

Video - Router Bootup Process (5 min)

Let's walk through the router boot-up process. As you can see, I have a console connection using Tera Term to a Cisco router. There are three major phases. In the first phase, the router runs the Power On Self Test, or POST program. Located in read-only memory, or ROM, the Power On Self Test checks for errors in the hardware, like the CPU, the DRAM, and also the NVRAM. After the system POSTs, the router then runs the bootstrap program. The bootstrap program is also located in ROM. This is the end of the first phase. The purpose of the bootstrap program is to locate and load the Cisco IOS software. The IOS is Cisco's operating system for the router. The Cisco IOS is located, by default, in flash memory. If the IOS image file is not found in flash memory and then loaded into RAM, then the router will look to a TFTP server on the network to see if it can find another IOS image.

After the IOS is completely loaded, the router then loads the configuration file, known as the startup config file. This file contains all of the configured settings for the router, such as the host's name and interface IP addresses. The configuration file is located in nonvolatile RAM, or NVRAM, in the router. If the router cannot find the start-up configuration file in NVRAM memory, it will also look to a TFTP server on the network to see if it can find a configuration file. If a configuration file is not located on a TFTP server either, then the router will enter set-up mode, which is a configuration wizard meant for initial setup. Let's watch the process in action. I'll go back to my Tera Term console connection and press Return. You can see that I now have a console connection to the router. I'll type "enable" to get to privileged user mode and then type "reload." This will reboot the router, and we can watch the boot-up process in action. I'll hit Enter. And "proceed with reload?" I'll hit Enter to confirm. All right, and you can see the system has found the bootstrap. The system has rebooted. "System Bootstrap, Version 15." You can see it right there.

So the system has performed the POST already and now found the bootstrap. It's located the memory. You can see there's 512 megabytes of memory on board. There's a DIMM slot that doesn't have any expanded memory in it. You can see that the system has found the ROMmon, or ROM Monitor Mode, a recovery subset IOS that's located in ROM memory in the event that an IOS is not found. You can see that the bootstrap program has now found the IOS image file and is decompressing the IOS image. You can tell this from the presence of the hash characters. It's finishing the boot-up process. It now recognizes that we are running the Cisco IOS software, version 15.2, subrelease 3. At the bottom here, you can see that the memory, the flash memory on the router has been recognized. And now the configuration is being loaded.

Now, with this router, I've configured one interface, and that is the Gigabit0/0 interface. So if we look here-- I'll scroll up slightly-- you can see that the interface GigabitEthernet0/0 has changed its state to up. That's because I've configured it. So we know, at this point, that the configuration has been loaded, and that's what we see from the output from the router here. At the end now, the router is finished booting, and I can press Enter. I'm met with the command prompt.