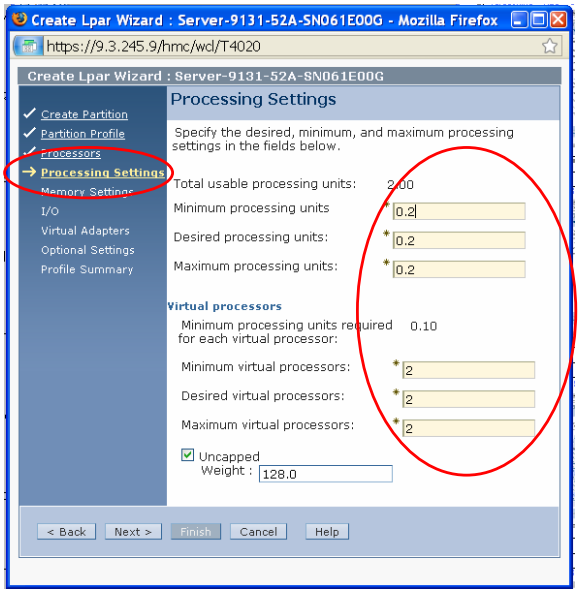
You can assign processors to LPARs in 1/10 of a CPU. Thus you can get more LPARs out of relatively limited number of CPUS

The Austin lab chose .2, . 2, .2 and 2,2,2 as it is the smallest number we could select and still get time slices on both processors of the VIOS. This mean that we have requested 2/10 of a CPU. By selecting 2 for the Virtual Processor value, the process gets 1/10 of a process across 2 processors and facilitates threading.

Remember that

1. 1 shared processor == 1 VP
2. >1.0 Shared Processor && <=2.0 shared processor == 2 VP

Partitioning -- Selecting the processing settings

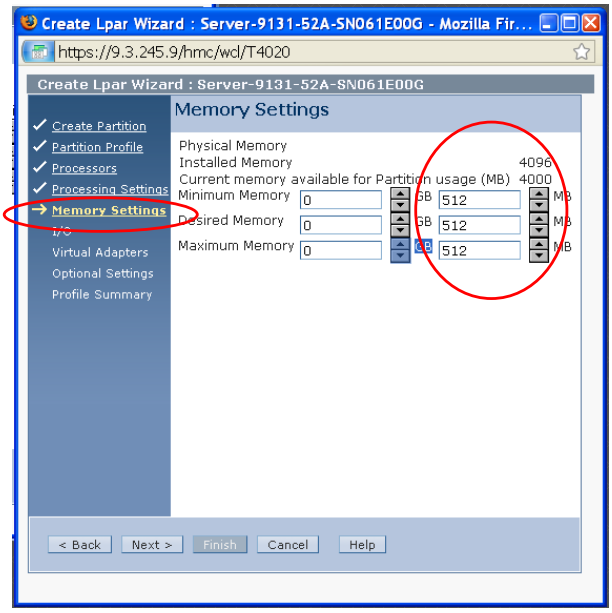


In this popup, you will need to select minimum, desired and maximum for partitioning units and virtual processors. The number of virtual processors gives you time slices on multiple processors. The uncapped field allows you to go above you maximum processing units.

The Austin lab chose .2, . 2, .2 and 2,2,2 as it is the smallest number we could select and still get time slices on both processors of the VIOS. This mean that we have requested 2/10 of a CPU. By selecting 2 for the Virtual Processor value, the process gets 1/10 of a process across 2 processors and facilitates threading.

Minimum, Desired and Maximum values are explained in a subsequent class about micro partitioning.

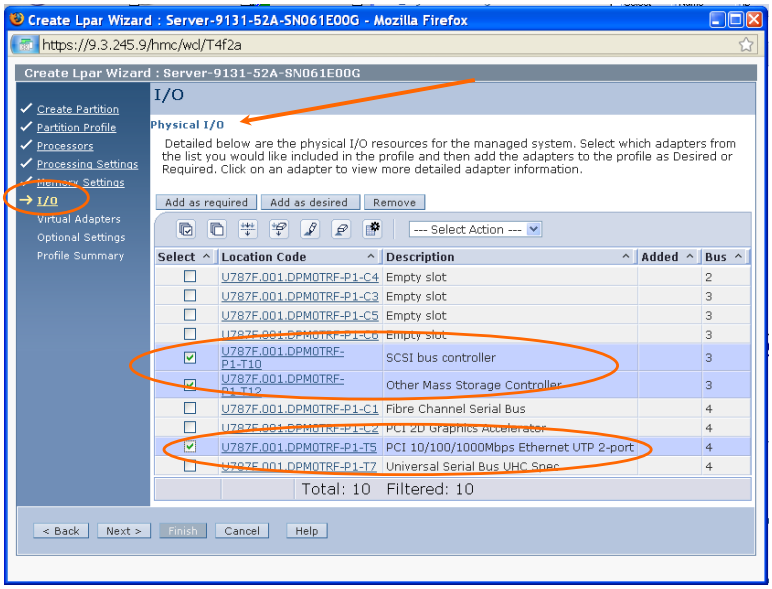
Partitioning -- Selecting the memory settings



The default value for minimum, desired and maximum is 128. 512 Minimum required for VIOS.

Note: This chart requires you to select GB + MB of storage. The demo chart specifies that .5 GB of storage is required for this VIOS. If you want 1.5, you would enter 1 in the column on the left and 512 in the column on the right.

Partitioning -- Specifying I/O



The next several charts illustrate how to set up the I/O for the VIOS.

The ***Physical I/O popup*** lists what's in your system. Notice there are a number of empty slots on this system.

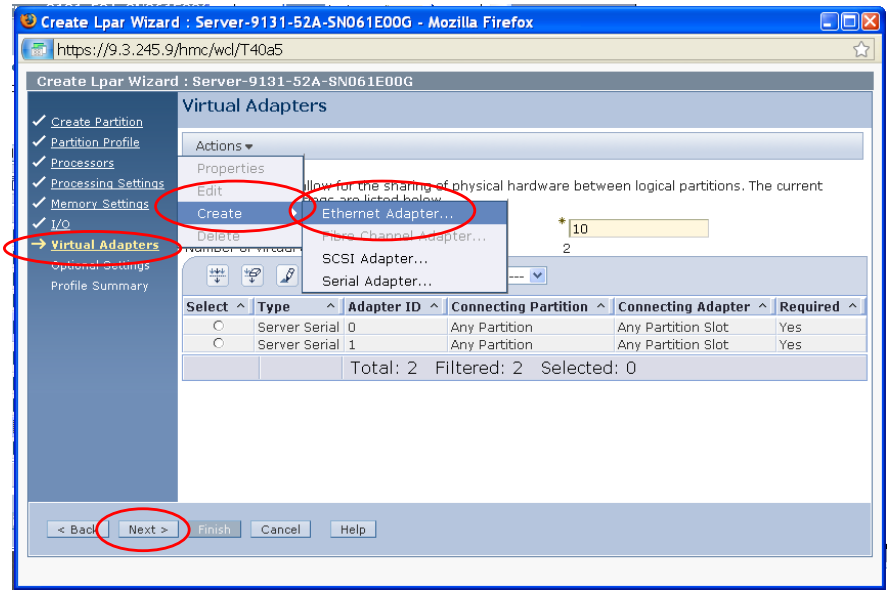
The next several steps configure the SCSI, other Mass Storage Controller and Ethernet Adapter.

