Converting an HMC-managed System p model to use Integrated Virtualization Manager

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Abstract

This white paper shows detailed steps for converting an IBM POWER5 processor-based system that is managed by IBM Hardware Management Console (HMC) to IBM Integrated Virtualization Manager (IVM). A significant portion of this paper is dedicated to explaining how to apply System p firmware updates. This is especially important for some early IBM System p and IBM POWER processor-based systems with older firmware levels. For most steps, there are screen captures to help make this paper a useful guide for a successful conversion from HMC to IVM. For thoroughness, this paper also provides instructions on how to use IVM to configure and manage partitions.

Introduction

IBM logical-partition technology allows a large system to be divided logically into multiple partitions. This provides enterprises with a significant opportunity to consolidate their IT environments, reducing systems management costs and overall IT expenses. Traditionally, IBM Hardware Management Console (HMC) handles logical-partition management. However, this requires a separate, stand-alone management system. Therefore, IBM has introduced a software-based partition management solution called Integrated Virtualization Manager (IVM). This tool is part of IBM Virtual I/O Server, which must also be installed on the system. (**Note:** IVM is not supported for IBM AIX 5L™ V5.2 and earlier IBM AIX® releases.)

IVM is designed to be an easy-to-use, browser-based tool that literally allows users to point, click and consolidate multiple workloads onto one IBM System p™ or other supported system. IVM provides an economical alternative to HMC for creating and managing logical partitions on entry and middle-level systems that are part of the IBM POWER5™ processor-based System p family.

Prerequisites

Part of the conversion process when moving to IVM for partition management (instead of HMC-based management) requires that you reset and upgrade the System p firmware. If you use a PC as a terminal type (tty) device, you must ensure that Microsoft® Windows® HyperTerminal service is set up and configured properly on the PC client.

This paper provides the detailed instructions for installing the System p diagnostics files and firmware (also referred to as “microcode”), as well as the instructions for verifying that your tty device is properly configured.

Getting the software

You need three sets of software in order to install Virtual I/O Server: the Virtual I/O Server software itself, the latest System p diagnostics file and the latest microcode updates.

Acquiring the Virtual I/O Server software

Virtual I/O Server 1.2.1 can be ordered through IBM sales.

Downloading the latest System p diagnostics file

Downloading the most recent System p diagnostics file is designed to be a simple and quick process.

1. Go to the Web site listed below. (See Figure 1.)
   http://www14.software.ibm.com/webapp/set2/sas/f/diags/download/home.html
2. Download the latest System p diagnostics file (CDLatest.iso file).
3. Burn the CDLatest.iso file onto a CD.

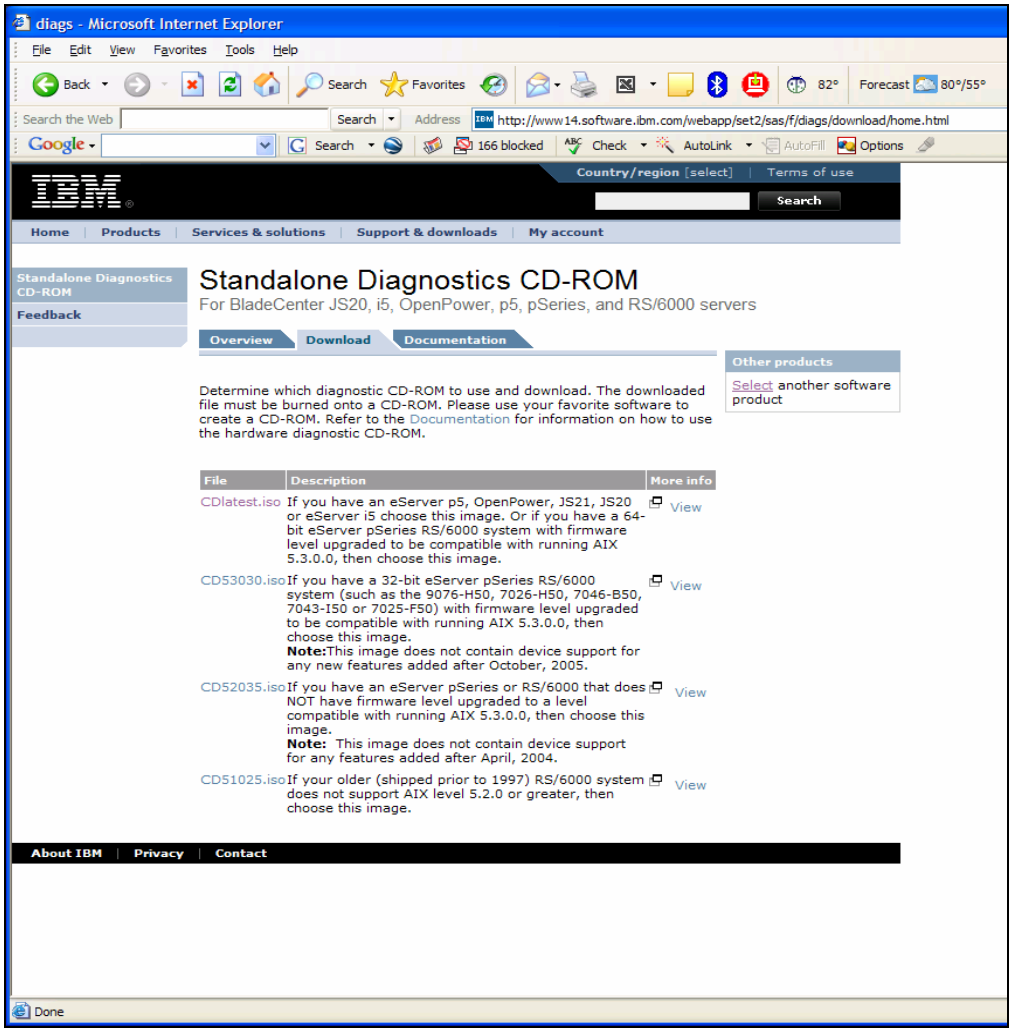

Figure 1. Downloading the latest System p diagnostics file

Downloading the latest System p firmware

Downloading the most recent System p microcode (and firmware) is also designed to be easy. .

1. From the Web site listed below (see Figure 2), select the machine type and model for the microcode you need to download and click **GO**.
   http://www14.software.ibm.com/webapp/set2/firmware/gjsn

   Note: IBM updates the firmware frequently; in this example, level SF235-185 is downloaded.

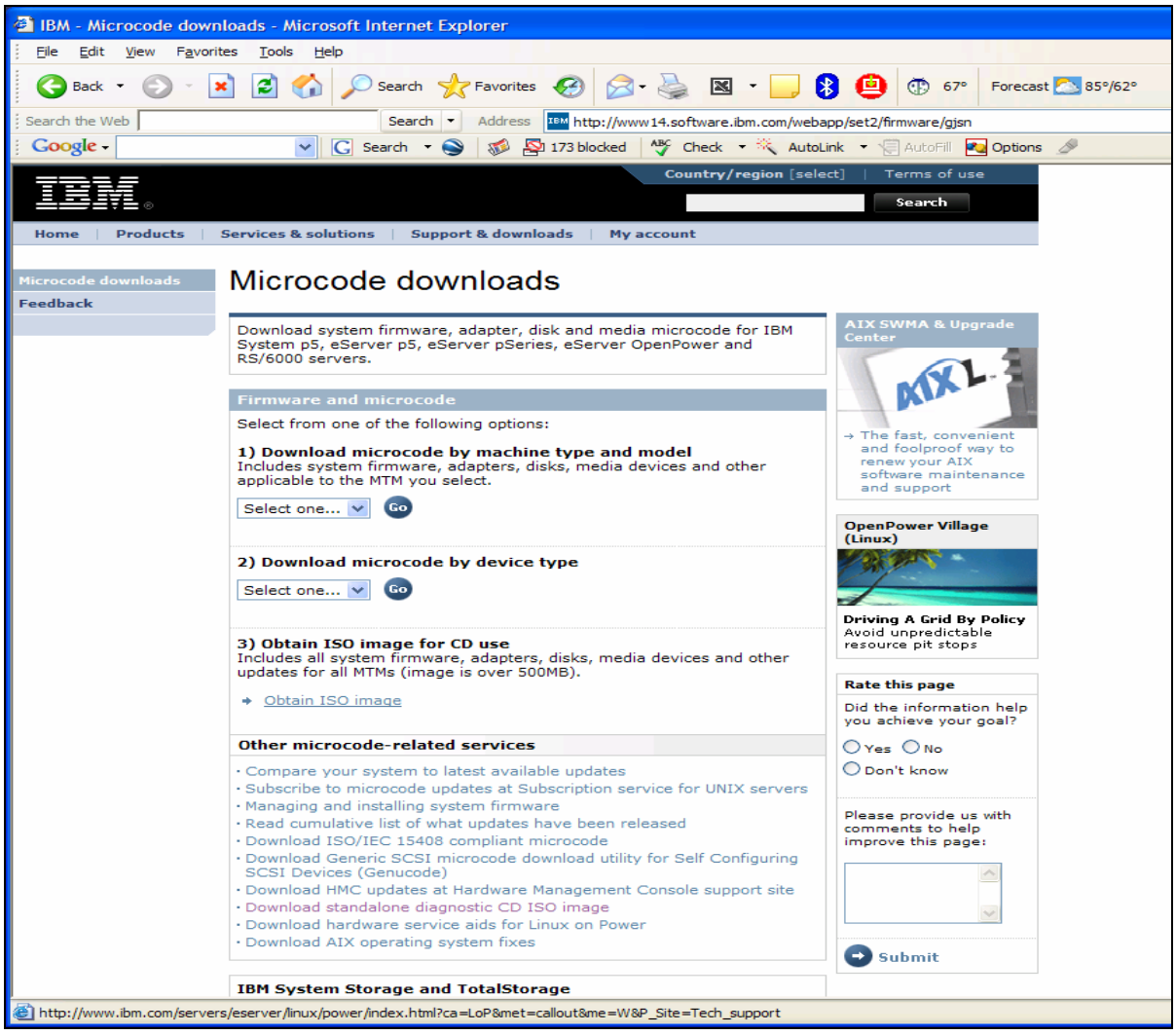

Figure 2. Downloading the latest System p microcode

2. From the next screen (see Figure 3), select the firmware updates that are not yet installed on your System p model; then press the **Enter** key to download this microcode.

   Note: Your System p model must be current to level SF235_185 or higher.

3. Burn the firmware file (*.img format) onto a CD.

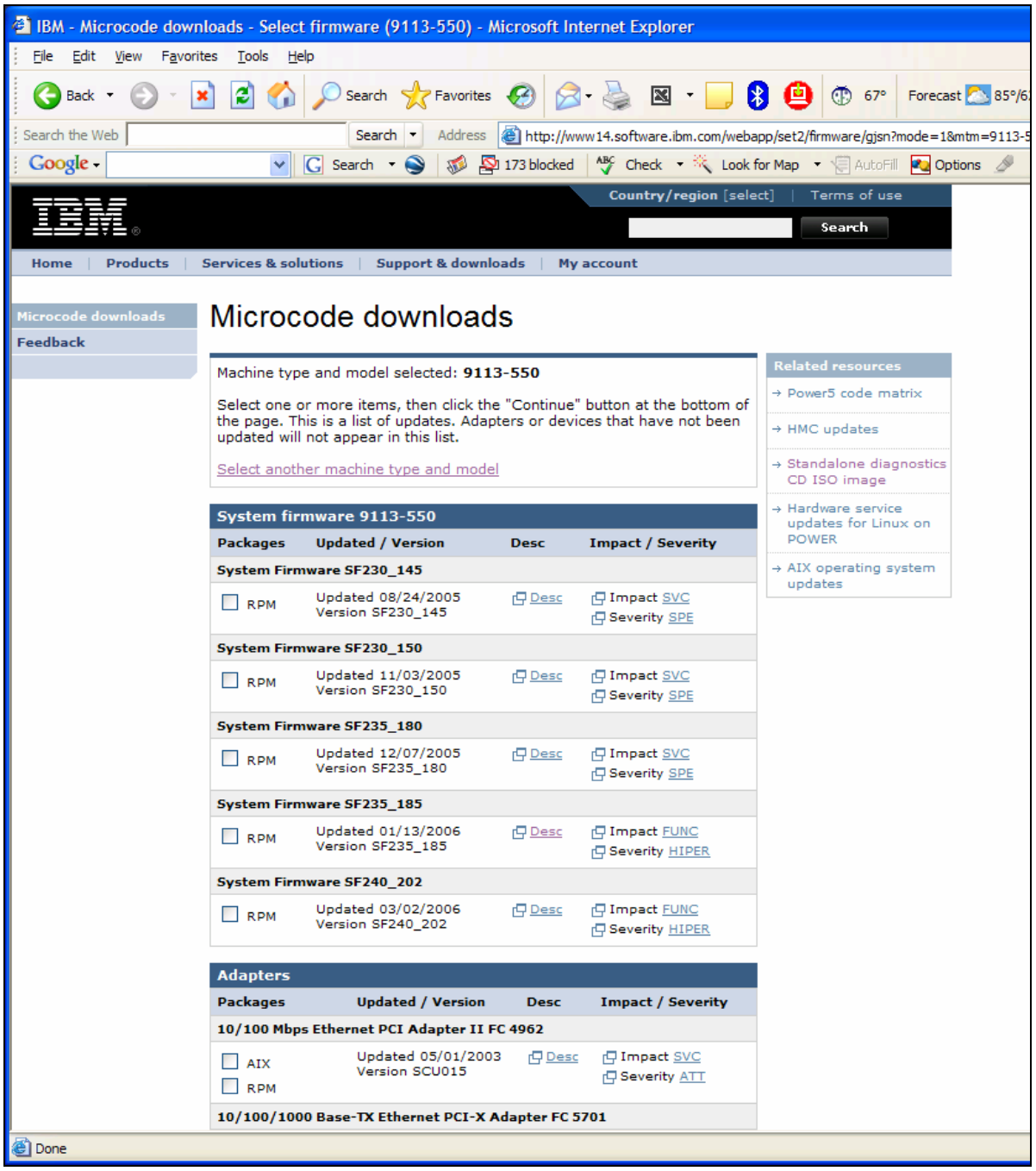

Figure 3. Selecting the firmware not yet installed on your System p model

Setting up the tty device

On the AIX operating system, a tty interface is necessary for installation processes, such as installing a Virtual I/O Server. If you install a Virtual I/O Server from a PC client (instead of a tty device), then set up HyperTerminal to serve as the tty emulation device.

1. Ensure that the Advanced System Management Interface (ASMI) connection is disconnected.

   Note: ASMI is required if you need to enter IBM Capacity on Demand (COD) microcode, which means that the System p model must be booted to Firmware Standby mode. The conflict here is that a tty connection does not work in Firmware Standby mode.

2. Disconnect any physical connections from the HMC0 and HMC1 ports.

   Note: This step is important because the system is sometimes confused if HMC is still in place.

3. Connect the RS232 cable between the T1 serial port at the back of the System p model and the PC serial port.
4. On the Lab Properties pop-up window, click the **Connect To** tab.
5. From the **Connect using** pull-down menu, select **COM1** or the appropriate communications port for your installation (see Figure 4).
   a. Click **Configure** to define the port settings.

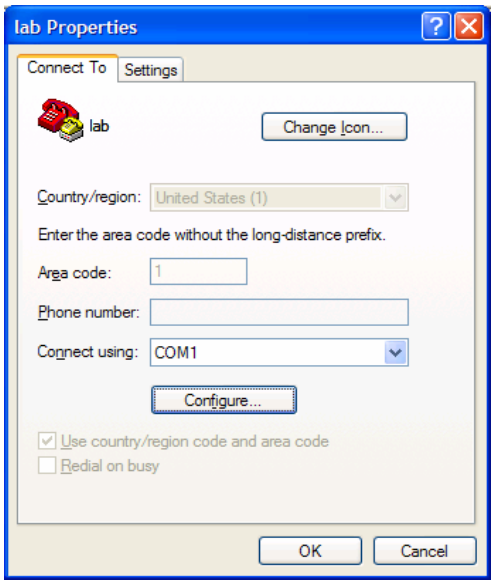

Figure 4. Selecting the COM1 port

b. Select the appropriate port settings for the tty communications port, and then click **OK** (see Figure 5).

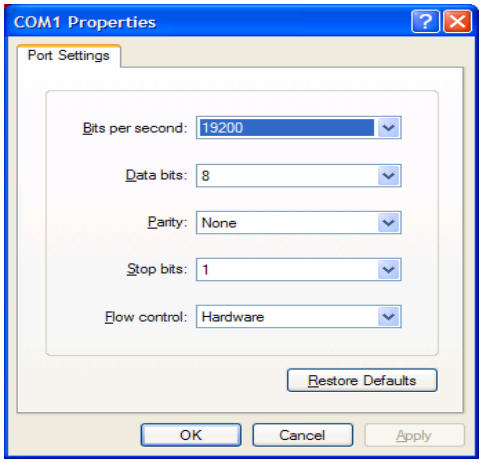

Figure 5. Establishing the port settings

c. If the tty device is not communicating to the System p model, it is necessary to boot the system in the Power Standby mode by performing the following steps:
   i. Press the **white reset button** on the front system panel to boot the System p model.
   ii. Select **System Service Aids** (see Figure 6). Then, press **Enter**.

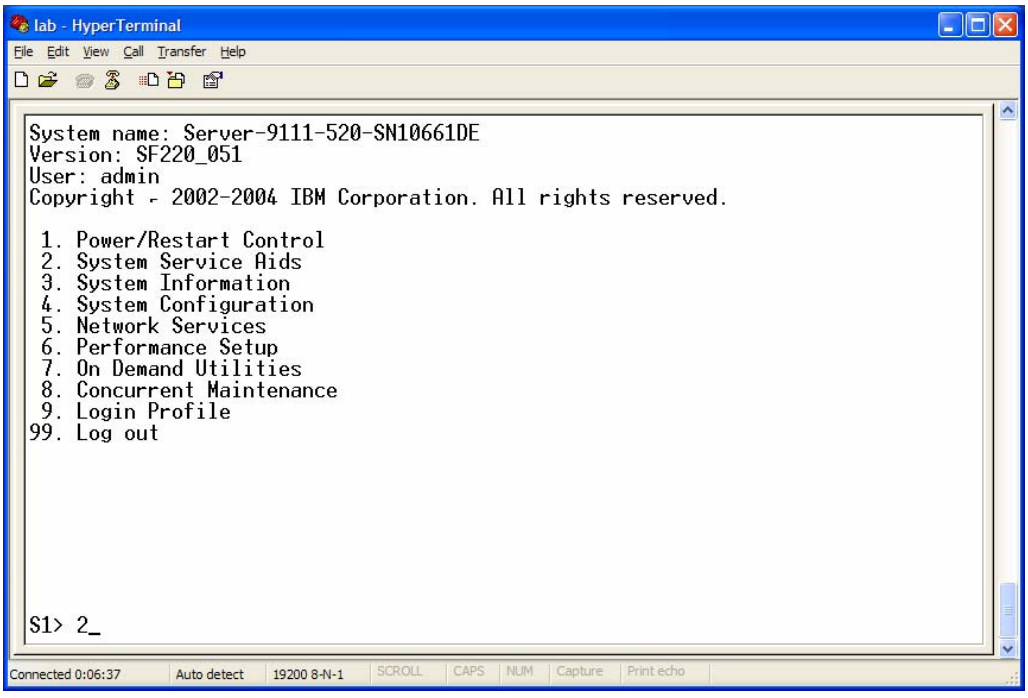

*Figure 6. Selecting **System Service Aids***

iii. Reset the System p model by selecting **Factory Configuration** (see Figure 7). Then, press **Enter**.

