9.1.3 System Hardware Information

Click one of the buttons to take you to that part of the video.

System Hardware Information 0:00-0:35

A key skill that you need to have as a Linux system administrator is knowing how to view information about the currently installed hardware in your system. In this lesson we're going to look at various tools that you can use to do this.

Believe it or not, one of the best tools for looking at hardware information is the good old /proc directory. We've talked about /proc before. Remember the /proc directory doesn't really exist in the file system. Instead, it's a pseudo file system that's dynamically created whenever you access it.

/proc 0:34-1:30

As you can see here, the /proc directory contains a whole bunch of subdirectories, and each one of these subdirectories that you see here in blue represents a process that's currently running on your system.

If you want to view information about a particular process, you can go into the appropriate directory here and there you'll find information about that running process. But that's not what we're concerned about in this lesson.

What we are concerned about are the other files over here within this directory. These files contain information about the hardware in your system.

For example, the cpuinfo file right here contains details about the CPU that's installed in the system. And because this is just a text file, you can use the cat, less, more, or any other text editor you want to view the contents of this file.

/proc/cpuinfo 1:31-2:23

In this example, I use the cat command to view the cpuinfo file on this particular system. And when we do, I learn that I have an Intel Pentium D processor, 2.8 gigahertz, and right here it tells me that it's a dual core processor--two cores. I can also see how much cache memory is available on this CPU.

There's more information displayed in the cpuinfo file than we can show on the screen at one time. In addition, there's another file in here called devices. The devices file contains a list of all the hardware devices installed in the system.

There's another file here called dma. This contains a list of all the DMA channel assignments in the system. Another interesting file is the interrupts file. The contents of a sample interrupts file is shown here.

/proc/interrupts 2:23-2:55

As you can see, it contains a list of IRQ assignments in the system. For example, we can see that our two ATA controllers on the system are assigned to interrupts 14 and 15. Our parallel portfolio is assigned to use interrupt 7.

There's also a file here called iomem, which contains a list of I/O port assignments on the system. Another very useful file is the modules file. This file contains a list of all the kernel modules currently being used by the system.

/proc/modules 2:56-3:31

An example of a modules file in /proc is shown here. I've just used the cat command to view it, and here you can see all the various kernel modules that have been loaded, such as our Bluetooth driver, which is used to provide support for Bluetooth devices in the system.

There is a subfolder here named scsi. The /scsi directory contains additional files that contain information about the various SCSI devices on your system. There's also a subfolder over here called bus. Within bus is a file named devices, which contains information about the various USB devices on the system.

/sys 3:32-4:29

In addition to the /proc directory, there's another directory within your Linux file system named /sis, and it also provides information about the hardware installed in the system. The file system within /sis is actually organized into a kind of tree structure that's grouped by the hardware bus, the hardware devices, and their associated drivers.

The top level of the /sis directory is shown here, and it contains many subdirectories to organize this information. For example, the /block directory contains a symbolic link file for each block device in the system.

The /bus directory contains a directory for each data bus in the system, such as your PCI bus, your SCSI bus, and your USB bus. And then within each bus directory there are two subdirectories called devices and drivers. These are shown right here.

I'm inside the USB bus directory.

/sys/bus 4:27-5:03

The /devices subdirectory contains entries for every device connected to that bus, while the /drivers directory contains subdirectories for each driver that's loaded for a given device on that bus.

Back up within the /sis directory itself is a directory called /class. The /class directory contains a listing of all device classes available. The /devices directory contains an entry for every hardware device that's been discovered on the system. There's also a directory here called /module.

/sys/module 5:04-6:00

The /module directory contains many subdirectories.

One for each module currently loaded into the kernel.

For example, here's our subdirectory for the Bluetooth kernel module. Here's a subdirectory for our mouse driver. Here's a subdirectory for our keyboard driver. Here are two subdirectories for our parallel port drivers and so on.

In addition to /proc and /sis directories, most Linux distributions also provide a wide variety of command line tools that you can use to view information about the hardware currently installed in your system and if you want to know the truth, a lot of these tools actually just pull their information right out of the /proc directory.

Be aware that many of the commands we're going to look at here may not actually be installed by default with some distributions. However, if it's not installed, you can usually go out and get it manually using either the yum, zypper, or apt-get commands.

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hdparm 6:01-6:32

Let's take a look at what some of these utilities are. The first one we need to look at is the hdparm command. It's used to display information about your hard disk drive. The syntax is to enter hdparm, and then specify which hard disk device file we want to view information about.

We would replace this with something like sda or sdb, whichever device we want to view information about. And when you do, data about that device is displayed on the screen.

In this case, I'm looking at information about the sdb hard disk drive.

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sg_scan 6:33-6:44

The next utility you need to be familiar with is the sg_scan utility. It's used to scan your SCSI buses and list all the devices that are connected to your SCSI controllers.

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sginfo -l 6:45-6:53

A similar command is the sginfo -l command. It's also used to display information about all the SCSI devices in your system.

lsusb 6:54-7:26

Another useful command is the lsusb command. It displays information about all the USB devices that are currently connected to your system. When you run it, you can see a listing of all your USB buses and all of the devices that are connected to that bus.

In this example, I can see that I have two different USB buses. I have bus 1 and then I have bus 2. On bus 1, all I have is a root hub. On bus 2, I have a root hub, and then I have another USB hub, and then I have a mouse.

hwinfo 7:27-8:21

Another useful utility is the hwinfo utility. It displays a comprehensive overview of all the system hardware in your system. It will probe the system hardware and then generate a system overview report.

An example of which is shown here. If you don't specify any options with the command, it will produce a very long report. What we usually do is limit the report to a single device subsystem using the --device option.

You can replace device here with a variety of different types of devices. You need to go look at the hwinfo man page to see which syntax to use for a particular type of device.

I'll also warn you that the hwinfo command is not installed by default on a lot of distributions, but you can usually go out and get it and install it with yum, zypper, or apt-get.

lspci 8:22-8:41

The last command we're going to look at here is lspci. This lists all the PCI devices installed with the system. When you use the -k option, then the lspci command will also list the kernel modules associated with each PCI device. You can see an example of doing that here.

Summary 8:42-8:56

That's it for this lesson. In this lesson, we reviewed the various resources that you can use to view information about the hardware installed in a Linux system. We first looked at the /proc and /sis directories, then we reviewed several command line utilities that you can use to view system hardware information.

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