The "*Other Mass Storage Controller*" will be used to map the DVD or CDrom to the various partitions for installation.

Select the desired adapters and then "*Add as Required*"

No additional popups or menus are used.

Partitioning – Selecting the virtual adapters



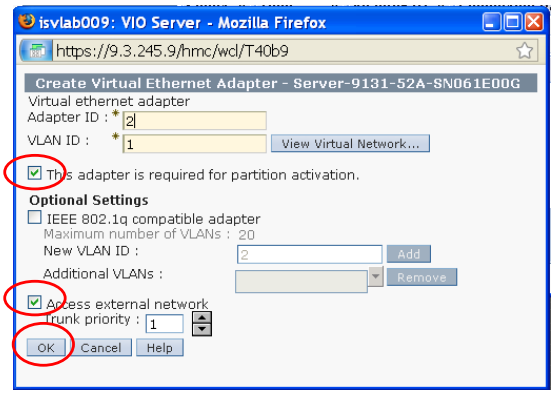
Once you have configured the physical adapters, you need to create the virtual adapters. You need to create 1 virtual Ethernet adapter and 1 virtual SCSI adapter for each LPAR you plan to create.

This set of “cookbook” classes will create one AIX and one Linux partition. So we will create 1 virtual Ethernet and 2 Virtual SCSI (one for each partition). You only need one virtual Ethernet as the virtual Ethernet on the LPARs and the single virtual Ethernet in the VIOS will talk to an Ethernet bridge.

For Ethernet, select *Actions->Create->Ethernet Adapter*.

Note: It’s best to give some thought about your requirements here. While the VIOS is reconfigurable, once it’s installed, you have to reboot to reconfigure that means that all LPARs attached to it will have to reboot resulting in possibly unexpected down time.

Partitioning – Creating a virtual Ethernet adapter

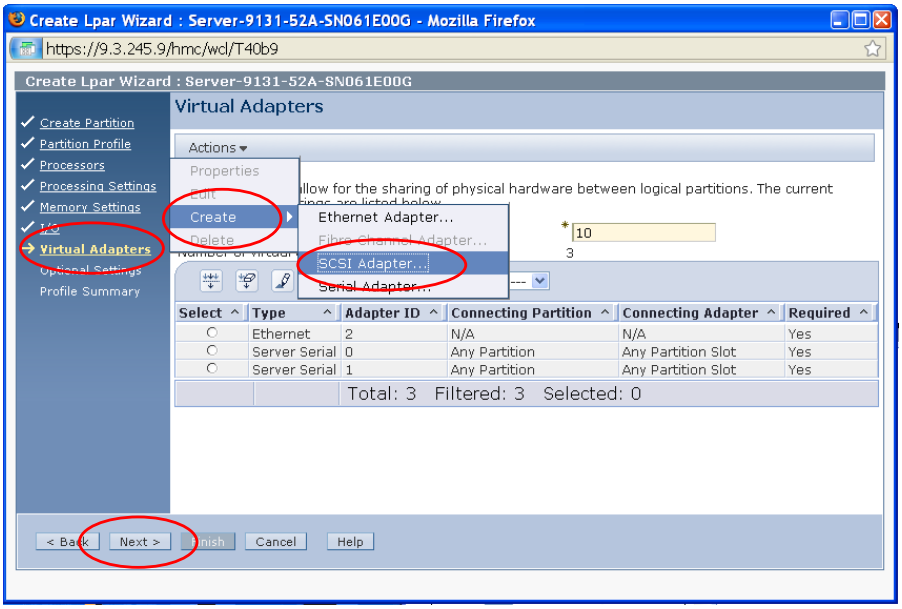


This is the popup to configure the virtual Ethernet adapter. Be sure to select

- The "*This adapter is required for partition activation*" field.
- "Access external network" field as this adapter will actually access the outside network. This will not be checked for other operating system LPARs

Select "*OK*" to finish with this popup.

Partitioning – Creating a virtual SCSI adapter

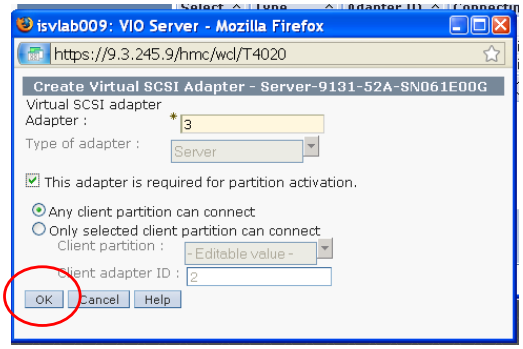


You will have to enter this menu as many times as want virtual SCSI devices.

If you have one LPAR plus the VIOS, it will be 2. The charts for this class will install a VIOS, AIX and Linux LPAR so we will create 3.

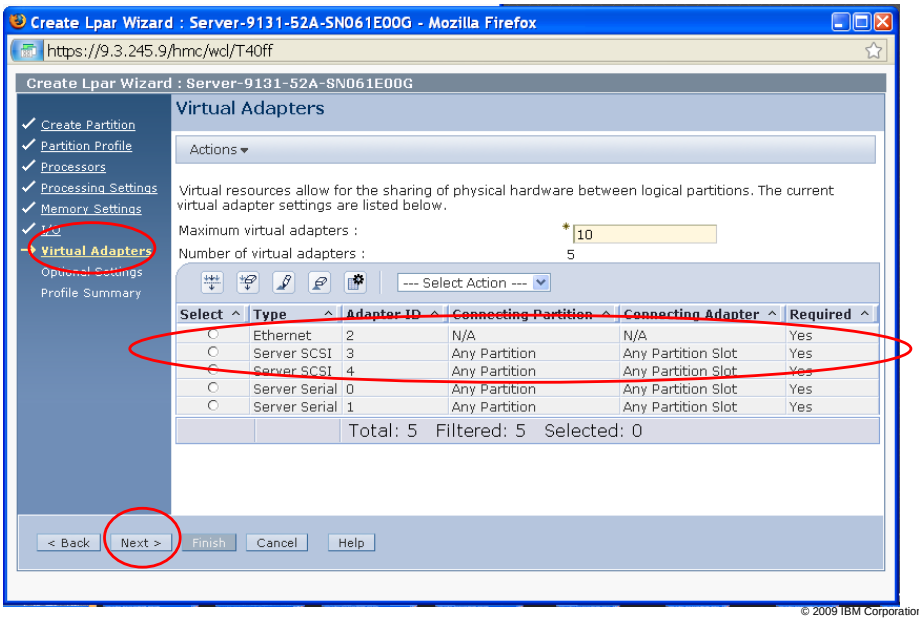
Select *Actions->Create->SCSI adapter*, and then select *Next*.