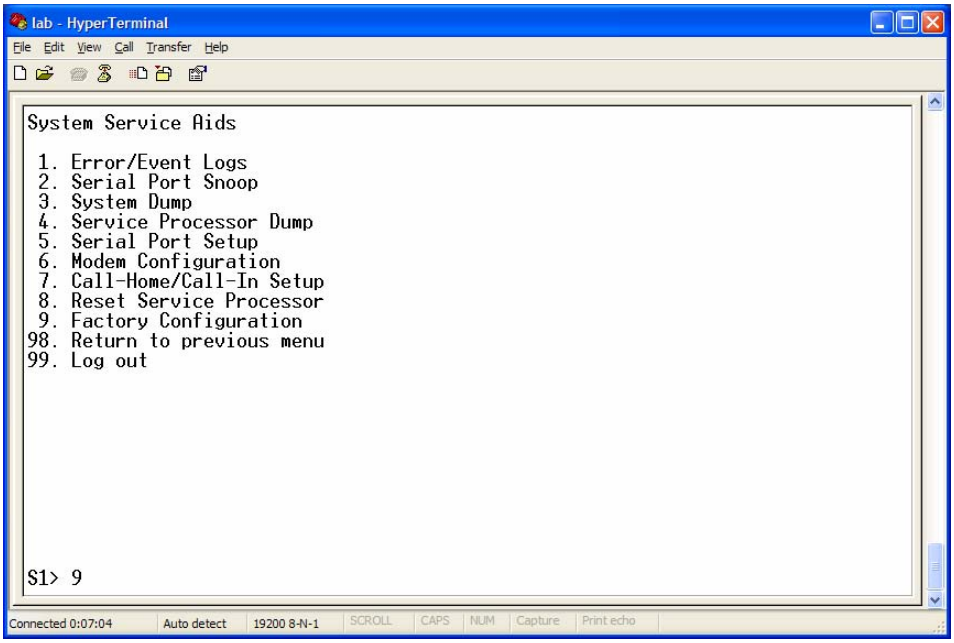

*Figure 7. Selecting **Factory Configuration***

iv. You see an important informational screen as shown in Figure 8. This screen warns you that continuing will result in the loss of all configured system settings. If you are sure you want to continue, type 1 to confirm that you do want to reset your System p model to its IBM factory settings. Then, press **Enter**.

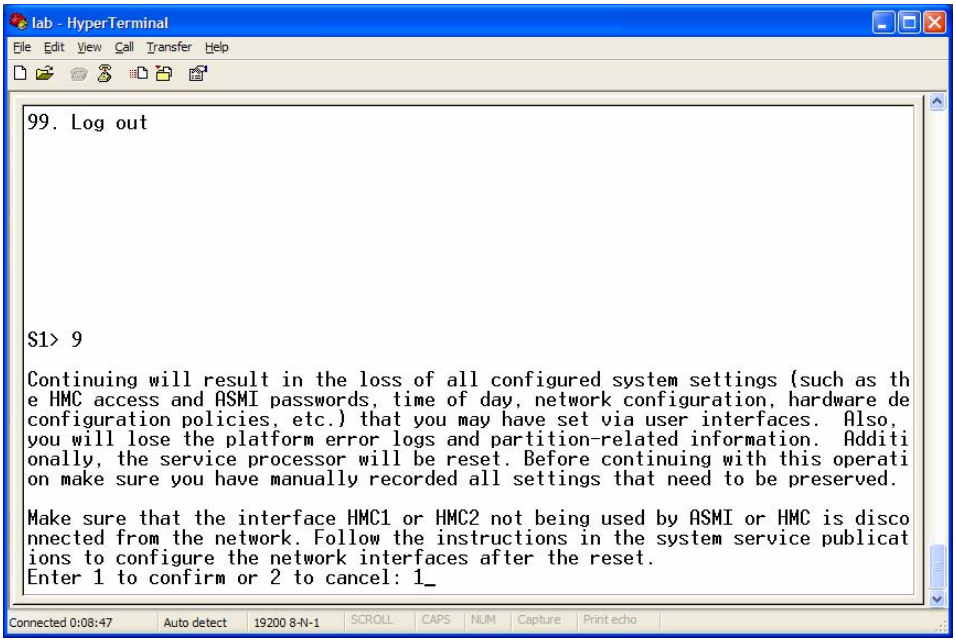

*Figure 8. Viewing the informational warning screen when resetting to **Factory Configuration***

v. The system now reboots itself. You receive an additional informational message that the system is about to reboot (see Figure 9). After the reboot finishes, you can load the system updates.

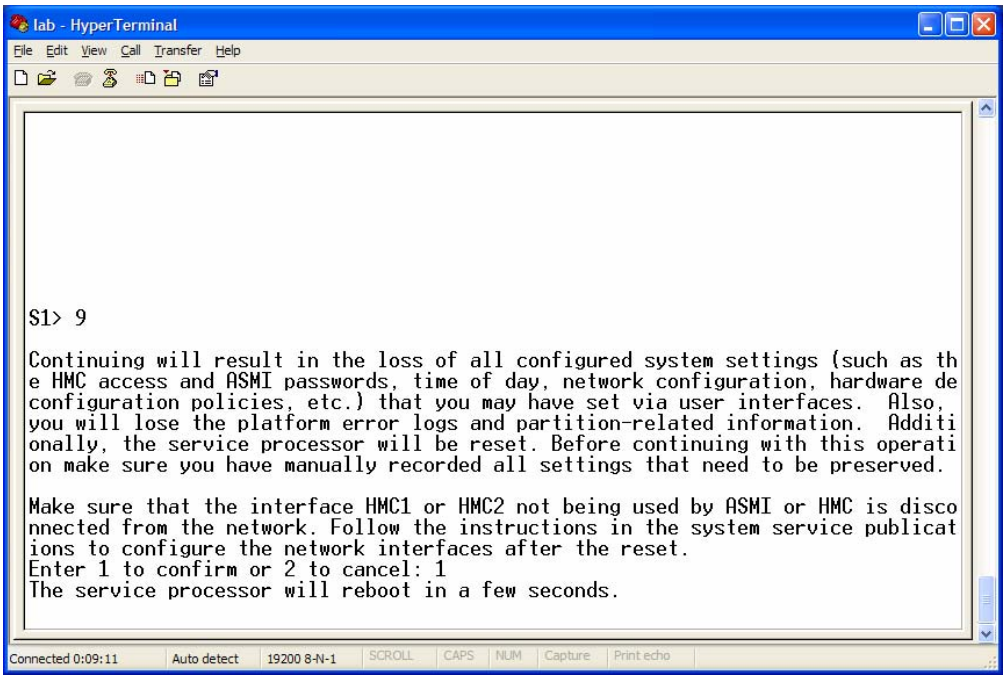

Figure 9. Viewing the informational screen that indicates a reboot will occur

Using the diagnostic CD to update the firmware

To update the microcode on your System p model, follow the directions outlined below. If your System p model has a firmware level that is greater than SF235_185, you can go directly to the “Installing Virtual I/O Server” section of this paper.

1. Put the newly created diagnostics CD (that contains the CDLatest.iso file) into the System p model’s CD drive. Then, reboot again by pressing the **white reset button**.
2. When you see the screen shown in Figure 10, type **0** to select your tty device as the active console for your System p model. Then, press **Enter**.

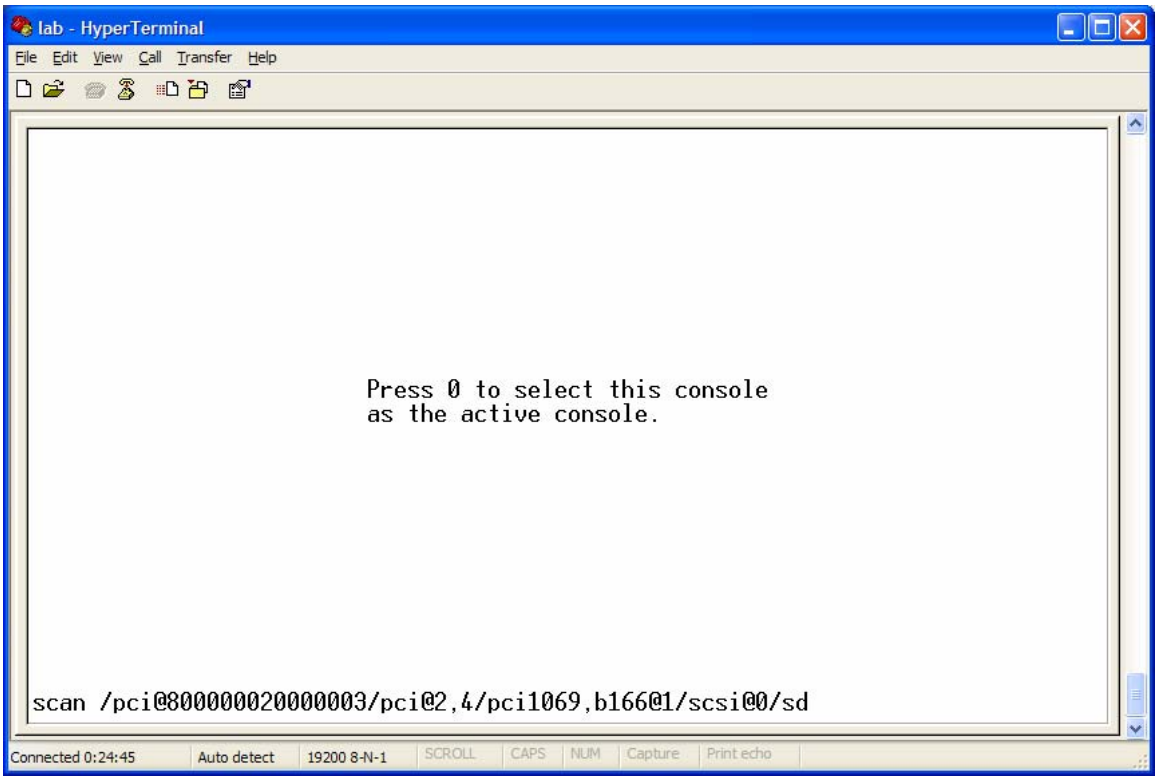

*Figure 10. Pressing **0** designates your TTY device as the active console*

3. Figure 11 shows an in-progress screen. There is no action to take on your part.

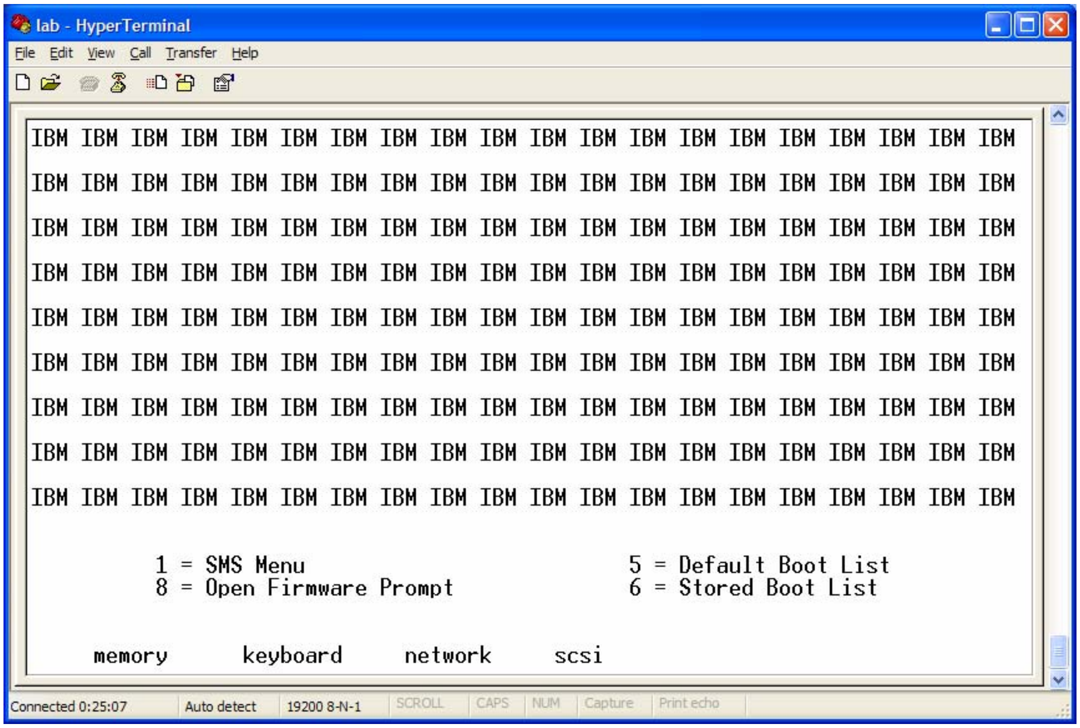

Figure 11. Viewing an in-progress screen

4. Type the password for your administrator account on the service processor (see Figure 12). Then, press **Enter**.

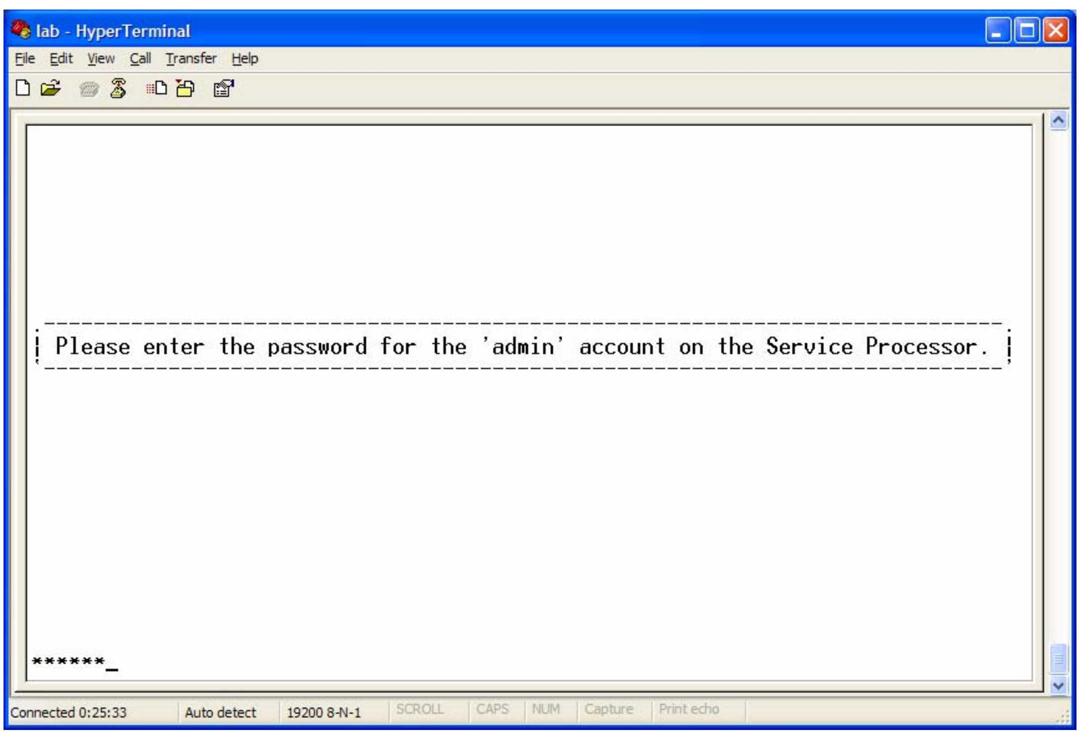

Figure 12. Entering your administrator password

5. Figure 13 shows an in-progress screen. There is no action to take on your part.

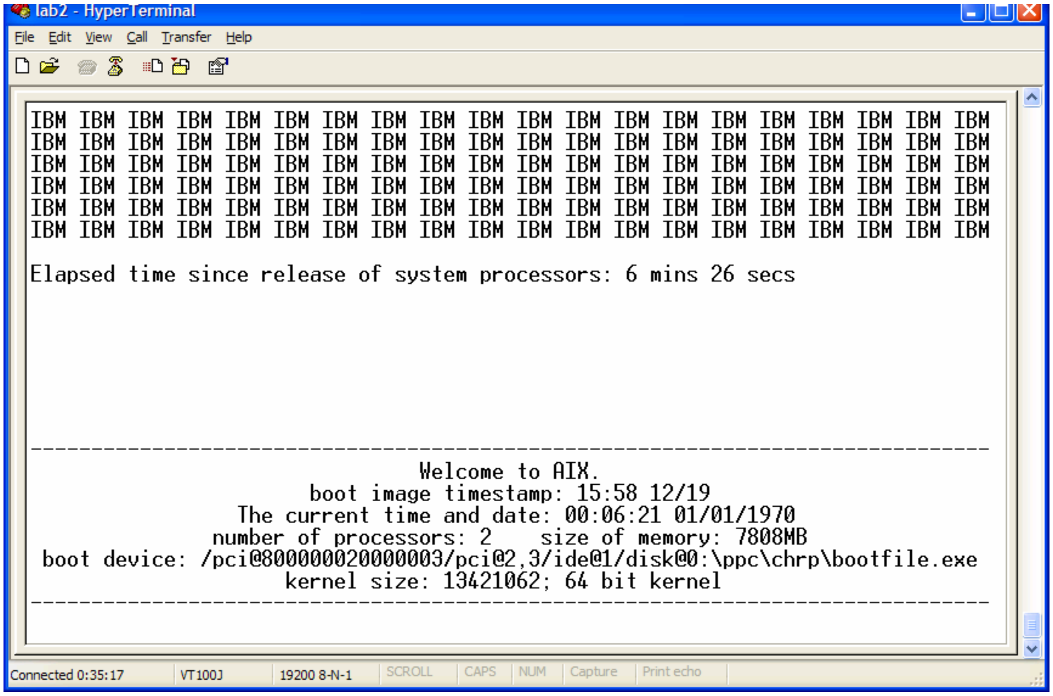

Figure 13. Viewing a reboot informational screen

6. When you see the screen shown in Figure 14, type **2** to identify your tty device as the system console for your System p model. Then, press **Enter**.

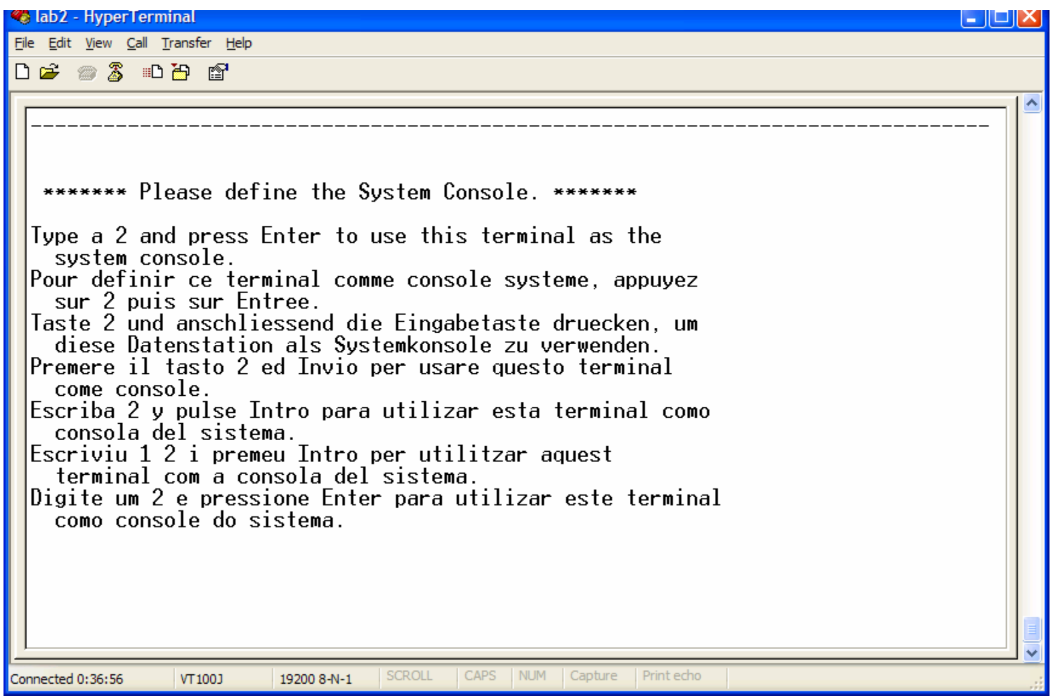

Figure 14. Identifying your TTY device as the system console

7. When you see the informational screen shown in Figure 15, read its explanation regarding the use of the Enter, Backspace and cursor keys during the installation of the new diagnostics. Then, press **Enter**.