Partitioning – VIOS -- Creating a virtual SCSI adapter



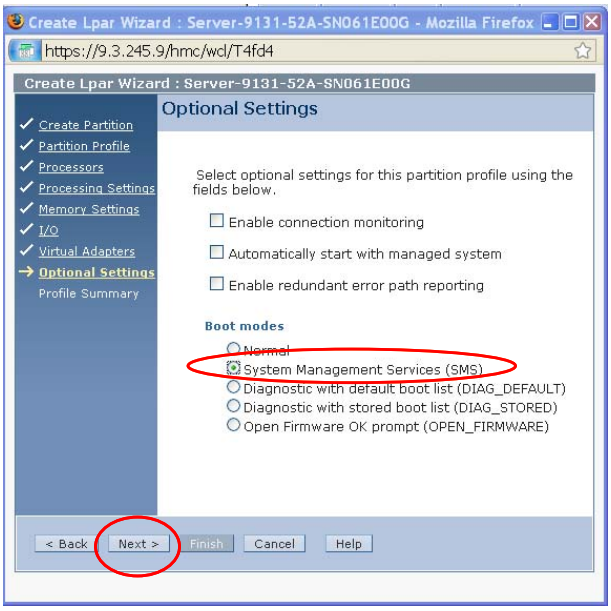
Take the defaults here. Be sure that "*This adapter is required for partition activation*". Then select OK.

Partitioning –Creating virtual adapters



When you come back to this window, you see that an Ethernet and 2 SCSI devices have been added. Select ***Next***.

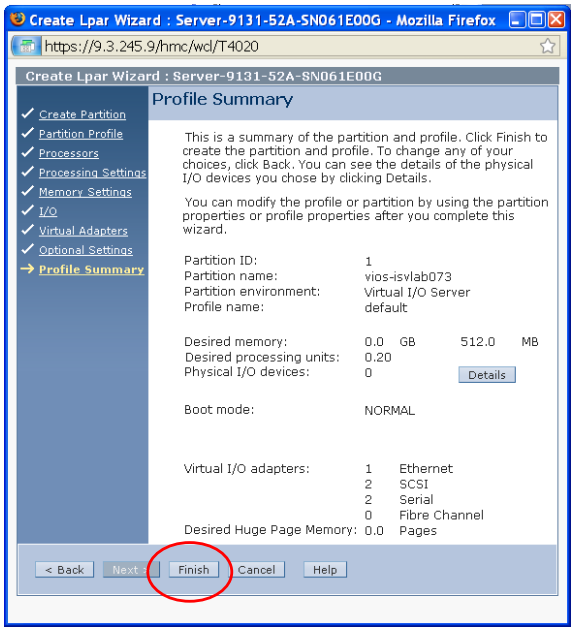
Partitioning – Selecting optional settings



This menu allows you select any optional settings.

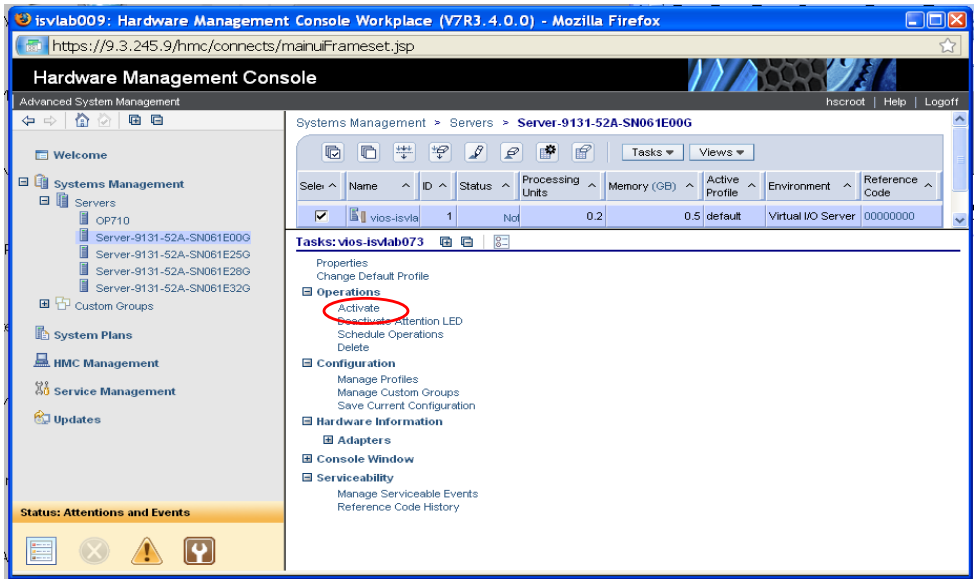
Select boot from SMS so it boots from the CD to allow the VIOS to be installed from the CD.

Partitioning – Reviewing the profile summary



This chart provides a summary of your choices. Review it carefully and then select "***Finish***"

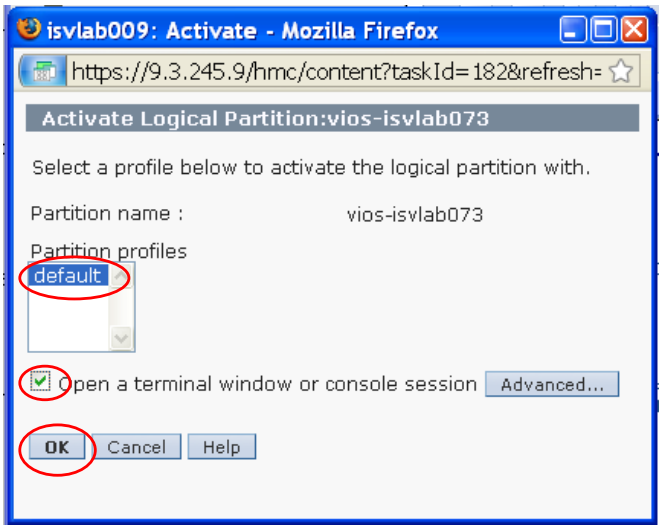
Partitioning – Install VIO Server



When you arrive back at this menu, select ***Activate***.

The next series of slides walk you through the steps of booting the system into the CD and installing VIOS from the CDROM.

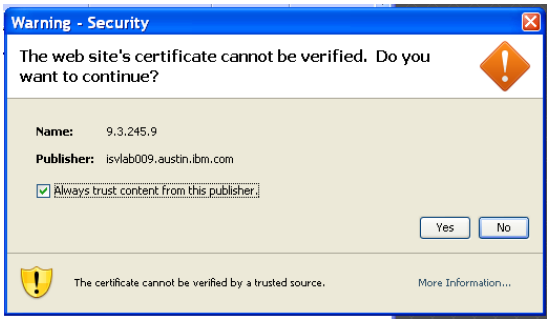
Partitioning – Specify the profile



For this example, select default. Note it is the name of the profile we created several slides earlier You may have a different name here.

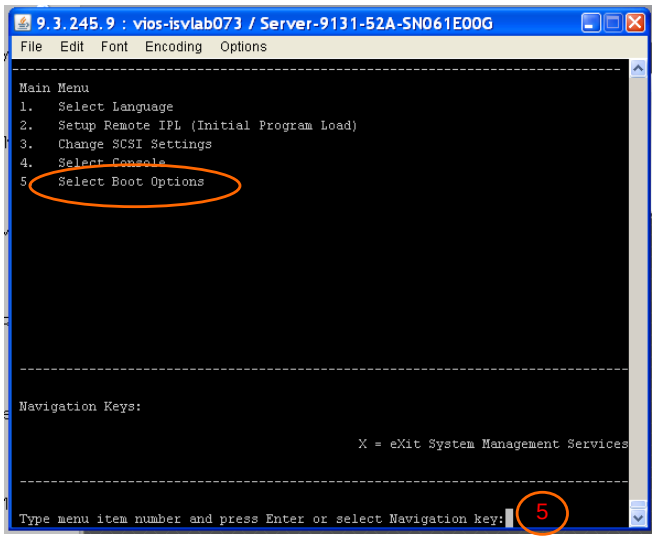
Note the check box for "*Open a terminal window or console session*" is selected. This will be important in installing the VIOS server software.

Partitioning – Security warning(s)



Accept all the security warnings. There may be multiple.

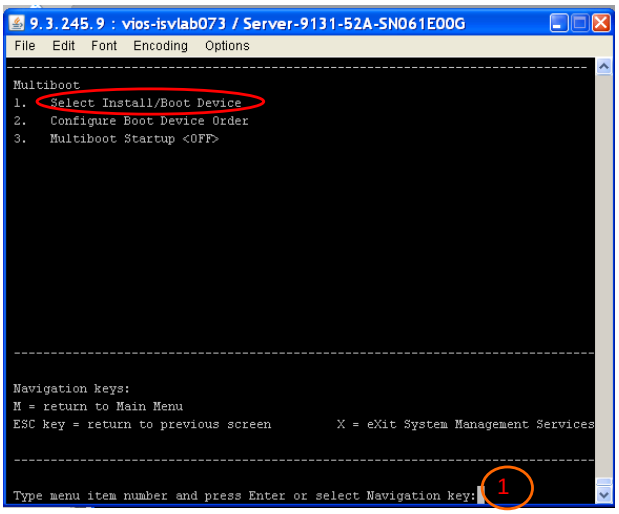
Partitioning – Select Boot Options



This is the terminal window that you specified several slides back. This starts the process of installing from CDROM.

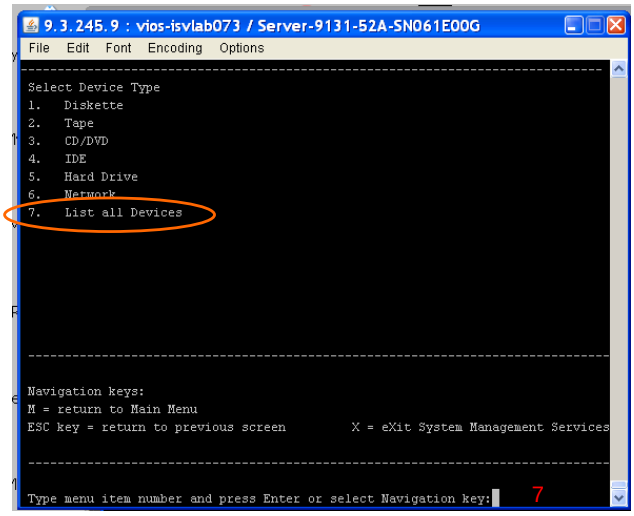
Choose "*Select Boot Options*" so that the HMC boots from CD and the HMC software can be installed. The next several slides illustrate this scenario of events.

Partitioning – Select Boot Device



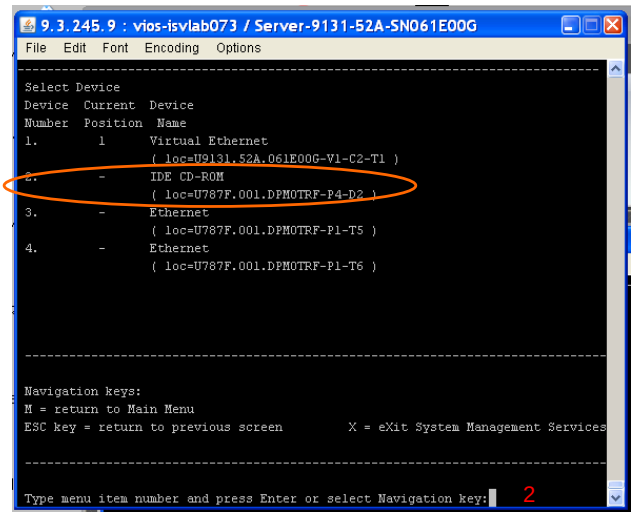
Select Install/Boot Device

Partitioning – List all Devices



List all devices

Partitioning – Select CD-ROM

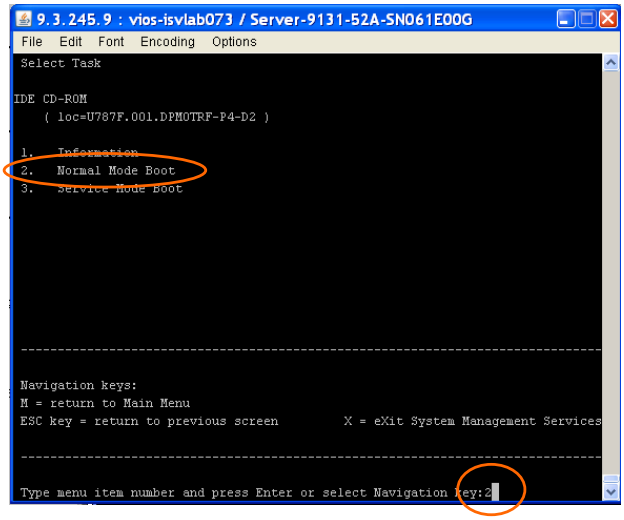


Choose the CDROM. It may be different device number on your system.

On this system, it is number 2.

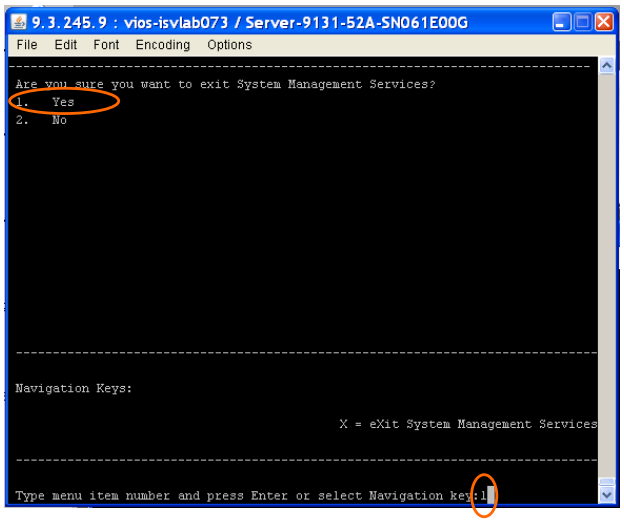
It may be a SCSI, USB or IDE – depends on the system.

Partitioning – Normal Boot Mode



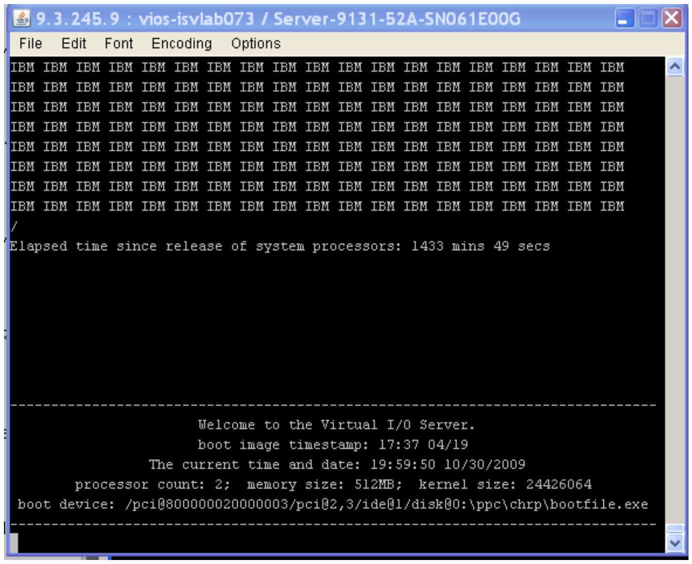
When presented with this menu, select Normal Boot Mode. For this system, it is number 2.