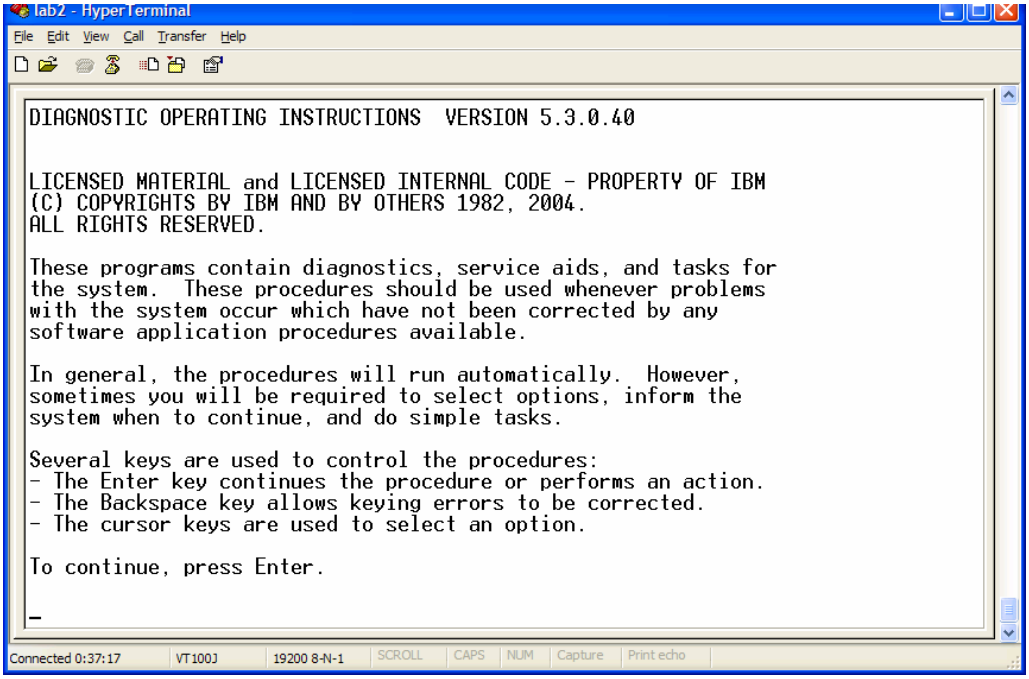

Figure 15. Reading the diagnostic operating instructions

8. When you see the screen shown in Figure 16, type **3** to list the tasks that are supported by the procedures that are contained on the diagnostics CD. Then, press **Enter**.

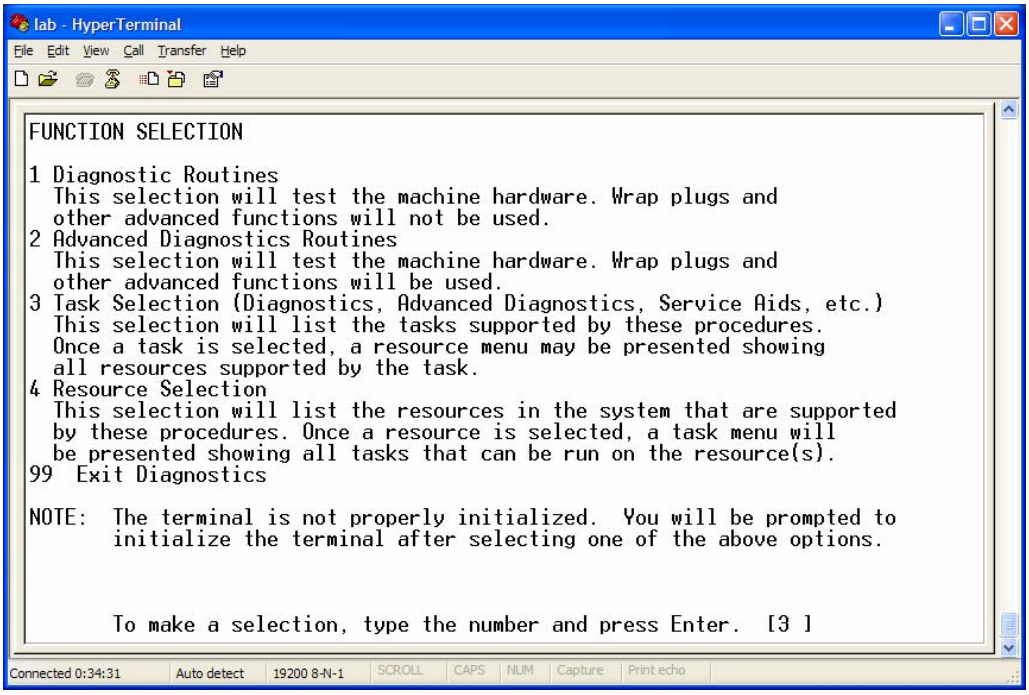

Figure 16. Listing the tasks that are supported by the updated diagnostics

9. If you are using a PC with HyperTerminal services, type **vt100** as the terminal type. Then, press **Enter** (see Figure 17).

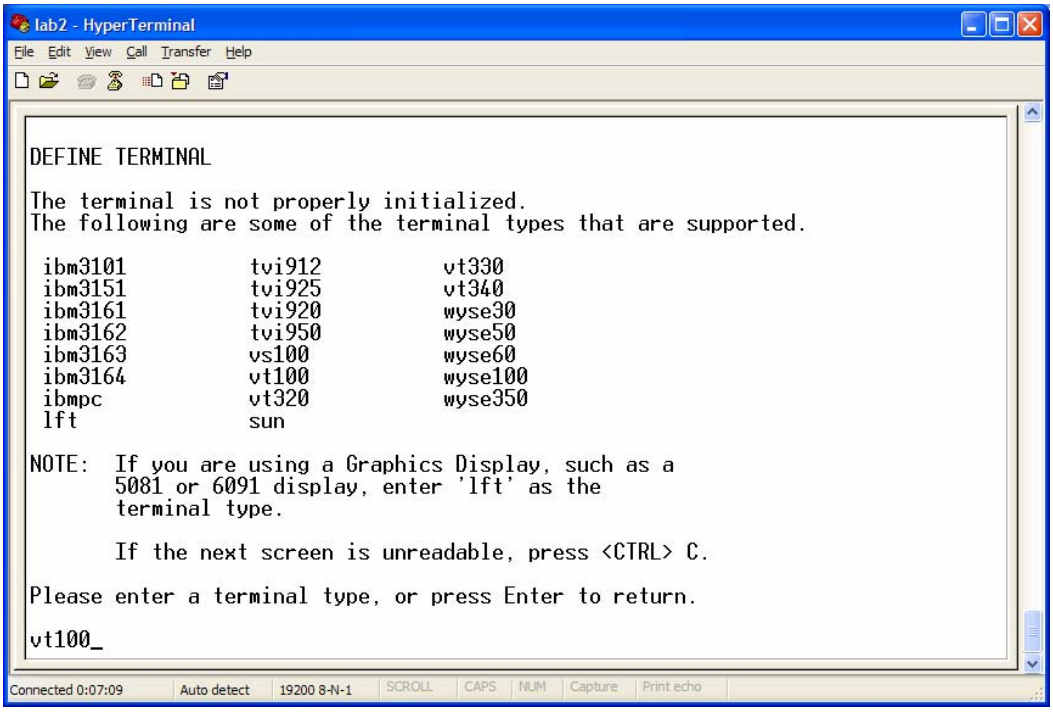

Figure 17. Entering the tty device

10. From the Tasks Selection List, move your cursor to highlight the **Run Diagnostics** task. Then, press **Enter** (see Figure 18).

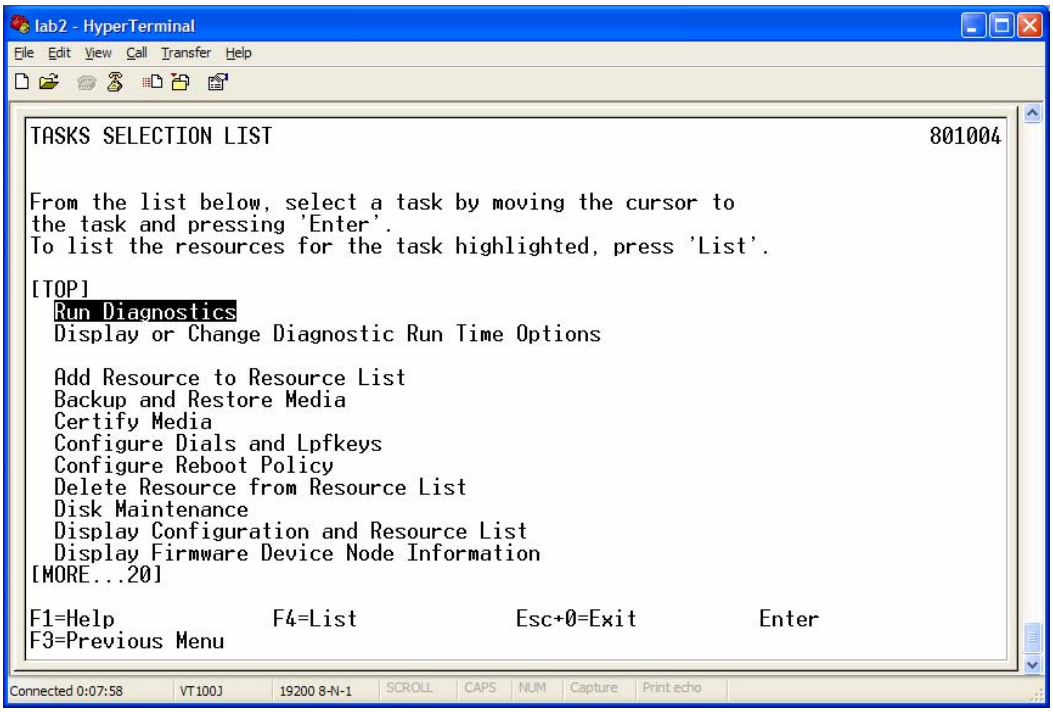

Figure 18. Selecting the Run Diagnostics task

11. From the Tasks Selection List screen shown in Figure 19, move your cursor to highlight **Update and Manage System Flash**. Then, press **Enter**.

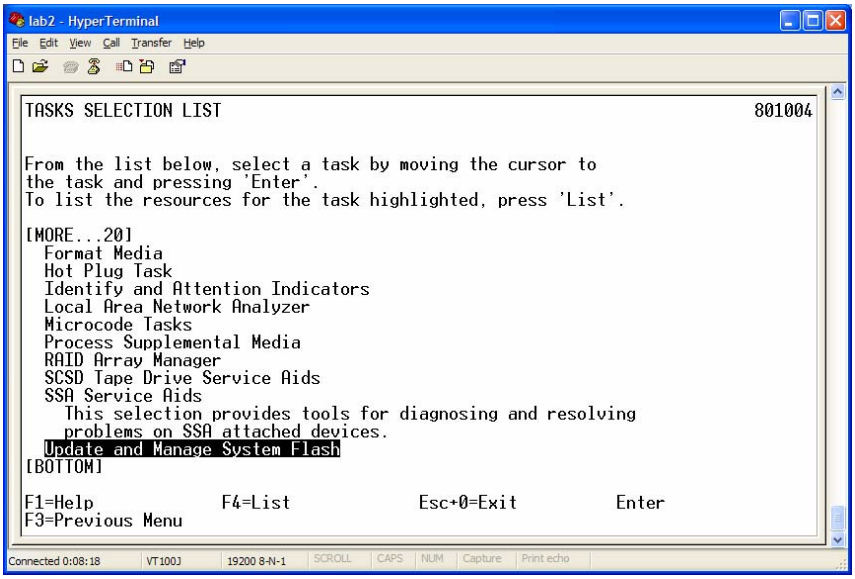

Figure 19. Selecting Update and Manage System Flash

12. Put the firmware SF235_185 (or higher level) CD in the CD drive. When you see the screen shown in Figure 20, select **Validate and Update System Firmware**.

    Note: If you have an IBM System p model 550 with a firmware level that is below SF222_102_102, you must update the firmware twice. Upgrade to level SF222_102_102 and then upgrade again to level SF235_185. The reason for this two-step process is that there is a high occurrence of timing problems on the p550. Firmware level SF222_102_102 is not listed under the microcode download site as depicted in the following screen captures. The best way to get this earlier firmware code release is to call your local IBM support contact.

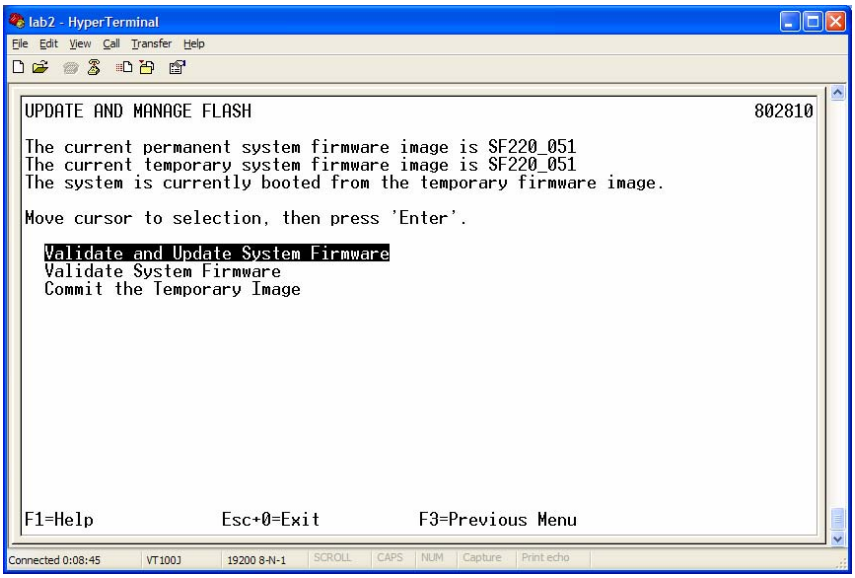

Figure 20. Selecting Validate and Update System Firmware

13. Move the cursor to highlight **Flash update image file**. Then, press the **F4** key (see Figure 21).

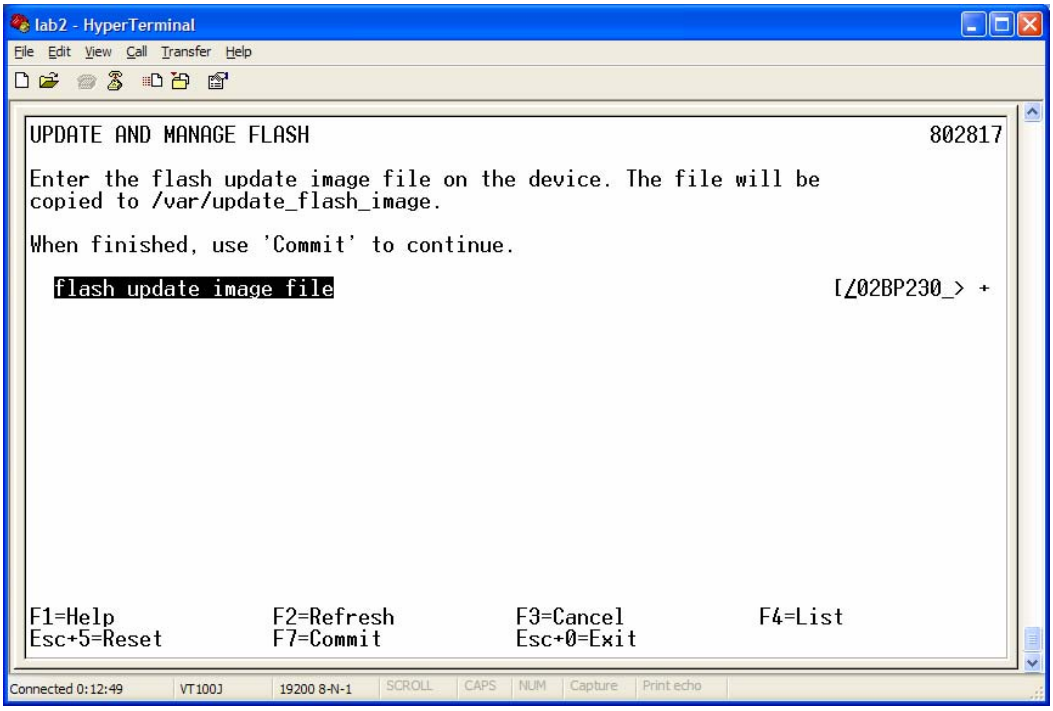

Figure 21. Selecting Flash update image file

14. Select the **…SqnP5/…** img file by moving the cursor to highlight the file name (see Figure 22). Then, press **Enter**.

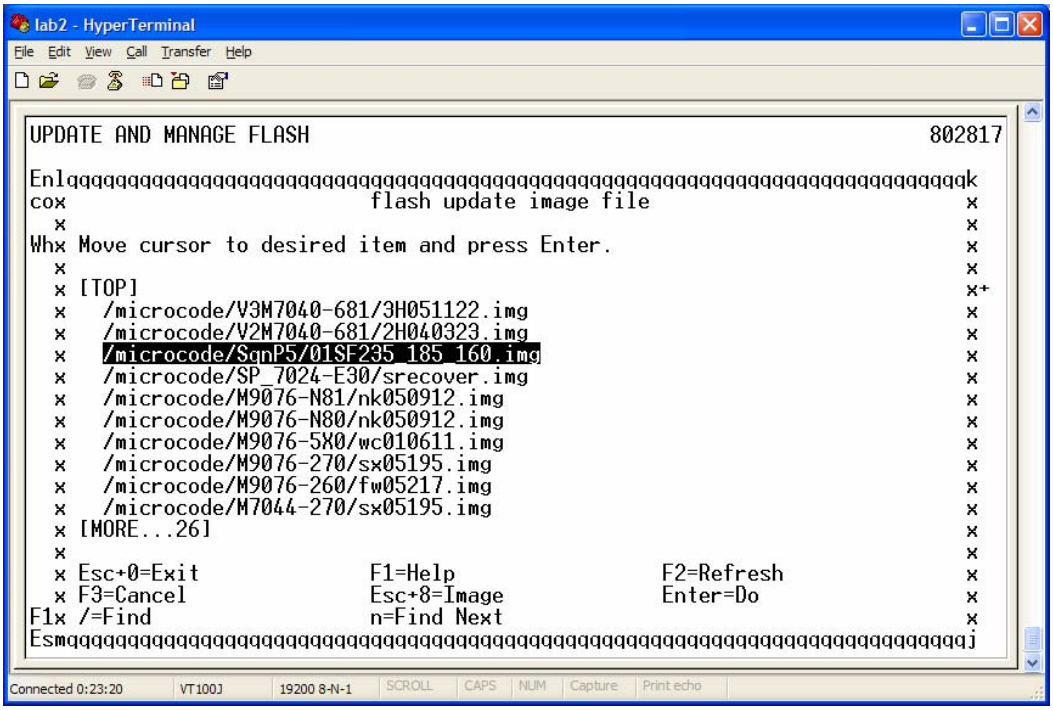

Figure 22. Highlighting the name of the flash file to use for the firmware update

15. Figure 23 shows an in-progress screen. There is no action to take on your part.

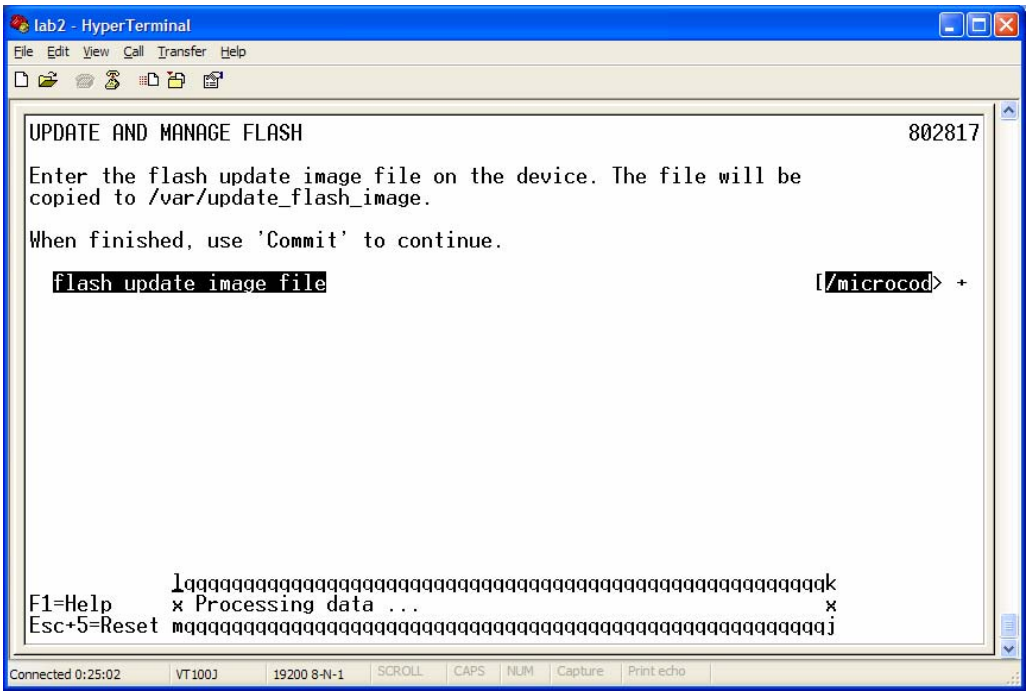

Figure 23. Viewing an in-progress screen

16. Notice that the next screen issues a warning (see Figure 24.) to inform you that the operating system is about to reboot itself. You can move the cursor over **YES** to highlight it. Then, press **Enter**. The reboot takes about 15 minutes to complete.