Partitioning – Obligatory confirmation



Here's the obligatory confirmation message. Be sure to select "***yes***" or number 1

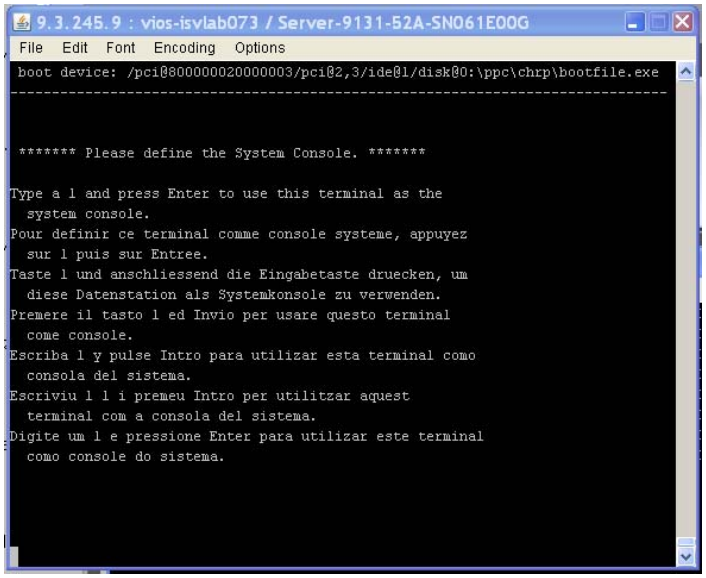
Partitioning – Normal Boot Mode



This is the screen you see while waiting for system to boot from cd

NOTE: The elapsed time is not helpful on this system as the system clock is not set appropriately.

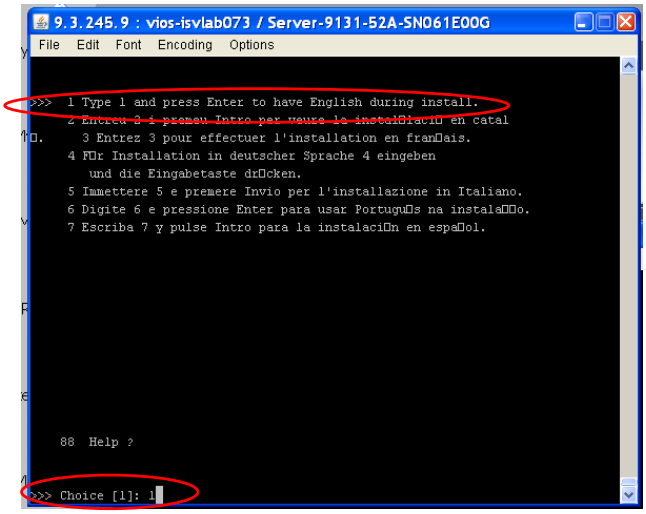
Partitioning – Select the Console



This menu is used to select the console.

Type 1 and press the Enter key.

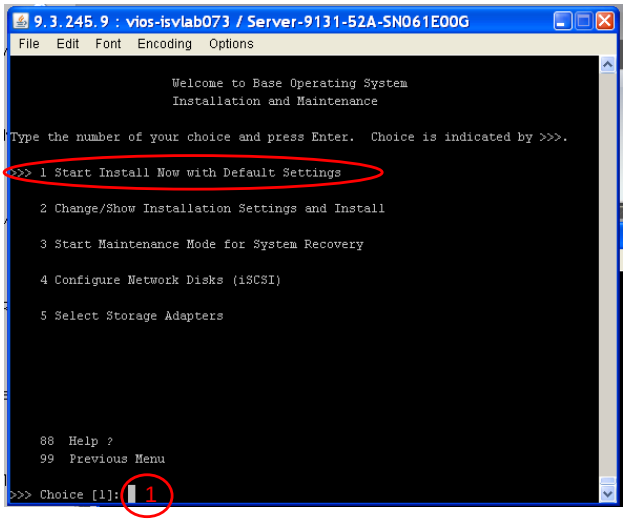
Partitioning – Select the language



This menu is used to select the language for install.

You may go through several wait windows before you arrive here.

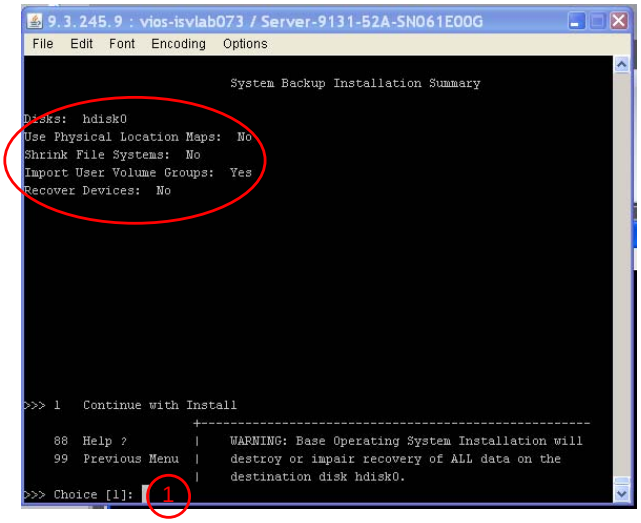
Partitioning – Select Start Install



Now you get to **REALLY** start the install.

You can select 1 to install with default settings or 2 to verify that they settings are what you want.

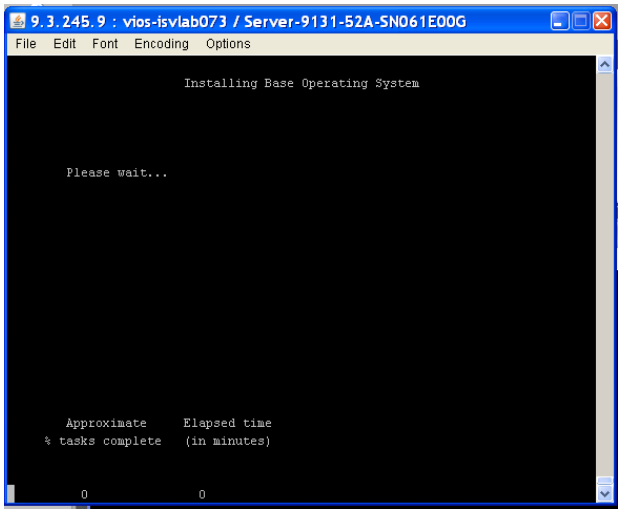
Partitioning – Select Continue with Install



This is your last chance to verify the configuration. Once you're certain of your configuration, select "1" for "Continue with the Install".

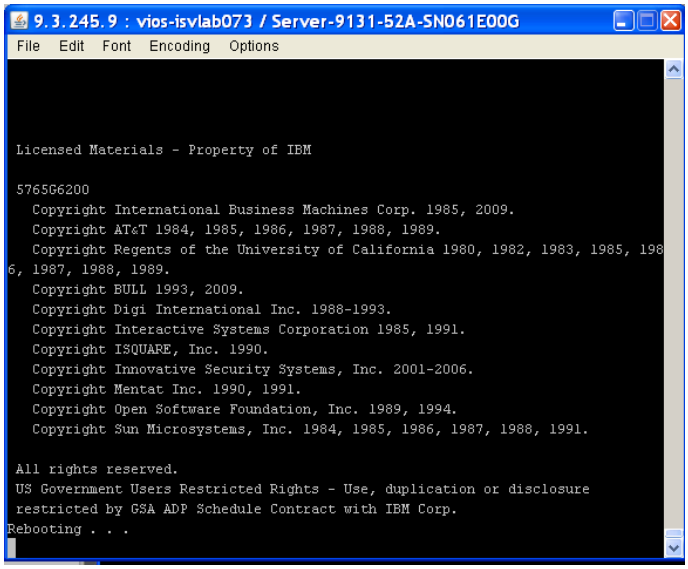
You can also select "99" to back up and change any values.

Partitioning – Wait menu



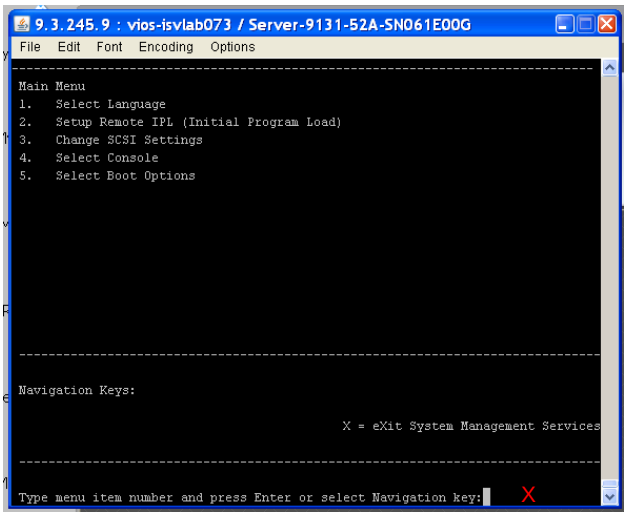
Now wait

Partitioning – Rebooting Menu



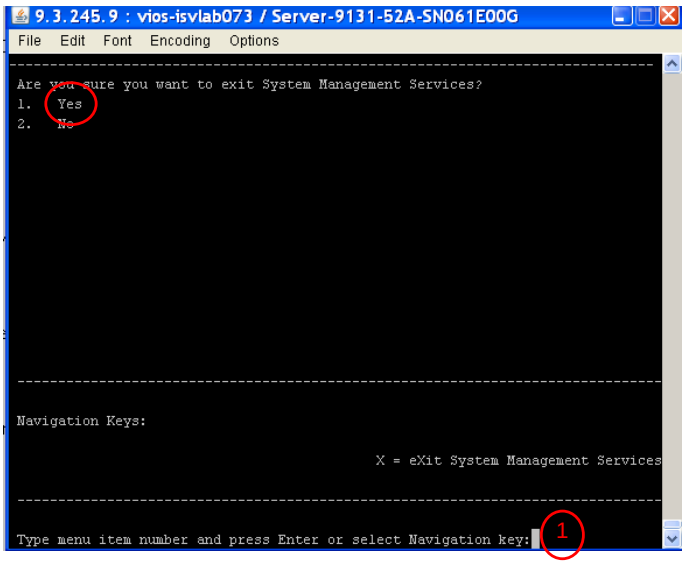
Eventually you get to the rebooting menu.

Partitioning – Rebooting after install



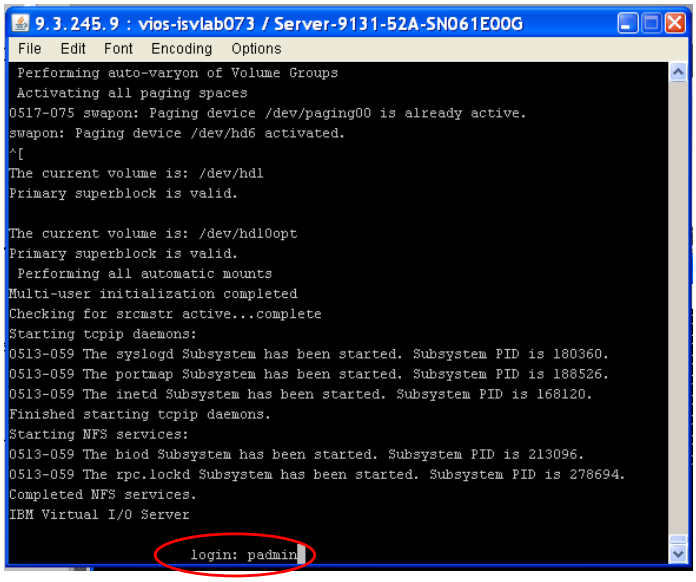
When you reach this menu, select " **X"** for exit System Management Services

Partitioning – Confirmation menu



Obligatory confirmation menu.

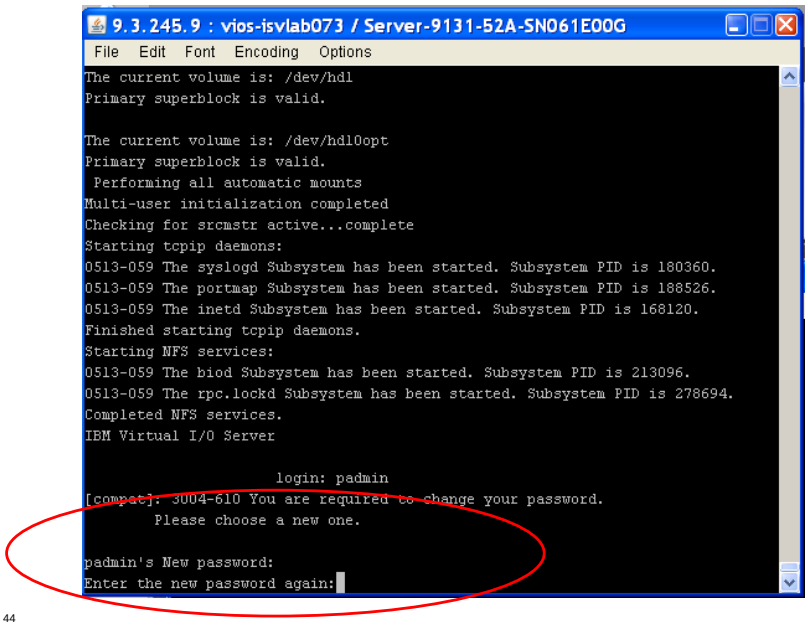
Partitioning – Login with administrator id



When you reach the login window, use the *padmin* id. This is the default administrator id.