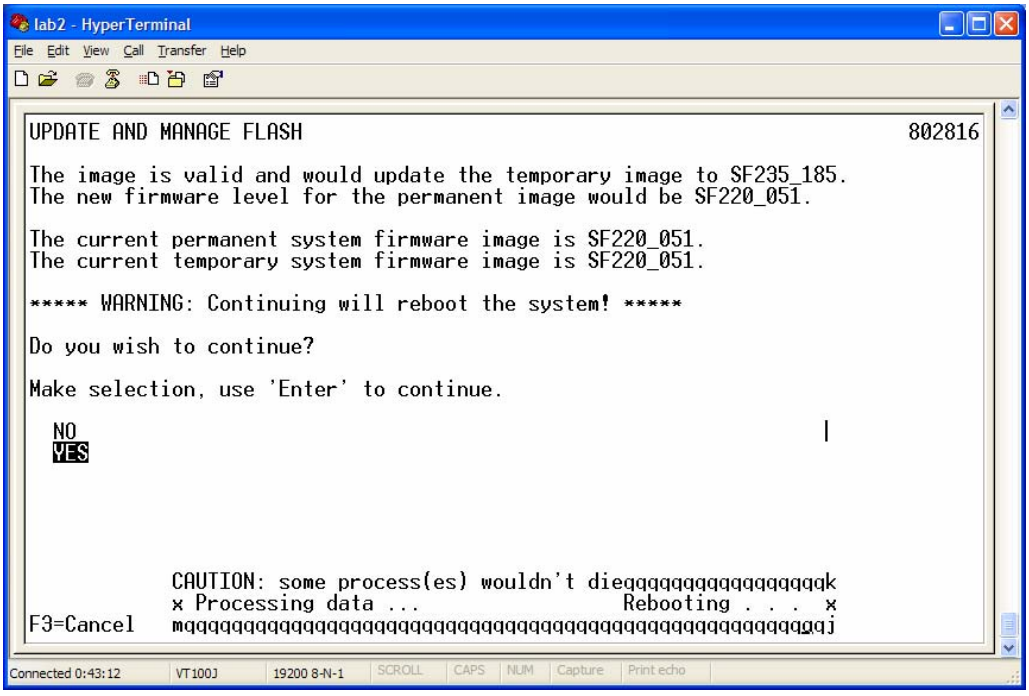

Figure 24. Selecting a reboot

17. If the system boots all the way to the operating system, press the **white reset button** again to boot to Standby mode. This is important because the goal is to make the System Management menu available through HyperTerminal tty emulation.
18. Confirm the new firmware level by reviewing the System Management menu on the tty device. Your System p model should be in Power On mode and Standby mode.
19. You then need to set the time of day by selecting option **4** (**System Configuration**) on the screen shown in Figure 25.

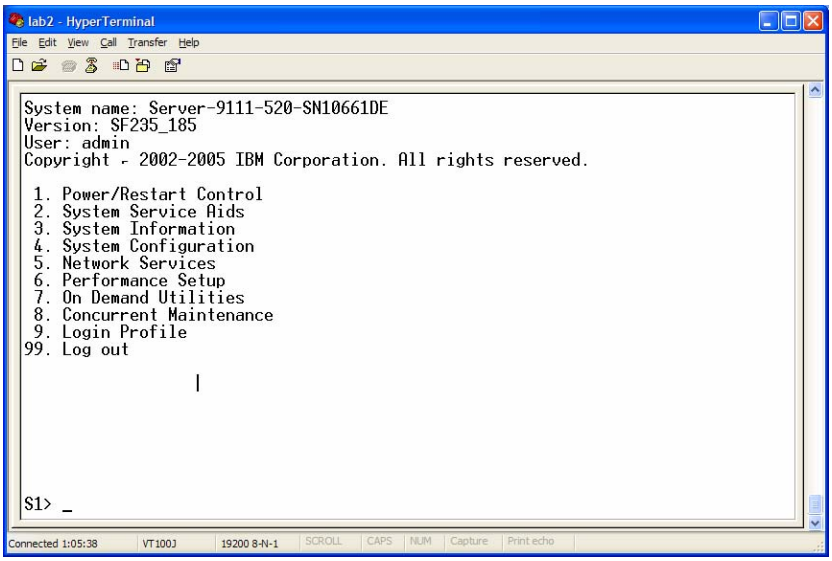

Figure 25. Selecting System Configuration functions

20. You see an intermediary system-configuration screen, where you select option **4** to see the **Time Of Day** panel (see Figure 26).

21. On the Time of Day panel, perform the following steps:
    a. Select option **1** (**Date**) to reset the date.

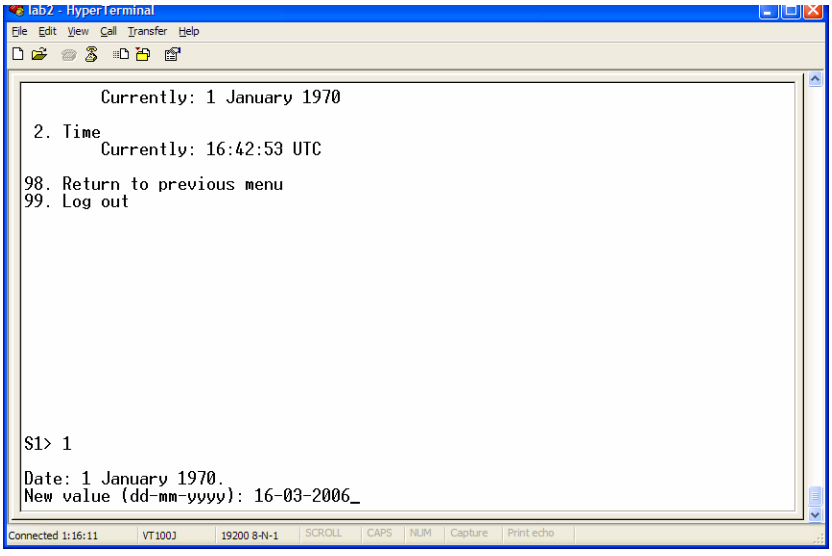

Figure 26. Updating the date for the system configuration

b. Select option **2** (**Time**) to update the time of day (see Figure 27).

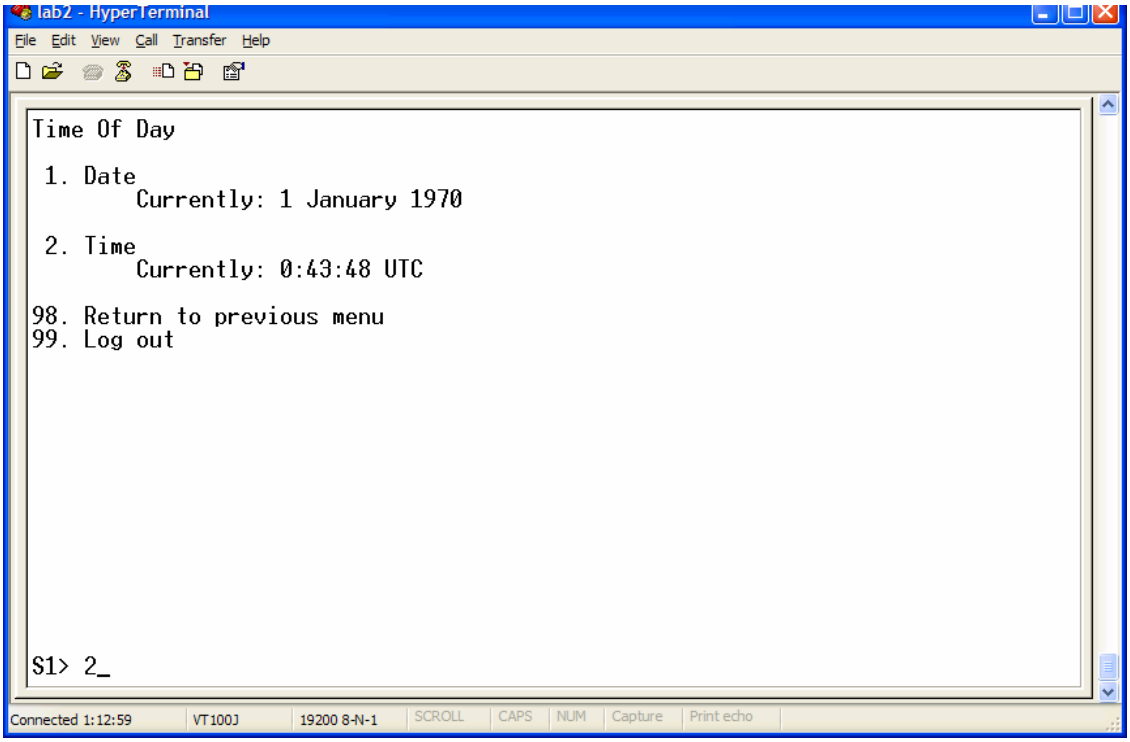

Figure 27. Updating the time of day for the system configuration

c. If you need to get the precise Coordinated Universal Time (UTC), you can do so at the following Web site: http://tycho.usno.navy.mil/cgi-bin/timer.pl (also shown in Figure 28.).

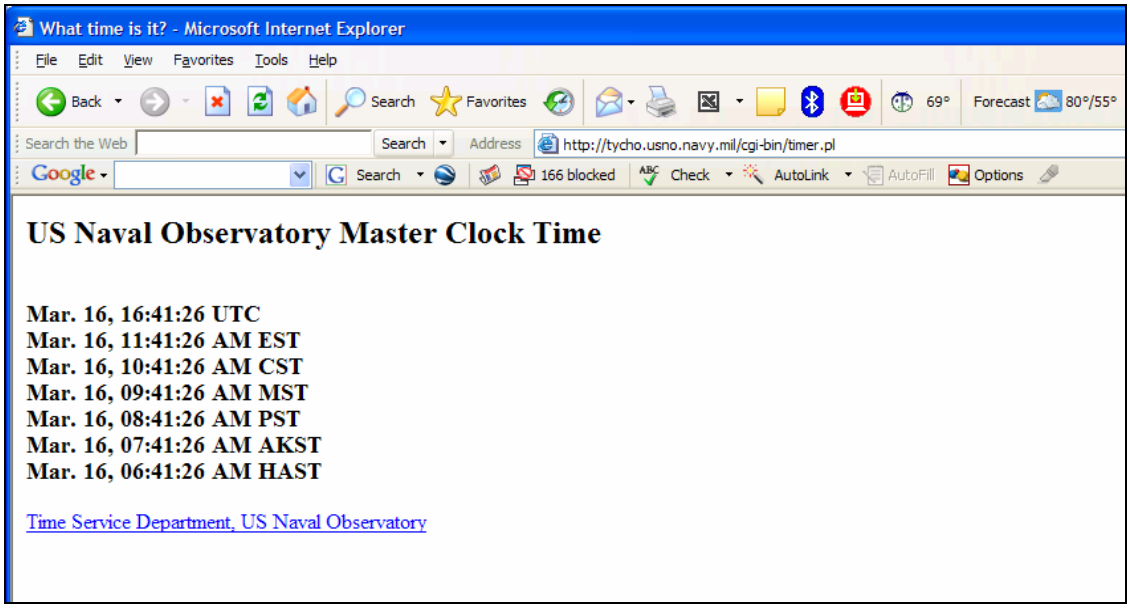

Figure 28. Getting the correct time to enter as the system time

Installing Virtual I/O Server

Now, you can install the Virtual I/O Server code. This is a highly automated process.

1. Load the Virtual I/O Server CD and press the **white reset button** to reboot the system. Follow the normal AIX installation process (see Figure 29).

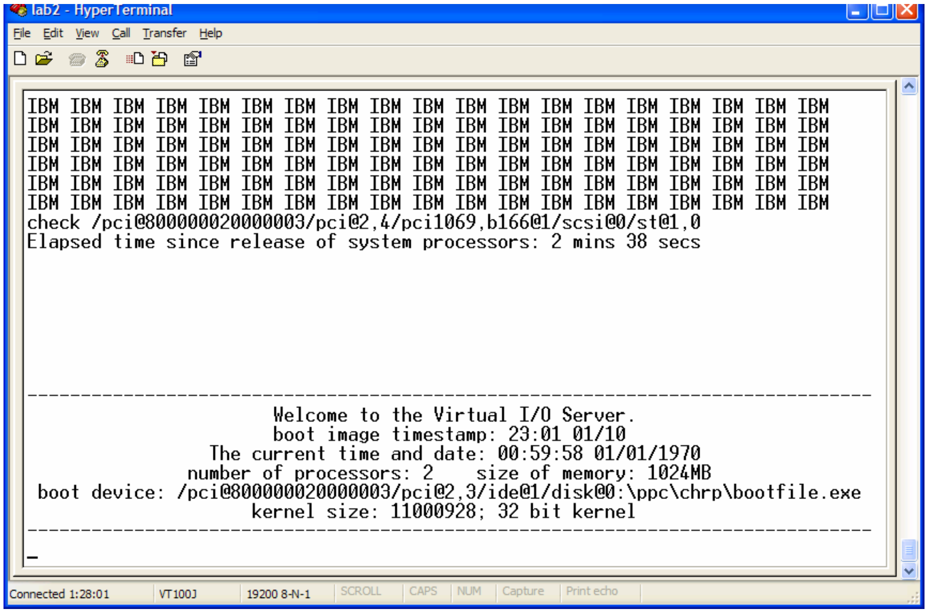

Figure 29. Viewing a reboot informational screen

2. When you see the screen shown in Figure 30, type **2** to identify your tty device as the system console for your System p model. Then, press **Enter**.

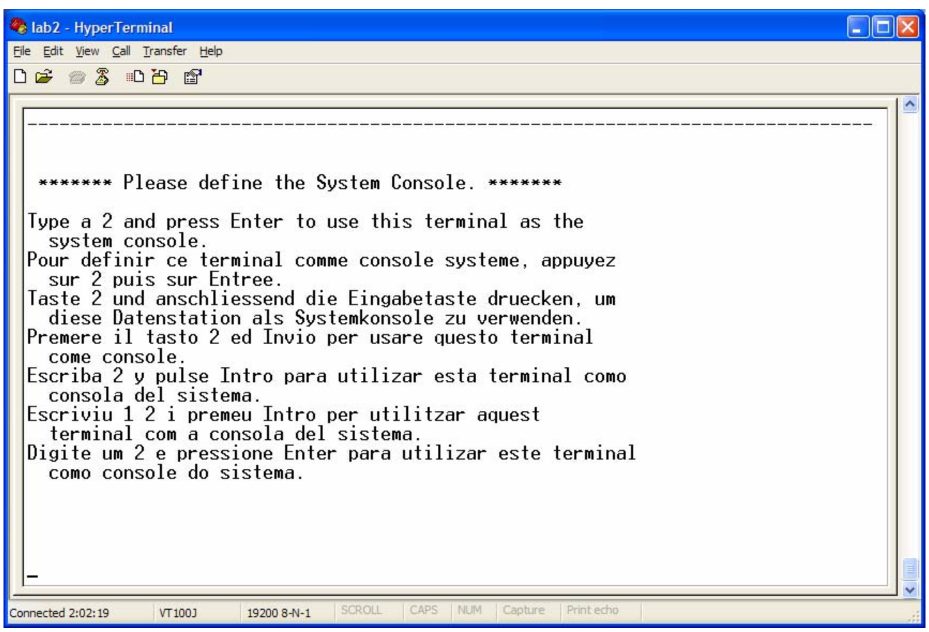

Figure 30. Identifying your tty device as the system console

3. In the next screen (see Figure 31), type the number corresponding to the language in which you want this AIX instance and Virtual I/O Server to display messages.

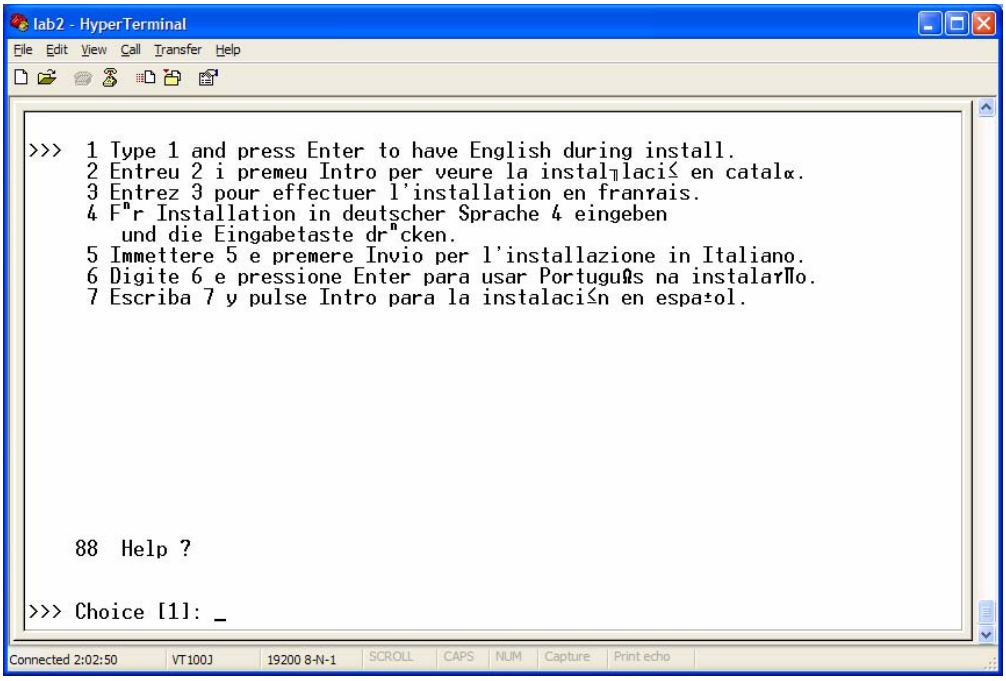

Figure 31. Choosing the language for this AIX instance

4. You see an informational screen that asks you to wait while the base AIX operating system is installed automatically (see Figure 32).