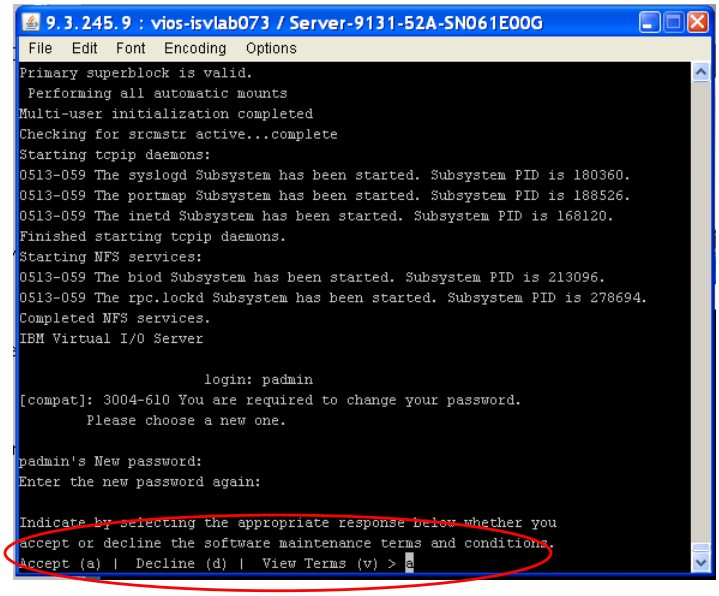
You may have changed it or may want to change it.

Partitioning – Set Password



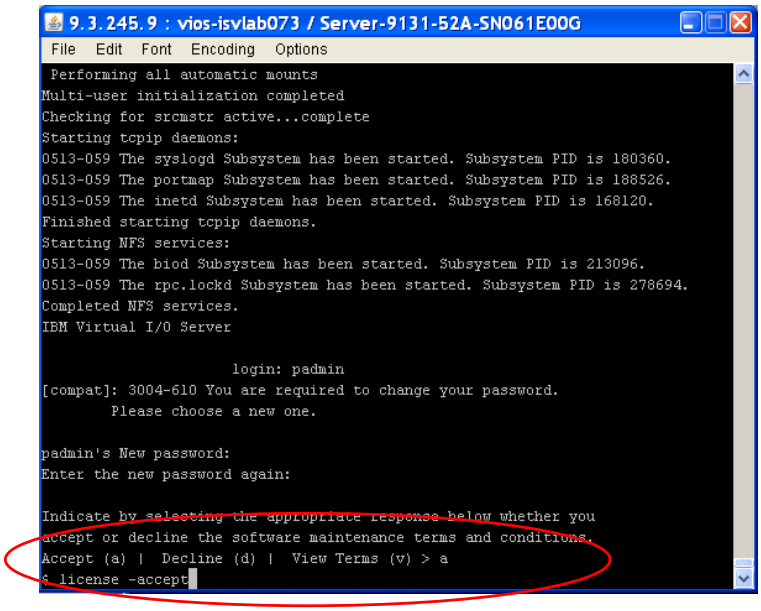
Here you are forced to set the *padmin* (administrator) password.

Partitioning – Accept the license



Accept the license

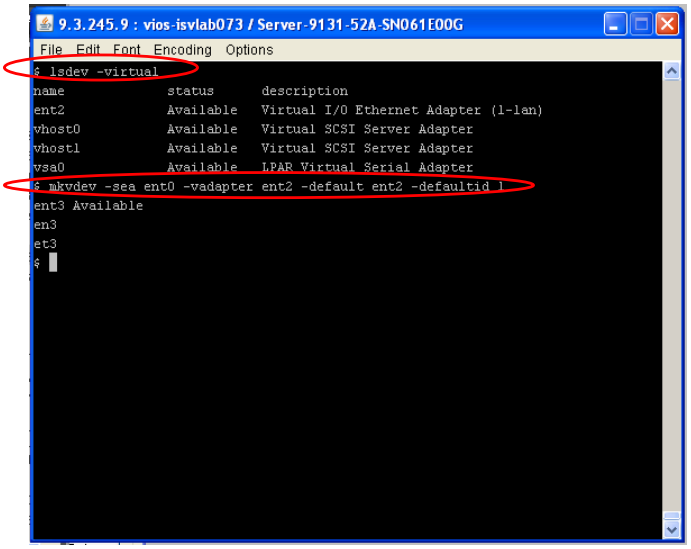
Partitioning – Accept the license -- again



Accept the license again.

This time you have to type "*license –accept*"

Partitioning – Configure Ethernet network setup



After license accepted, you come up in a shell.

Run *lsdev –virtual*

This command lists all the virtual devices.

Documentation for lsdev command is here:

http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.aix.cmds/doc/aixcmds3/lsdev.htm

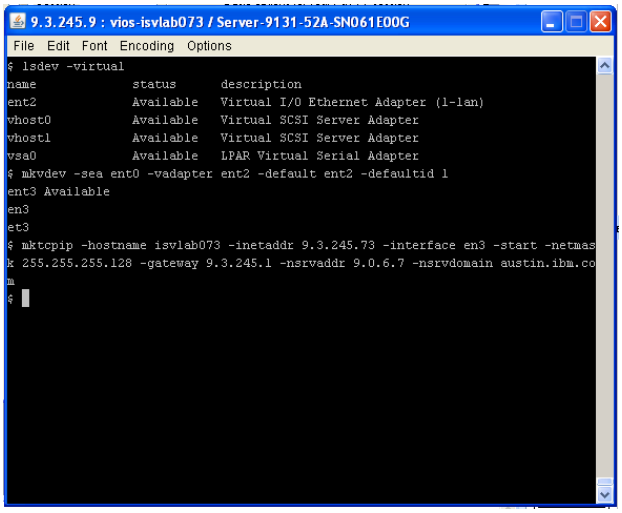
Run the ***mkvdev*** command to make a shared Ethernet adapter. The example command in the screen shot uses ent0 because first physical Ethernet and ent2 because it was the first virtual Ethernet. The result of this command is a virtual adapter called ent3. The manual page for ***mvkdev*** is here:

http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/index.jsp?topic=/iphcg/mkvdev.htm

Mkvdev connect the ent2 virtual adapter to communicate with the Ethernet bridge.

Partitioning – mktcpip

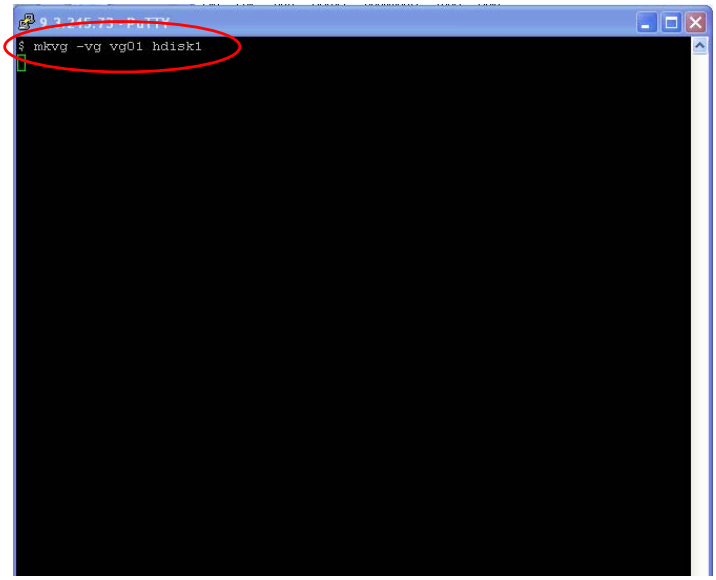
```
mktcpip –hostname myhost –inetaddr xxx.xxx.xxx.xxx –interface en0 –start –netmask
xxx.xxx.xxx.xxx –gateway xxx.xxx.xxx.xxx  -nsrvaddr xxx.xxx.xxx.xxx –nsrvdomain xxx.xxx.com
```



mktcpip sets up the network for the vios to access the outside world from the public network.