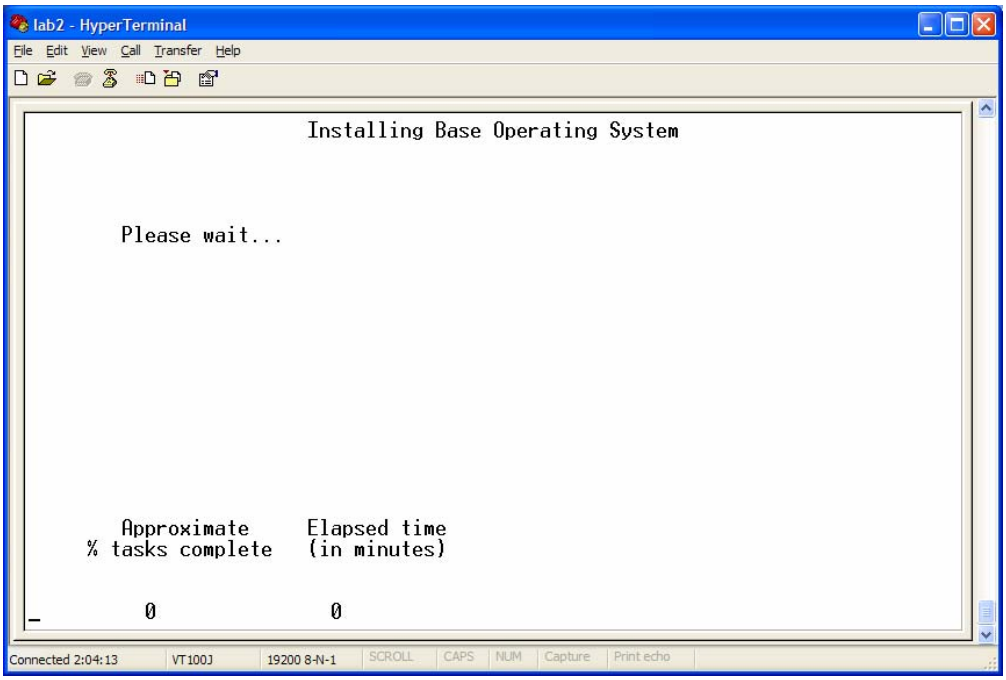

Figure 32. Installing the base AIX operating system

5. After the installation, the system reboots to the Virtual I/O Server prompt (see Figure 33).

Starting Virtual I/O Server for the first time

1. Log on using the default **padmin** user ID and **padmin** password. You can then reset the password as required.

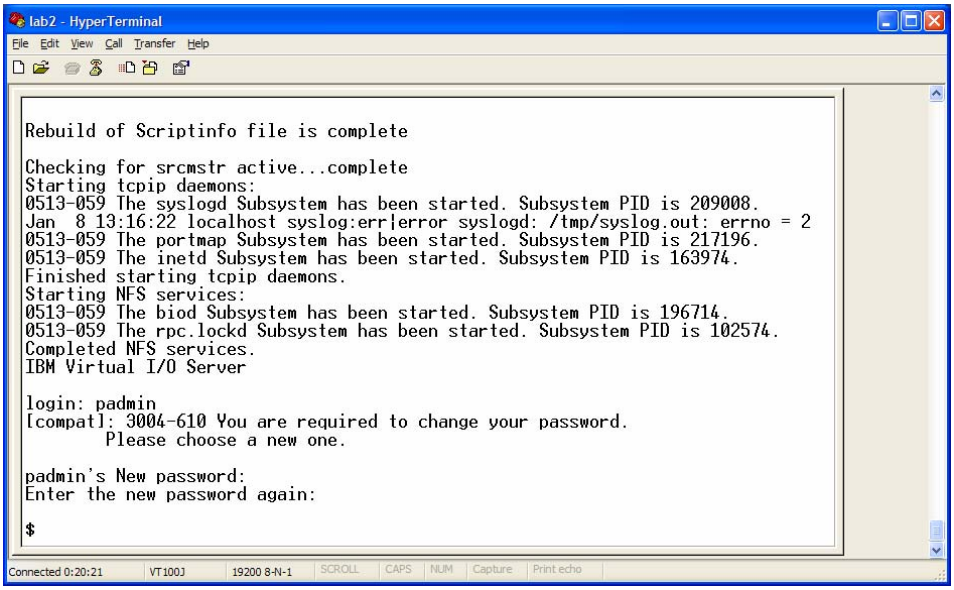

Figure 33. Logging on to Virtual I/O Server

2. Enter the following two AIX commands to accept the new license and start the Virtual I/O Server configuration process (see Figure 34):

```
>license –accept
>mkgencfg –o init
```

3. Check the network interfaces on the system by entering the following AIX command (see Figure 34):

```
>lsdev | grep ent
```

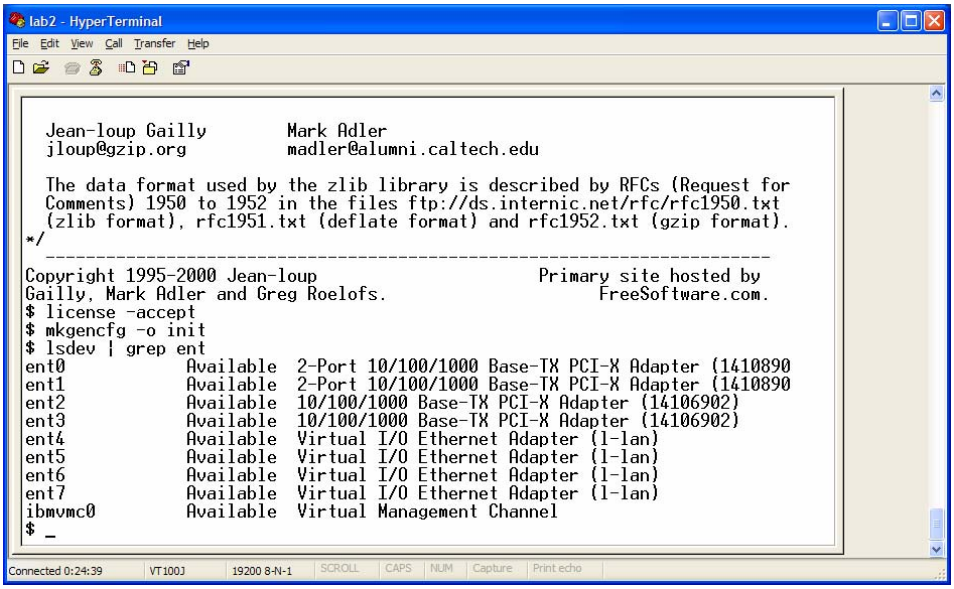

Figure 34. Entering AIX licensing and other relevant commands

4. Physically connect Ethernet 0 (the T5 port at the back of the System p model) to your site network. (**Note:** The 9.3.245.* network addresses below are examples.)
5. Set up the IP address on the en0 port by using the following AIX mktcpip command:

```
>mktcpip –hostname isvlab044 –inetaddr 9.3.245.44 –interface en0
–netmask 255.255.255.0 –gateway 9.3.245.1
```

   At this point, the Virtual I/O Server setup is complete. You can now use IVM to set up partitions.

6. To access the IVM interface, point your browser to **http://9.3.245.44**.
7. Log in with the **padmin** user ID and the password you established in step 1 on the previous page. The default user ID is padmin (see Figure 35).

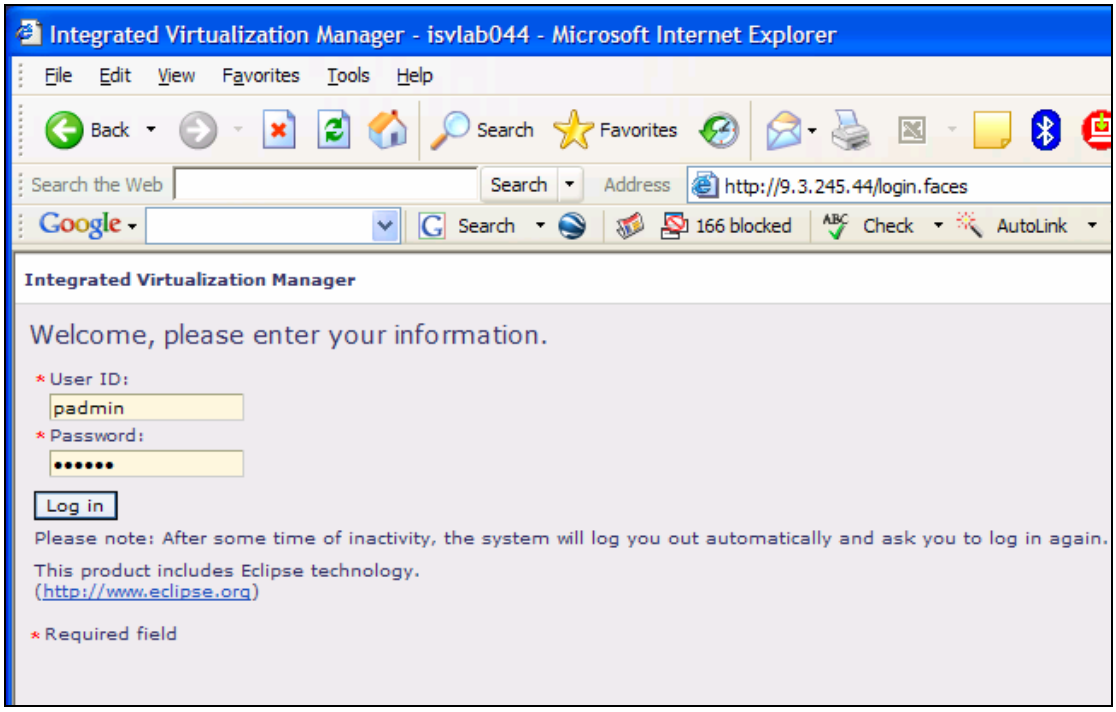

Figure 35. Logging in to Virtual I/O Server

8. You now see the main IVM display (see Figure 36).

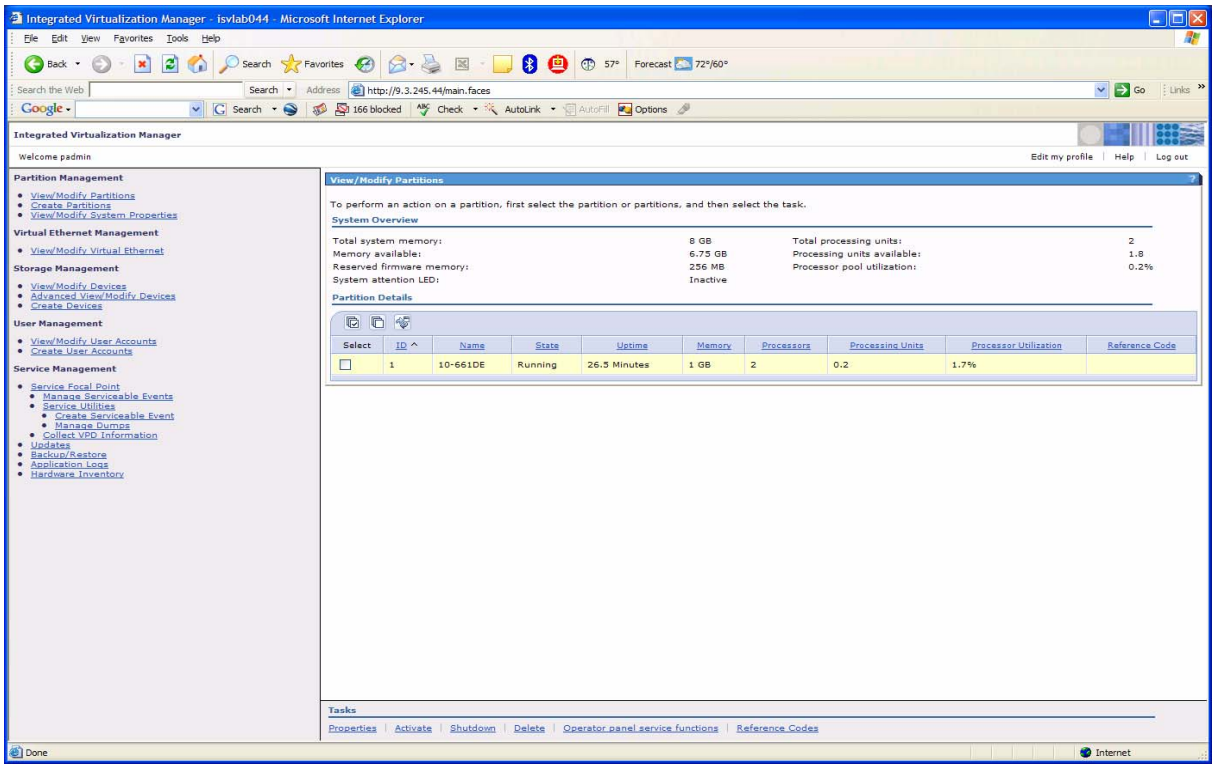

Figure 36. Viewing the main IVM display

9. Notice that the left panel of the IVM acts as a navigation tree (see Figure 37), enabling you to view, modify and create partitions, Ethernets, devices and user accounts. You can also access service-related functions, such as backups, restores, application logs and other facilities.

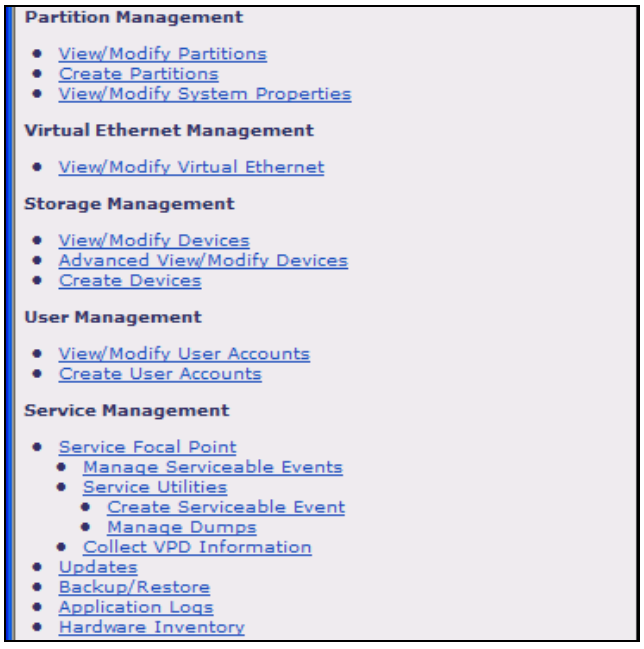

Figure 37. Navigating the left IVM panel to access various system-management functions

10. The right IVM panel provides system-overview information for each partition, including details for each managed partition (see Figure 38).

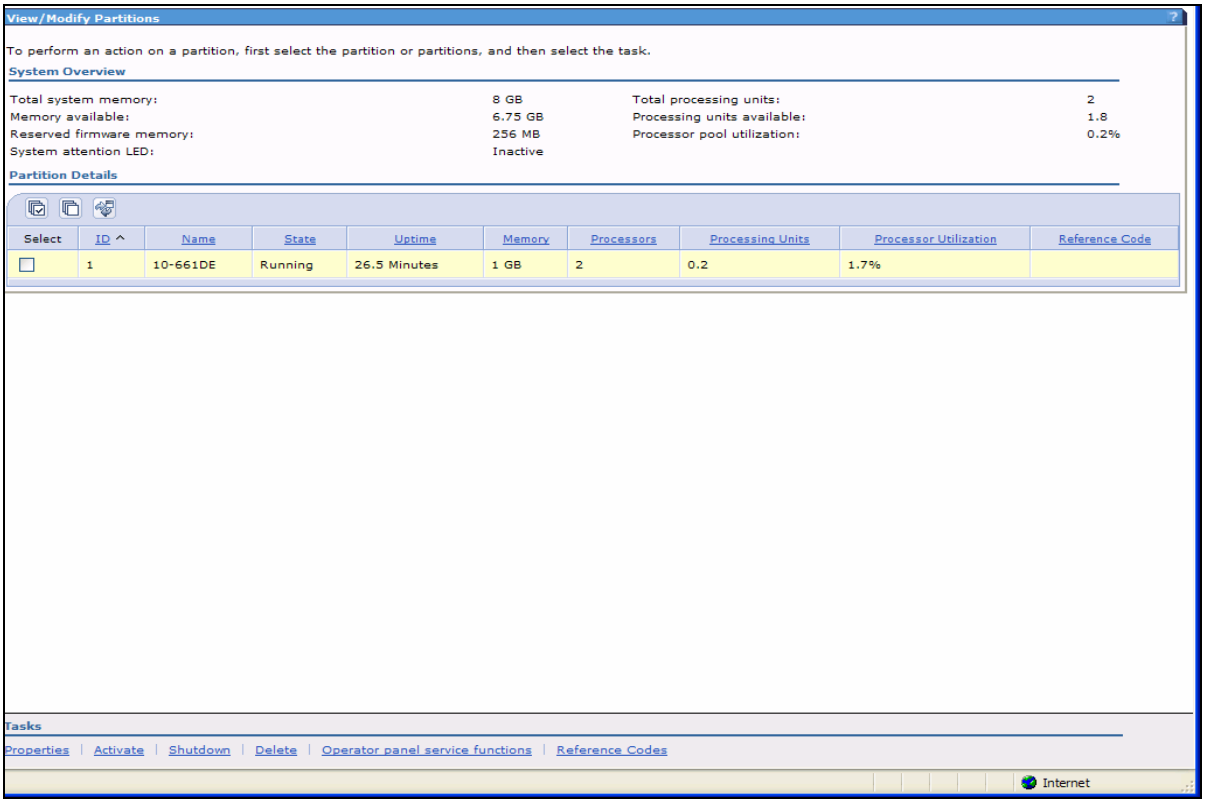

Figure 38. Viewing the details available on the right IVM panel

Creating a new storage pool

With the IVM running, you can create and modify partitions as required.

1. From the left navigation panel (see Figure 39), click **Create Devices**. Then, click the **Advanced Create Devices** tab and click **Create Virtual Disk**.

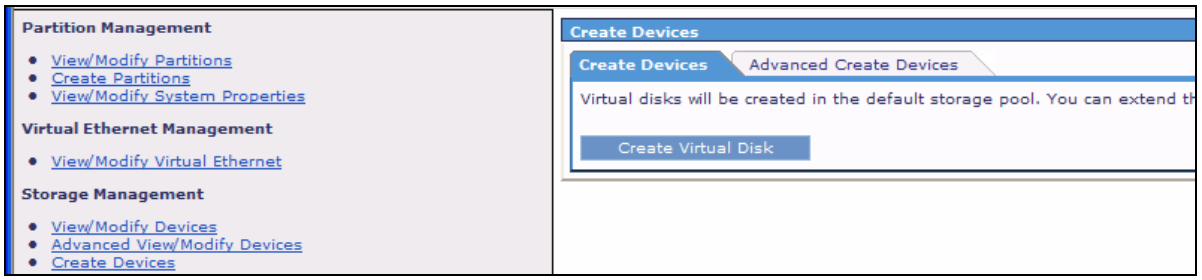

Figure 39. Creating a storage pool

2. In this example, three disks (hdisk0, hdisk1 and hdisk2) make up a storage pool called "LparStoragePool." In the Create Storage Pool pop-up window, select these three disks (see Figure 40). Then, click **OK**.

> **Note:** In this sample system, Virtual I/O Server uses hdisk3 as its own disk drive resource. It is recommended that you devote this entire disk to Virtual I/O Server.

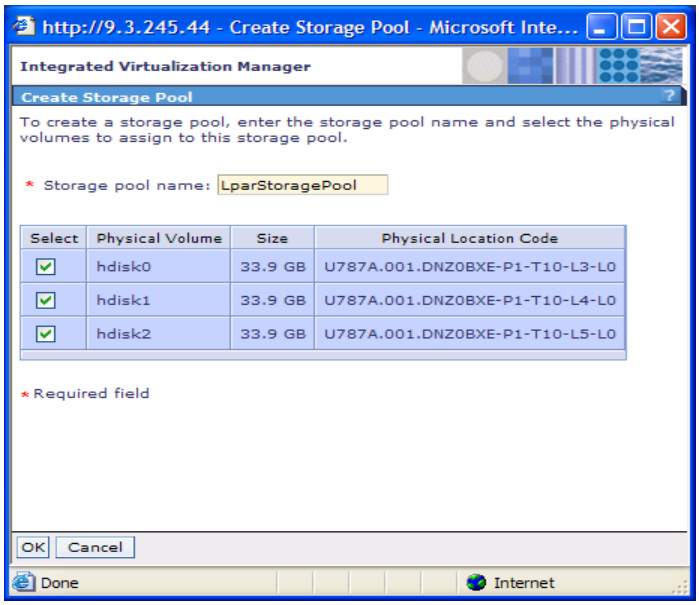

Figure 40. Selecting physical disk volumes to assign to a partition

.

3. In the left navigation pane, click **View/Modify Devices**, and then click the **Physical Volumes** tab. Notice that Virtual I/O Server creates the new storage pool and uses all three hdisks (see Figure 41).

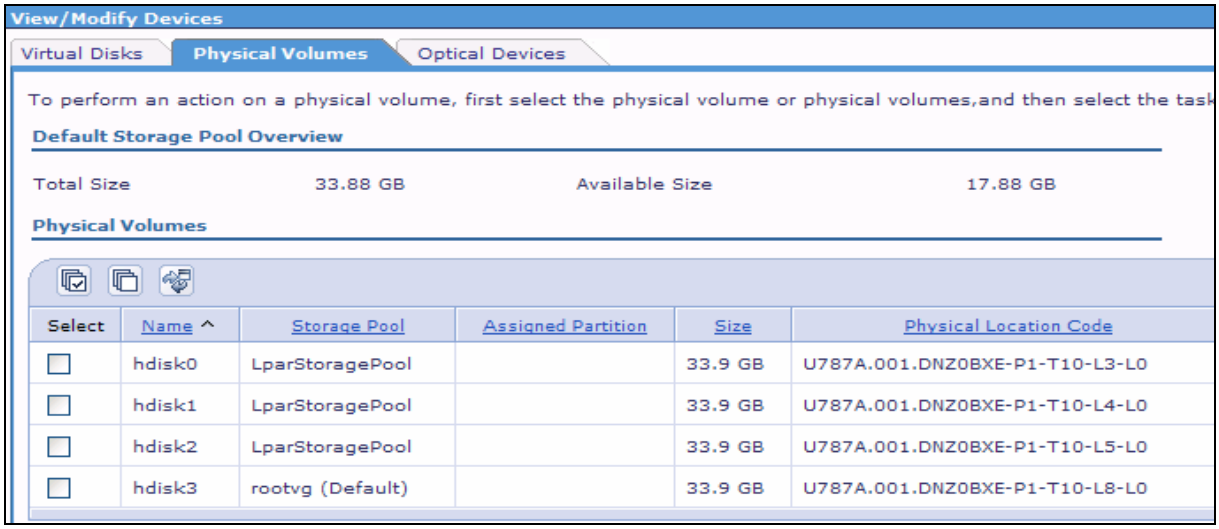

Figure 41. Viewing the newly created storage pools

4. From the left navigation pane, click **Advanced View/Modify Device.** Select the LparStoragePool item from the storage pool list. Then click **Assign as default storage pool** at the bottom of the panel (see Figure 42).

   Note: The default storage pool for Virtual I/O Server is rootvg. To separate the partition storage from the Virtual I/O Server rootvg, you must tell the system to use the new LparStoragePool as the default storage pool. Therefore, future storage activities do not touch the Virtual I/O Server rootvg.

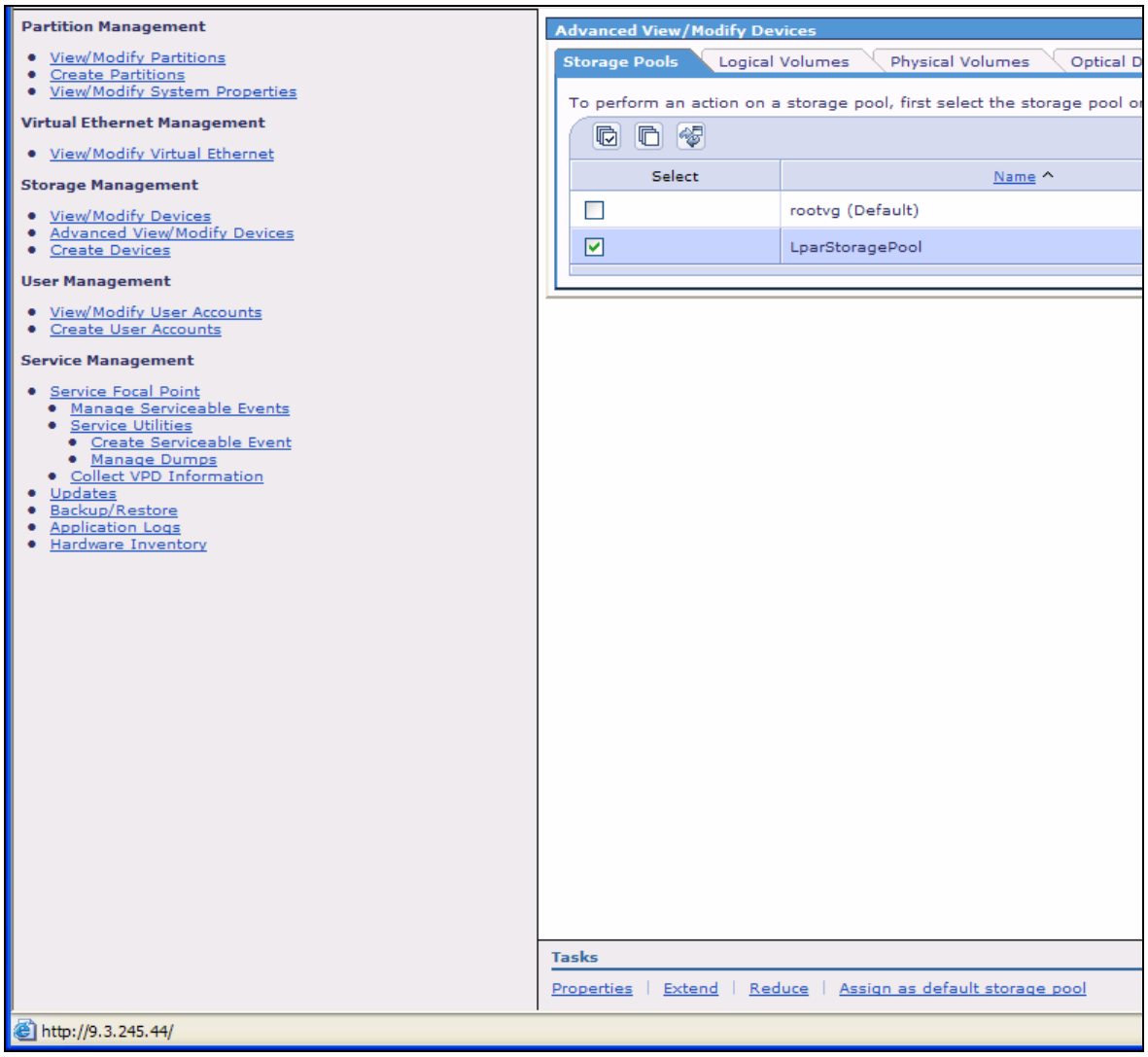

Figure 42. Assigning a default storage pool

5. After you click **Assign as default storage pool** (in the previous step), the system prompts you to verify your decision (see Figure 43). Click **OK**. Then, press **Enter**.

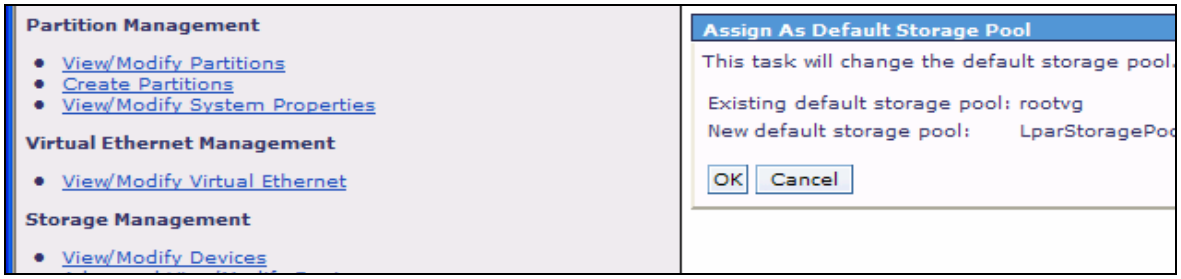

Figure 43. Verifying your decision to assign a default storage pool

6. Confirm that the new default storage pool is created correctly (see Figure 44).

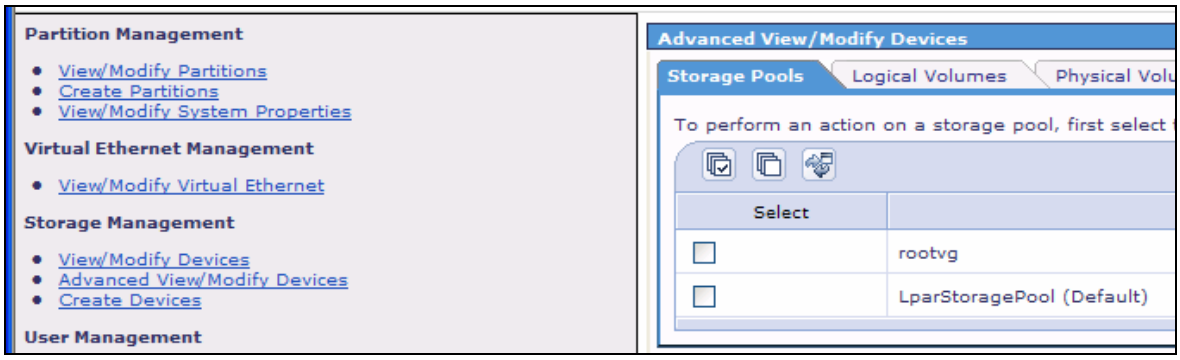

Figure 44. Confirming the new default storage pool

Creating logical volumes

After specifying the new, default storage pool for partitions to use, you can proceed to create logical volumes (LVs). Logical volumes serve as logical disks that are visible to the partitions as if they are physical disks.

1. From the left navigation, click **Create Devices** under Storage Management. Click **Advanced Create Devices** from the right panel and click **Create Storage Pool** (see Figure 45).

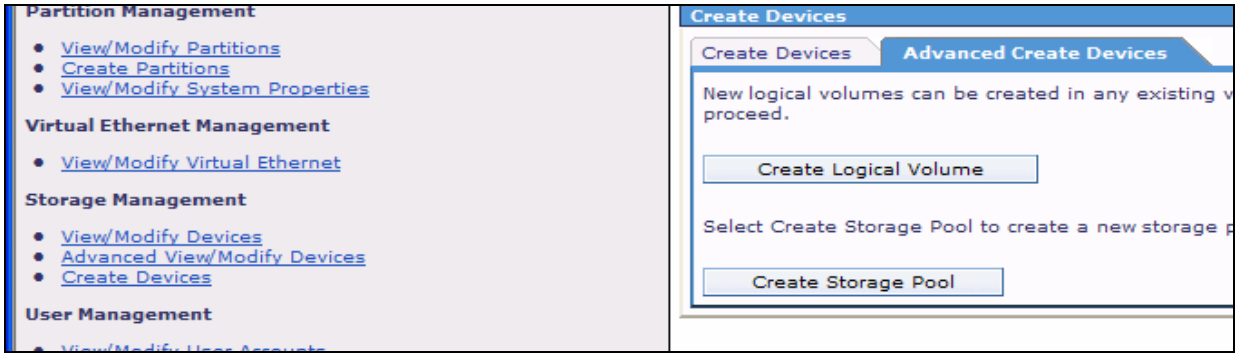

Figure 45. Creating a logical volume

> **Note:** This example uses 25 gigabytes of disk space (from LparStoragePool) to serve as rootvg for partition 1. Two logical volumes are created to serve as rootvg for a total of two partitions.

2. In the pop-up window shown in Figure 46, type **25** for Logical Volume Size. Then, click **OK**.

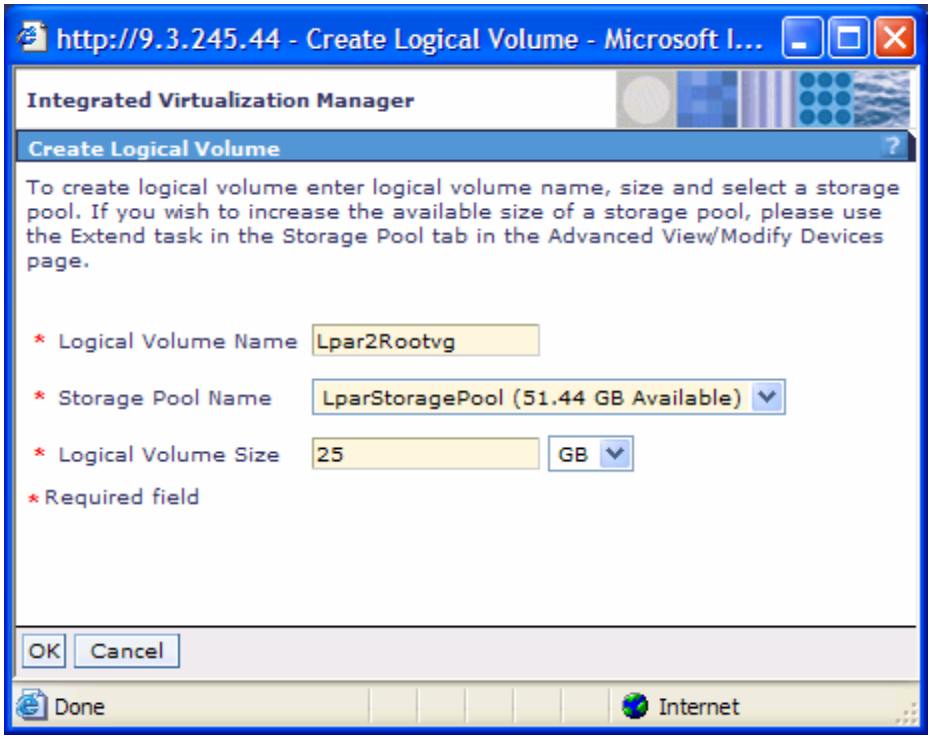

Figure 46. Specifying the disk-space size for a logical partition

3. Verify the creation of two logical volumes (see Figure 47).

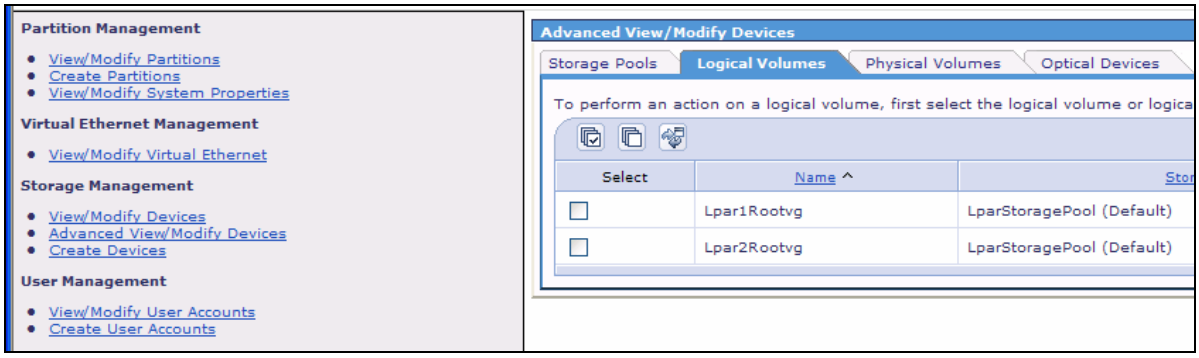

Figure 47. Verifying the creation of two logical volumes

Creating logical partitions

You can use the IVM to create logical partitions.

1. From the left navigation panel (see Figure 48), click **Create Partitions** (under Partition Management).

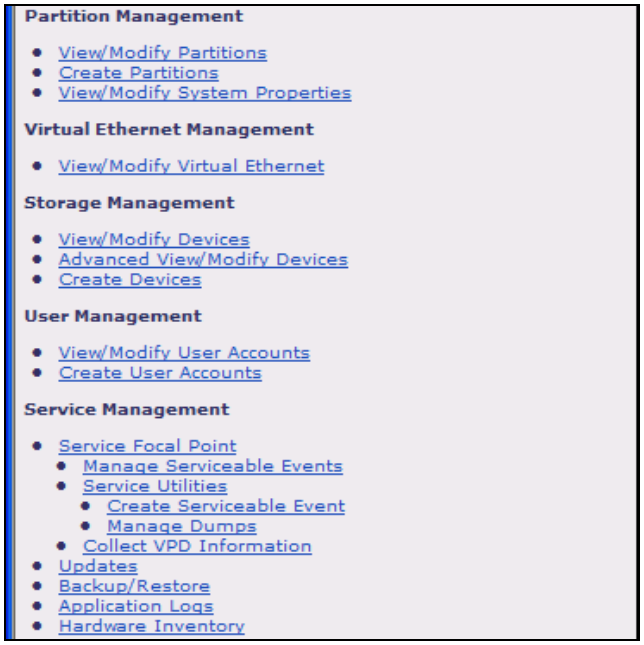

*Figure 48. Selecting **Create Partitions***

2. Click **Start Wizard** and you are presented with the screen shown in Figure 49.
3. After typing the partition ID and the partition name, click **Next**.