This is where you'll enter the ip address and other network settings you want the VIOS to use. The *–interface* flag is set to use the new virtual adapter we just created.

Partitioning – VIOS -- Make a volume group



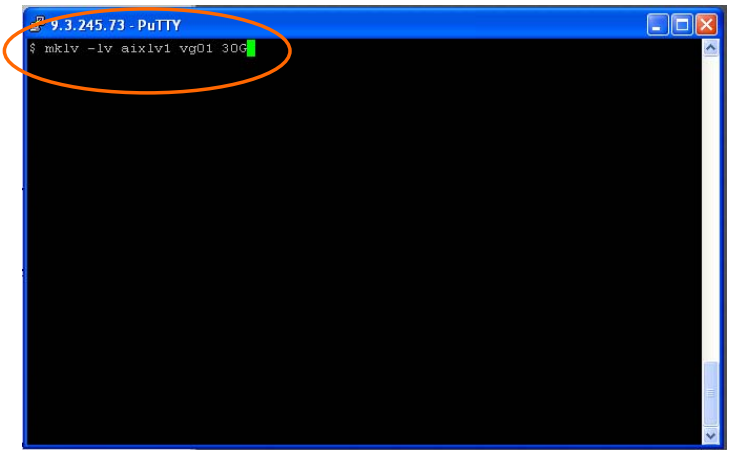
Each of the LPARS will have its own logical disk partition. To create a logical partition, you must first make a physical partition.

First you must make a volume group as the create a logical volume command requires a volume group. One or more disks can be included I the volume group.

The **mkvg** command creates a new volume group using the physical volumes represented by the *PhysicalVolume* parameter. After creating the volume group, the **mkvg** command automatically activates the new volume group using the **activatevg** command.

The command on this slide creates a volume group named vg01 on hdisk1.

Partitioning -- Making logical volumes backing devices for virtual disks



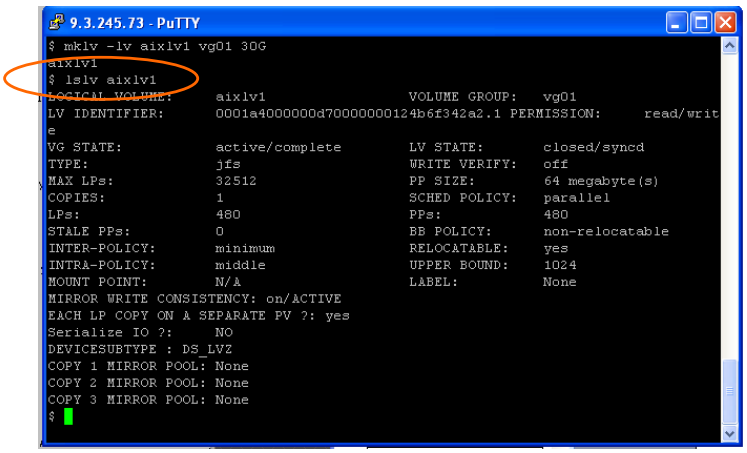
Now you must create a logical volume.

You can specify the size in MB or GB.

This command makes a logical volume named aixlv1 (logical volume 1) in volume group vg01

The **mklv** command creates a new logical volume within the *VolumeGroup*. If you specify one or more physical volumes with the *PhysicalVolume* parameter, only those physical volumes are available for allocating physical partitions; otherwise, all the physical volumes within the volume group are available.

Partitioning – Verify the newly created logical device

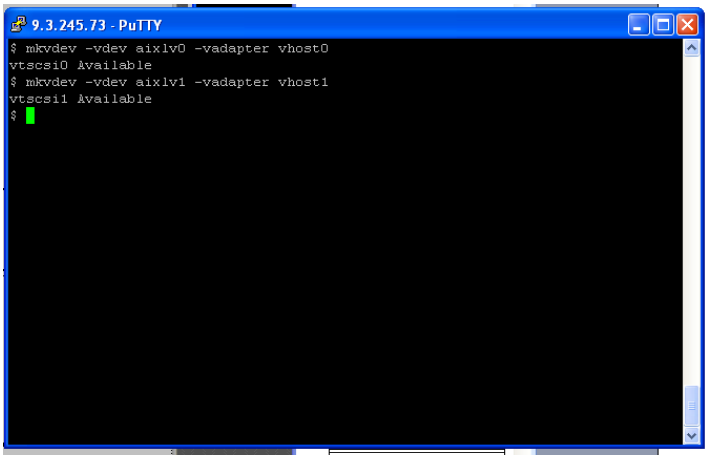


Finally list information about the newly create logical volume

The **lslv** command displays the characteristics and status of the *LogicalVolume* or lists the logical volume allocation map for the physical partitions on the *PhysicalVolume* in which the logical volume is located. The logical volume can be a name or identifier.

We will need 2 logical volumes – one for vhost0- and one for vhost 1—that is – the AIX partition and the Linux partition to be discussed in subsequent cookbook classes.

Make our virtual SCSI mappings – mkvdev --



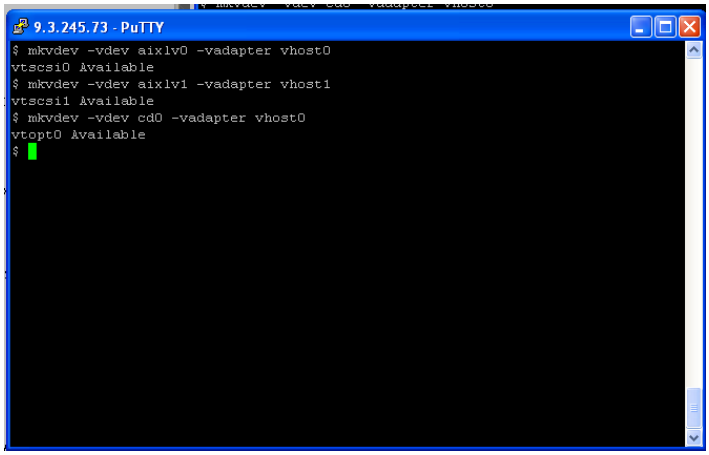
Mkvdev -vdev (name of the logical volume –vadapter (virtual adapter to attach to) vhost0

Then returns vtsci0 – making virtual target device

This procedure will be repeated to create vtsccsi1

Then, run "*mkvdev -vdev cd0 -vadapter vhost1*" to map the CD to vhost1 as well. Eventually we will run this again to map it to the other vhost to install the other LPAR

Make our virtual SCSI mappings – mkvdev --



Arbitrarily attaching to one of the virtual scsi adapters.

Vhost 0 has virtual scsi AND cdrom

Now we can return to the HMC and create some operating system LPARs.

References

- Virtual I/O Server
  http://www14.software.ibm.com/webapp/set2/sas/f/vios/documentation/home.html
- Advanced Power Virtualization (PowerVM) Best Practices
  http://www.redbooks.ibm.com/abstracts/redp4194.html
- http://www-05.ibm.com/cz/events/power6/pdf/Milan_Mondek_POWER6-virtualization.pdf

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