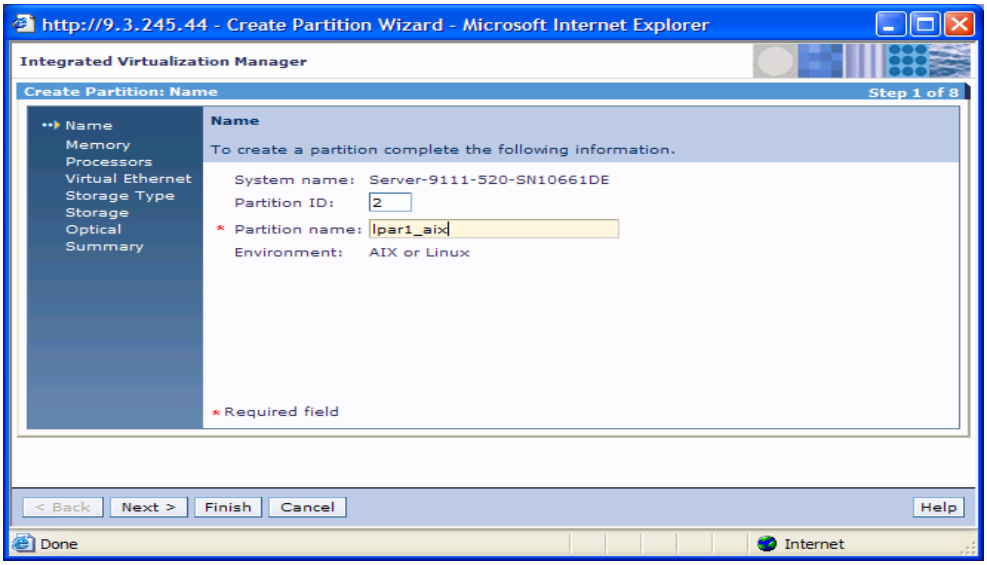

Figure 49. Entering the partition ID and the partition name

4. Assign 1.5 gigabytes of memory to the partition (see Figure 50). Then, click **Next**.

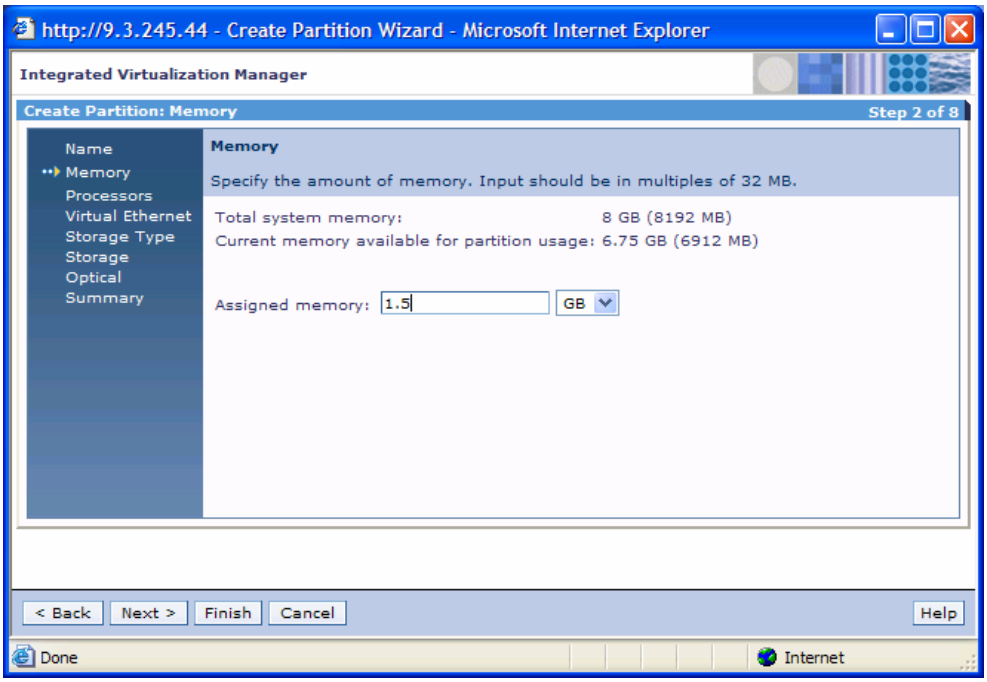

Figure 50. Assigning memory for the new partition

5. Select two processors for this partition and leave the **Shared** radio button selected (see Figure 51). Click **Next**.

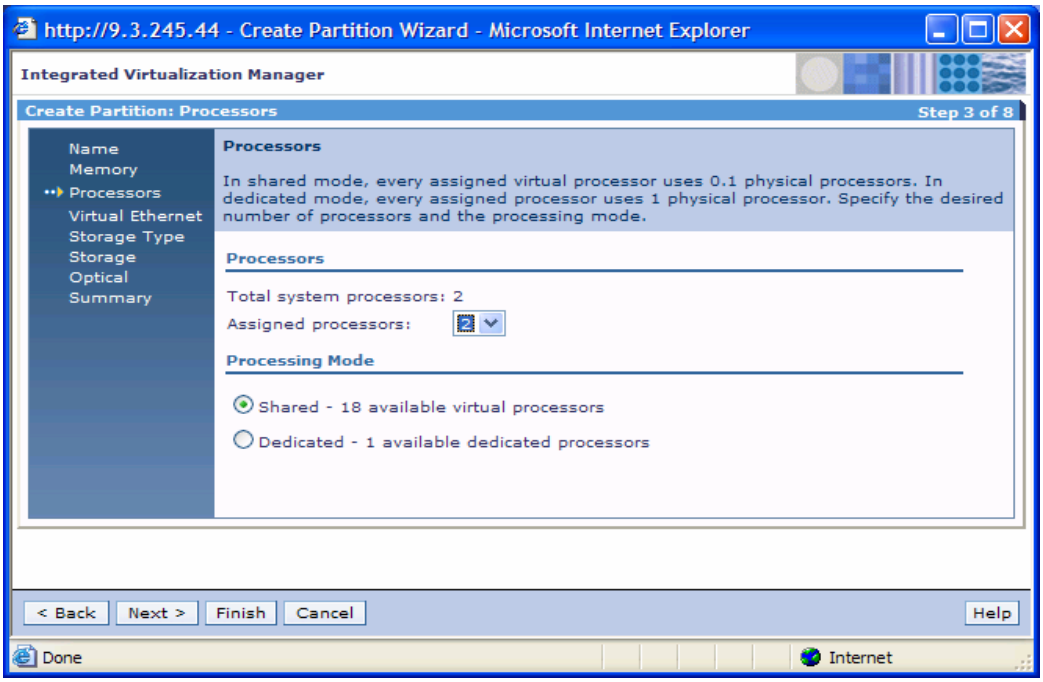

Figure 51. Assigning two processors to the new partition

6. Click **Virtual Ethernet**. Accept the default value of **1** (see Figure 52). (**Note:** Do not enter a bridge value at this point, as you will set the Ethernet bridge later.) Click **Next**.

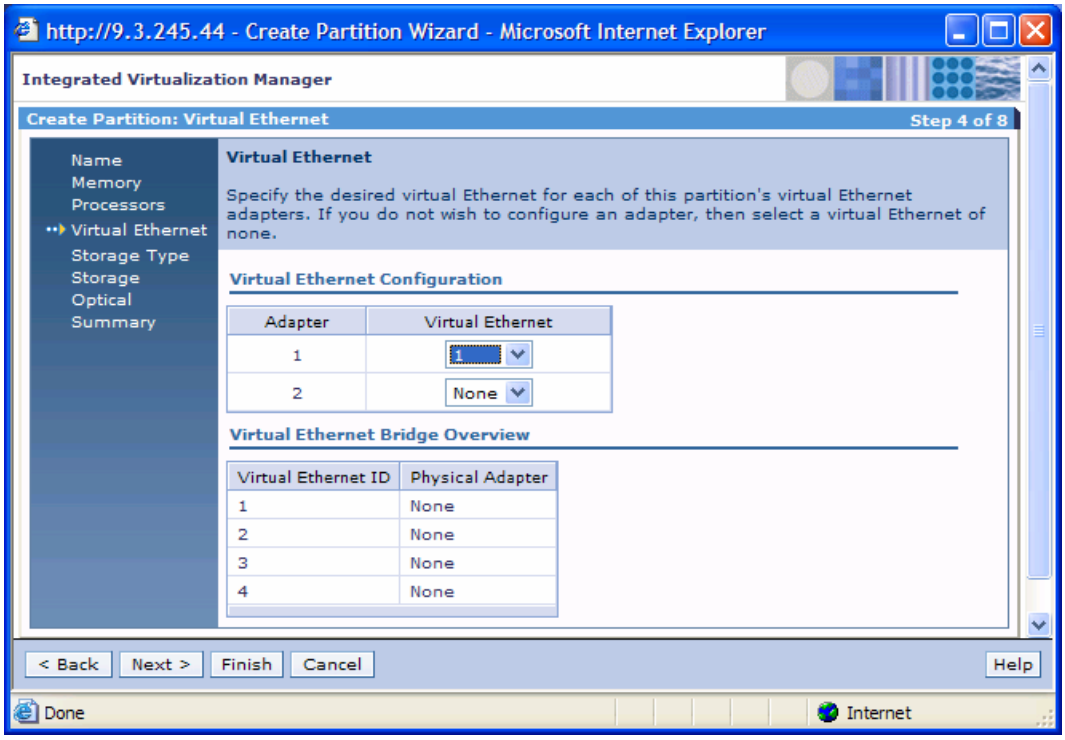

Figure 52. Selecting the Virtual Ethernet

7. From the Storage Type screen, select **Assign existing virtual disks and physical volumes** (see Figure 53). Click **Next**.

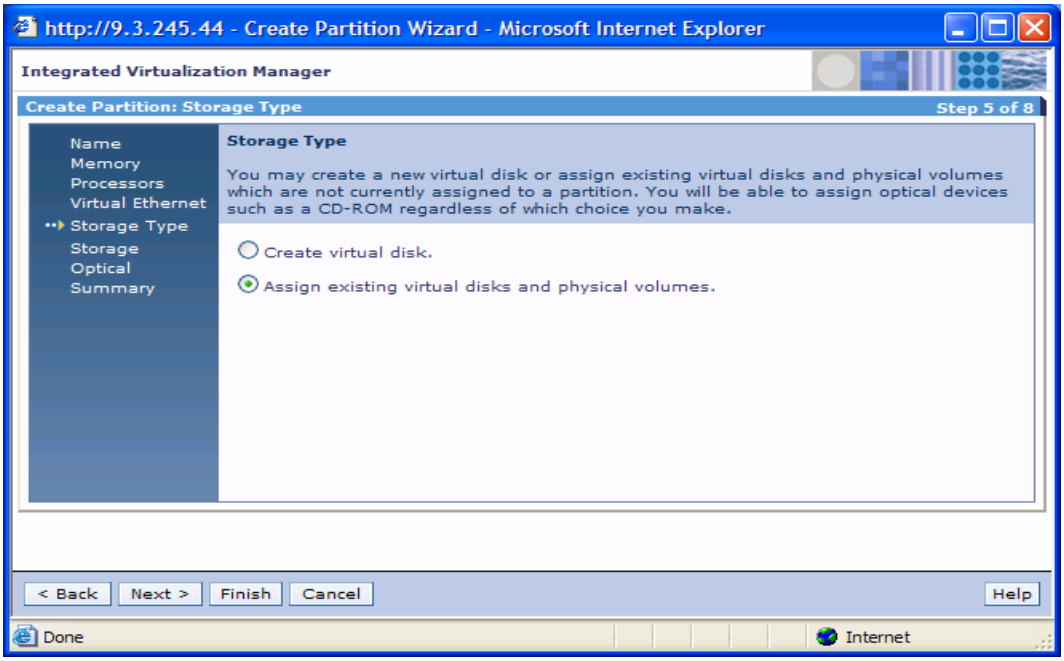

Figure 53. Assigning existing virtual disks and physical volumes

8. Select **Lpar1Rootvg** as the logical volume (see Figure 54). Click **Next**.

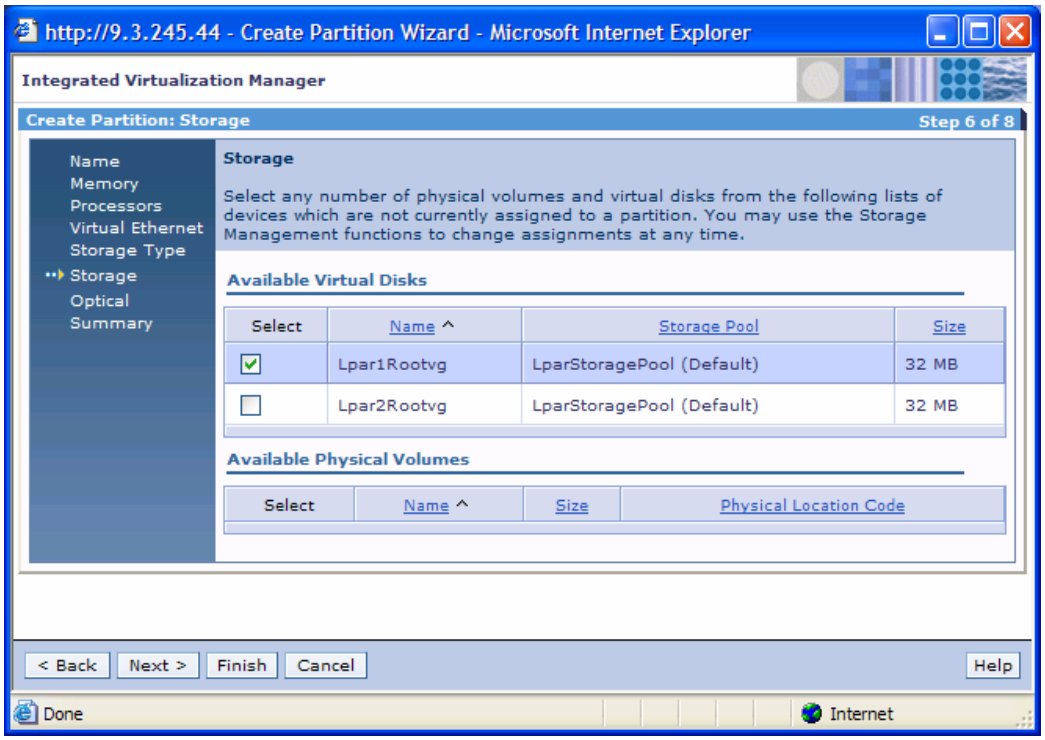

Figure 54. Selecting Lpar1Rootvg as the logical volume

9. Select the CD drive (See Figure 55). Click **Next**.

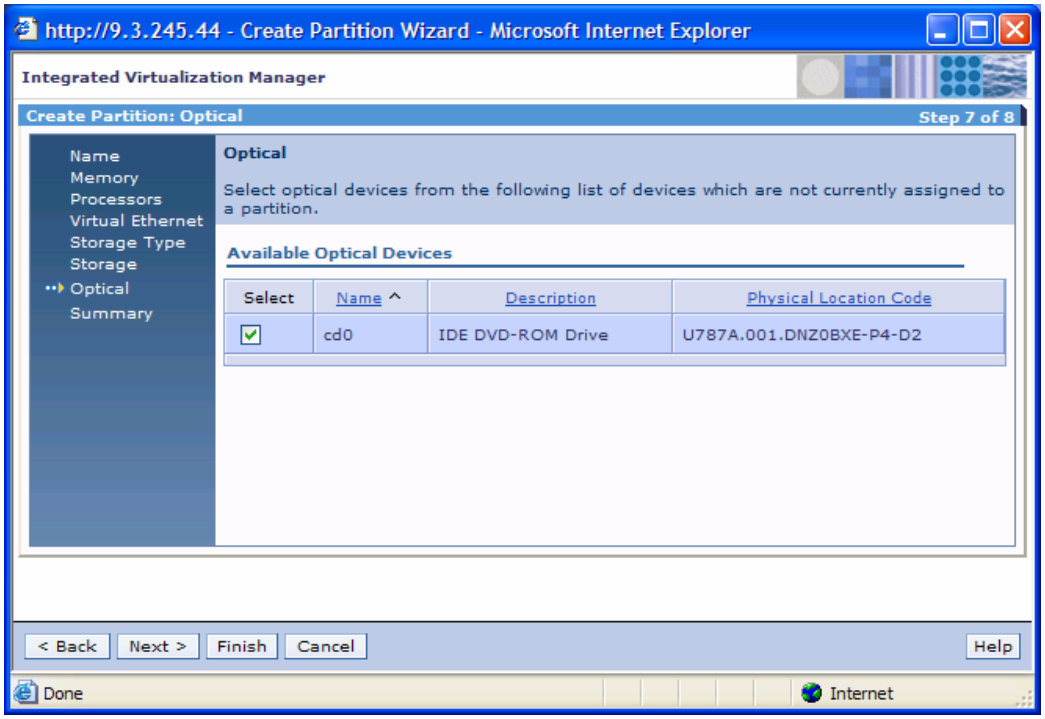

Figure 55. Selecting the CD drive

10. Review the partition Summary screen for accuracy (see Figure 56). Then, click **Finish**.

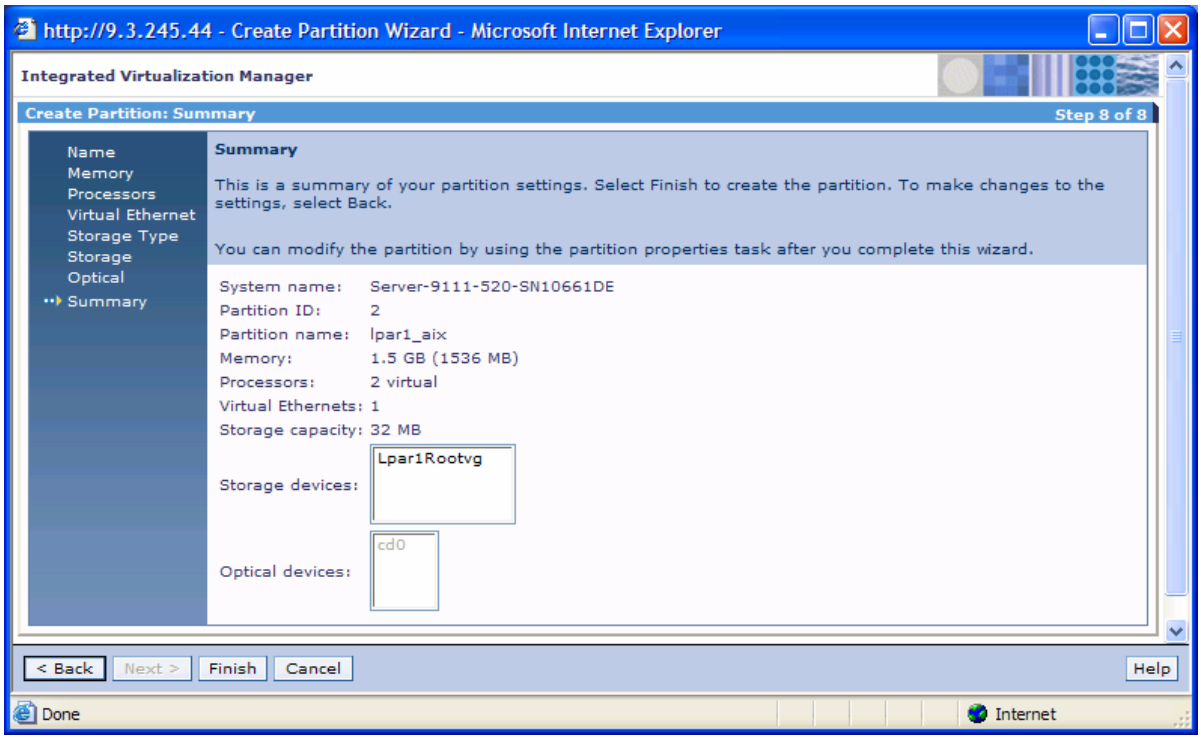

Figure 56. Reviewing the partition summary screen for accuracy

Note: You build all partitions in the same way. For this example, one additional partition is created (see Figure 57).

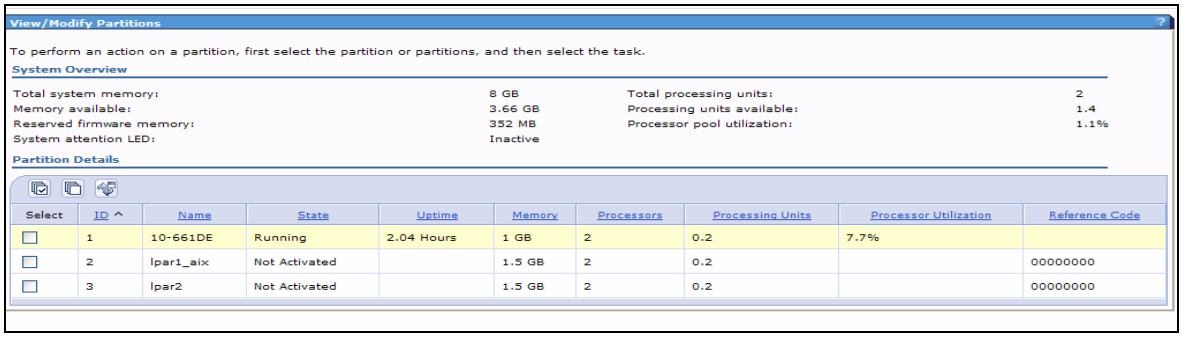

Figure 57. In this example, one additional partition is created

Bridging the virtual Ethernet

Before installing the operating system for the partition, it is important to bridge the virtual Ethernet that is assigned to the partition to a physical network adapter. When setting up the Virtual I/O Server Ethernet in a previous example, the ent0 port and IP address 9.3.245.44 were assigned. In this example, the same physical Ethernet (ent0) is assigned to the lpar1_aix partition.

1. On the left IVM navigation bar, click **View/Modify Virtual Ethernet**. Then, from the Virtual Ethernet Bridge tab, select the **ent0** physical adapter from the pull-down menu (see Figure 58). Then, click **Apply**.

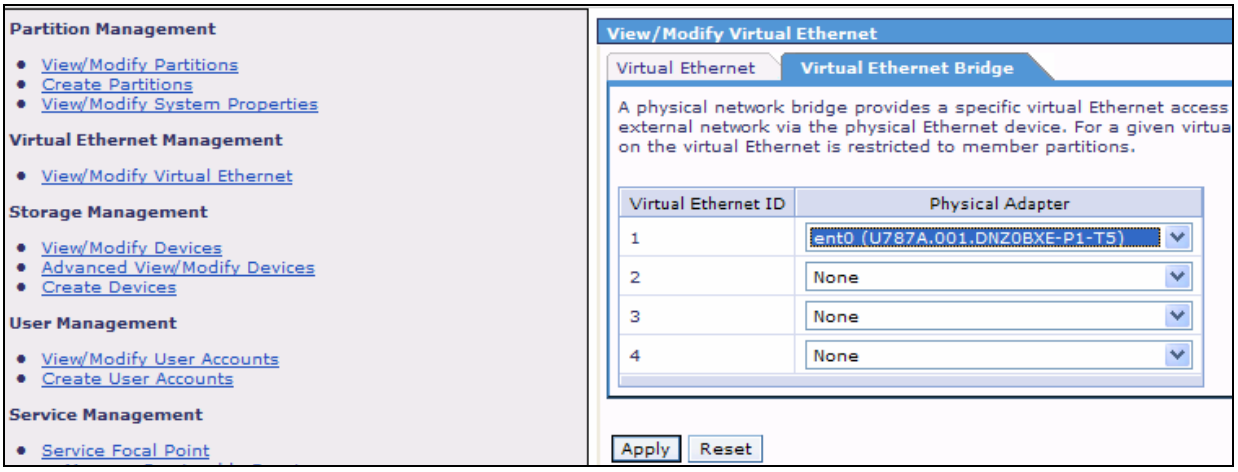

Figure 58. Selecting the ent0 physical adapter

2. On a command line, enter the following AIX command to verify that the shared Ethernet adapter (SEA) is created (see Figure 59):

```
>lsdev | grep ent
```

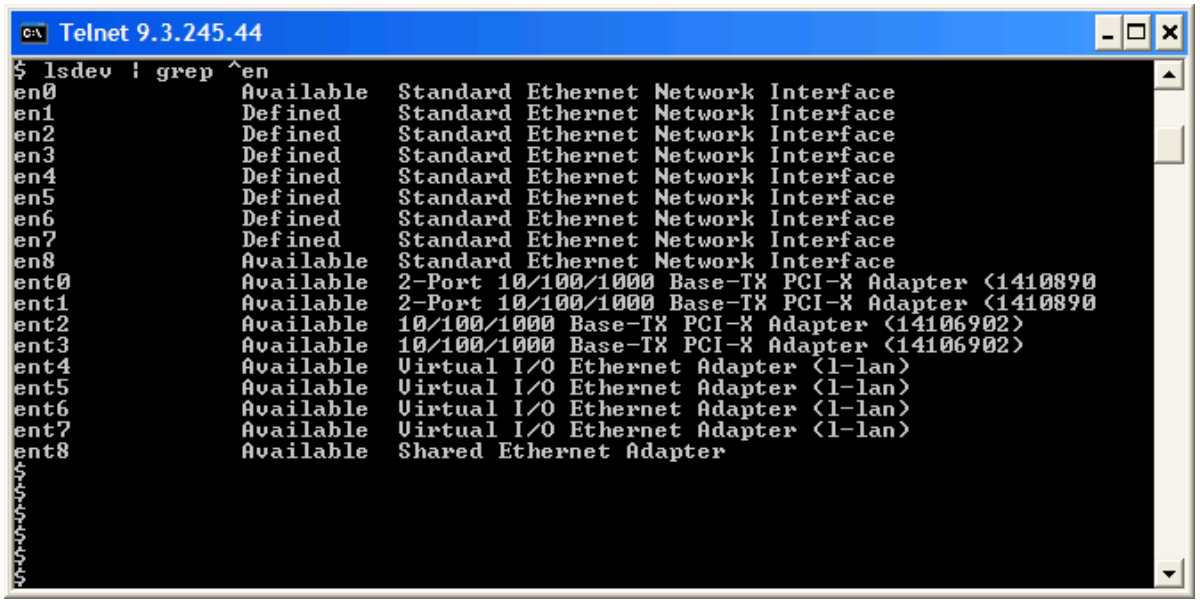

Figure 59. Verifying that the SEA is created

3. Use the following AIX command to verify the SEA (ent8) details (see Figure 60):

```
>lstcpip
```

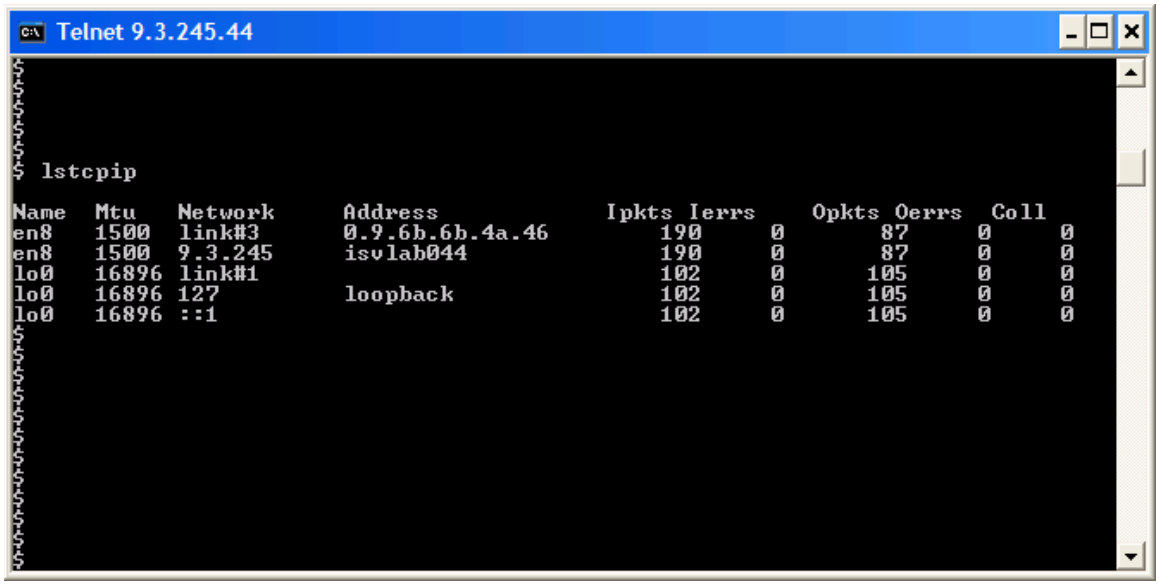

Figure 60. Verifying the SEA (ent8) details

Installing AIX on the partition

You are now ready to install the AIX operating system on the lpar1_aix partition.

1. From the View/Modify Partitions screen, select **lpar1_aix**. Notice the ID number. In this case, the logical partition's ID is **2**.
2. If the logical partition's state is not at "Open Firmware," you must activate it by selecting the partition and clicking the **Activate** button at the bottom of the screen (see Figure 61).

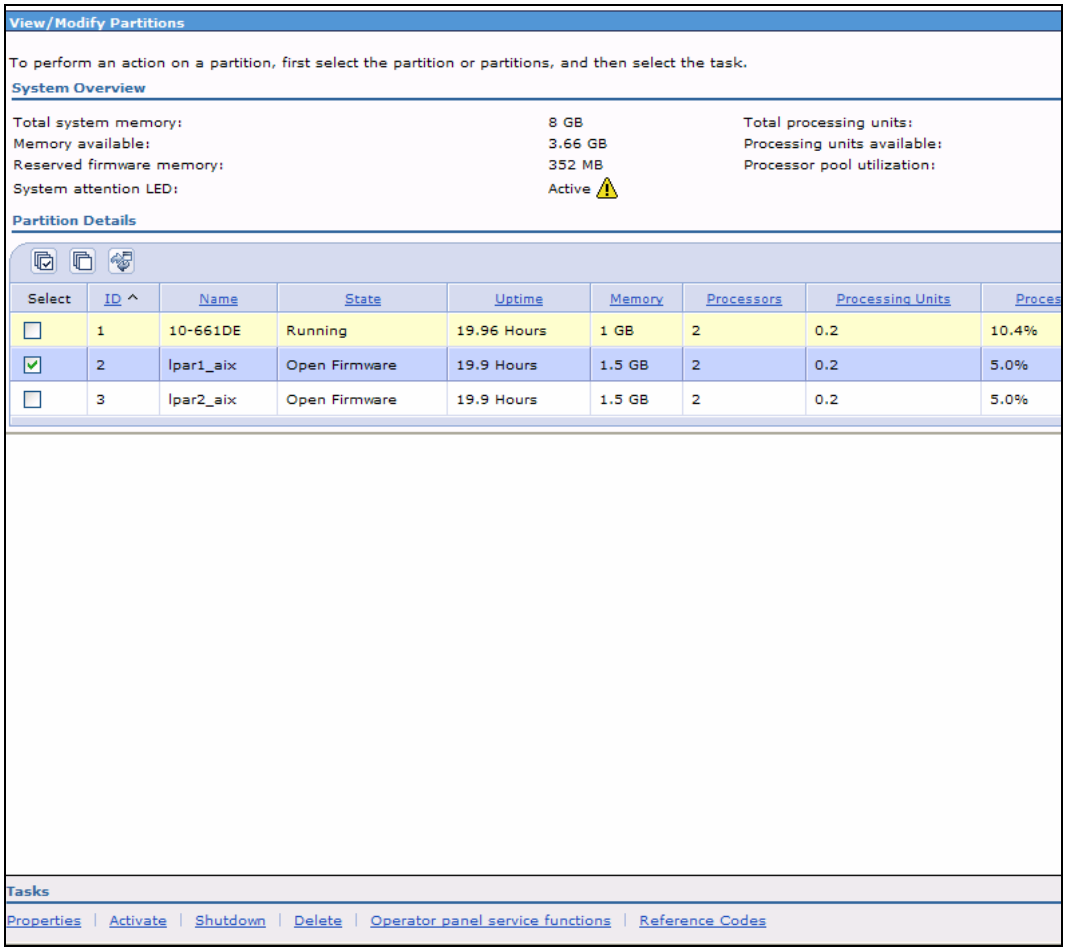

Figure 61. Activating the logical partition

3. Use the AIX PuTTY command to telnet the logical partition to the Virtual I/O Server IP address.
4. Log in with **padmin** as the user ID. Enter the password that you set up earlier (see Figure 62).

Figure 62. Logging in to the partition

.

5. Use the AIX command listed below to open a virtual terminal for the lpar1_aix partition (see Figure 63).

   ```
   >mkvt –id 2
   ```

   Note: To terminate this command, enter the ~ (tilde) character.

Figure 63. Opening a virtual terminal

Note: If you do not activate the partition (as explained in step 2), the mkvt command appears to be hung (see Figure 64).

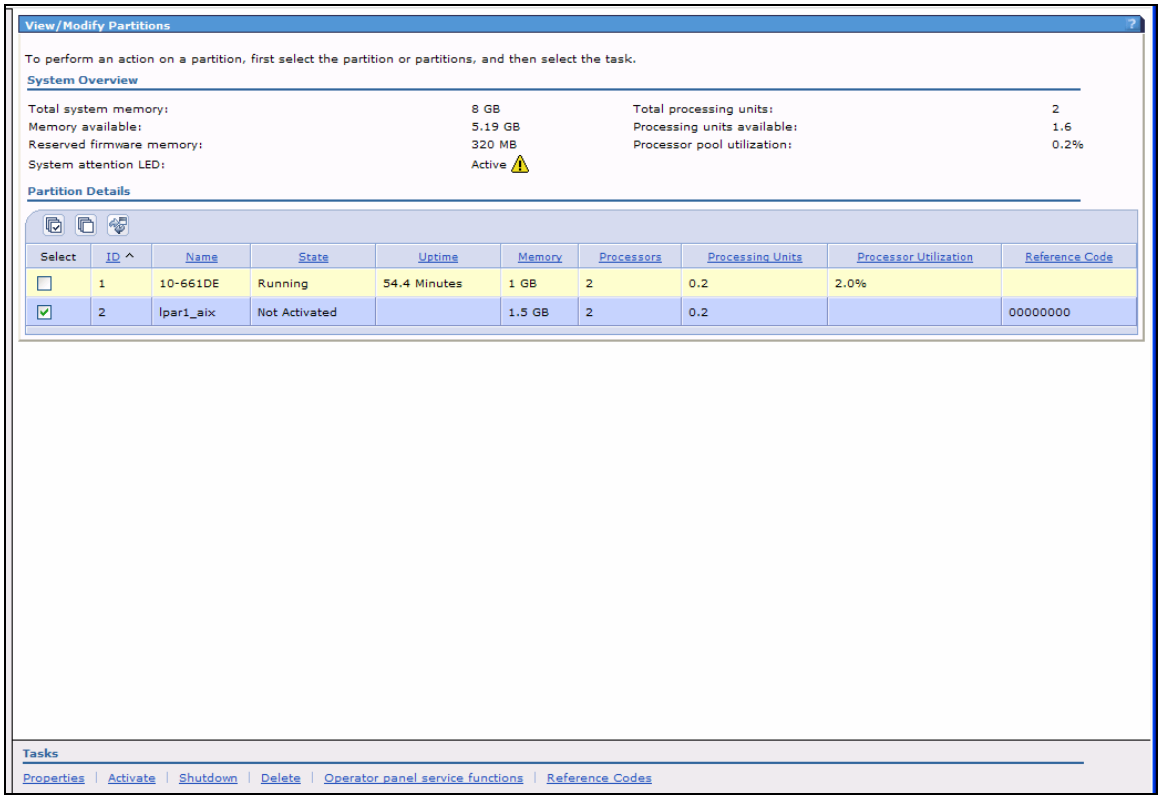

Figure 64. Observing a hung mkvt command

6. Activating the partition brings up an AIX installation display. Follow the normal AIX installation process from this point forward.

Note: This paper omits detailed screen captures related to the installation.

7. On the next screen (see Figure 65), select option **5** (**Select Boot Options**).

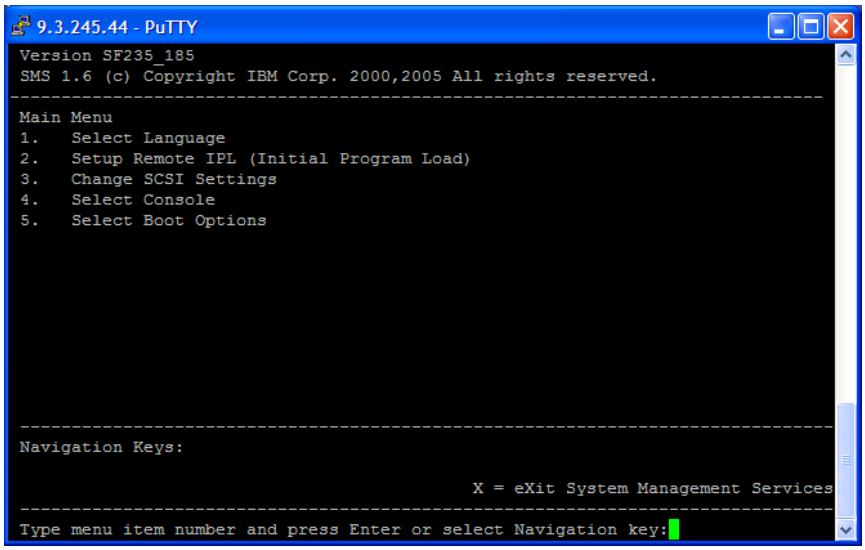

Figure 65. Selecting boot options

8. Log in from the tty device (or the PC-based HyperTerminal service) and verify the correct Power-on settings for the newly created partition on the System p model (see Figure 66):

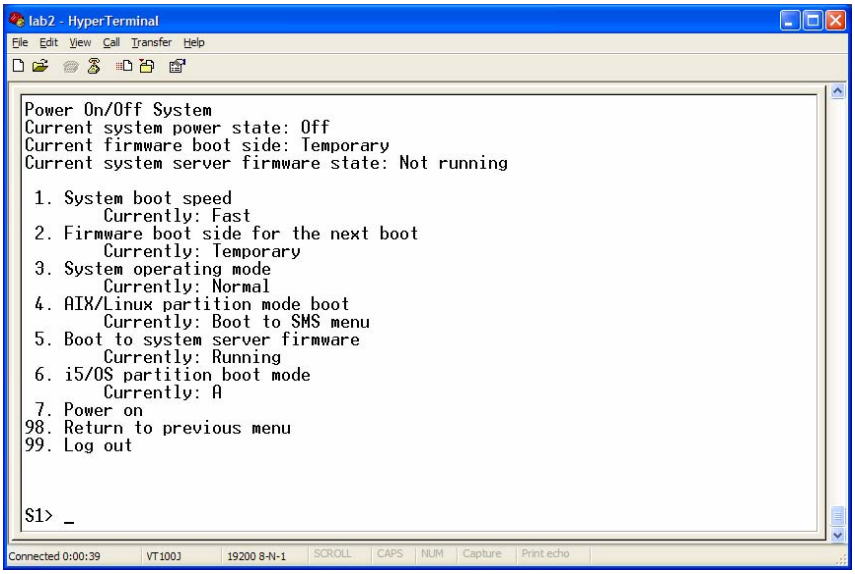

Figure 66. Verifying correct system Power-on settings

9. After pressing the **white reset button** on your System p model to boot in Standby mode, the system might hang. If so, review the following steps.
   a. Check to see if the system LCD panel shows the “C7004019” message; if so, the system is trying to boot in partition mode. In this case, you need to reboot, either by pressing the pin hole or by disconnecting and then reconnecting the power cord.
   b. If the light on the front system panel is green but nothing is displayed in the LCD panel, disconnect the power cord at the back, wait 15 seconds, and then reconnect the power cord.

Summary

The main steps in converting an HMC-managed System p model to use IVM involve resetting the system to its IBM manufactured configuration and upgrading the system firmware to support Virtual I/O Server. To perform these steps, the basic tty connection is essential. Windows HyperTerminal or a standalone TTY terminal suffices for this purpose.

This paper provided the step-by-step instructions to perform these operations and also presented screen captures as examples for configuring IVM partitions to install the AIX operating system. Next, you can install IVM-managed System p models, either from the beginning or from a previously HMC-managed configuration.

Resources

These Web sites provide useful references to supplement the information contained in this document:

- IBM eServer™ iSeries® Information Center
  http://publib.boulder.ibm.com/iseries/

- IBM System p and AIX Information Center
  http://publib.boulder.ibm.com/infocenter/pseries/index.jsp

- IBM Publications Center
  www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/pbi.cgi?CTY=US

- IBM Redbooks™
  www.redbooks.ibm.com/

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