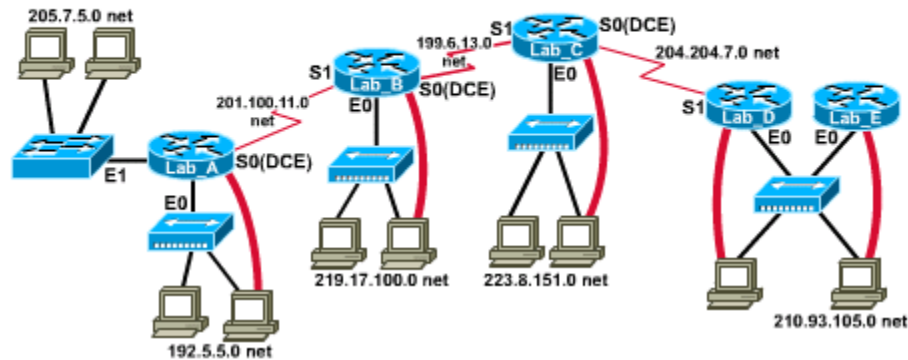


◀ Lab 1.6.6.1 IOS update / TFTP- Overview

Router Lab Topology



Router Name - Lab_A	Router Name - Lab_C	Router Name - Lab_E
Router Type - 2514	Router Type - 2501	Router Type - 2501
E0 = 192.5.5.1	E0 = 223.8.151.1	E0 = 210.93.105.2
E1 = 205.7.5.1	S0 = 204.204.7.1	SM = 255.255.255.0
S0 = 201.100.11.1	S1 = 199.6.13.2	
SM = 255.255.255.0	SM = 255.255.255.0	
Router Name - Lab_B	Router Name - Lab_D	
Router Type - 2501	Router Type - 2501	
E0 = 219.17.100.1	E0 = 210.93.105.1	
S0 = 199.6.13.1	S1 = 204.204.7.2	
S1 = 201.100.11.2	SM = 255.255.255.0	
SM = 255.255.255.0		

Estimated Time: 30 min.

Objectives:

- Display information about current IOS software and router memory.
- Review IOS 12.0 memory requirements and update options
- Use a TFTP Server to backup a router's existing IOS image from Flash
- Use a TFTP Server to update a router to a new version of the IOS software

Background:

As new versions of the Cisco IOS software become available, it is necessary to periodically update the existing IOS image to support the latest features and improvements. In this lab you will determine what version and IOS your router is currently running and become familiar with the requirements for updating to a newer version. You will check to see how much flash memory the router has and how much of it is currently used by IOS image and how much is free. You will always want to backup your current IOS before upgrading to a newer version. It is a good idea to keep a backup copy of the IOS image file for each router. The process of downloading a new IOS image from Cisco Connection Online (CCO) will be also be reviewed. The TFTP server method of updating your IOS will be covered in this lab. The primary goal of this lab is to get your router updated to IOS 12.0.

Tools / Preparation:

Prior to starting the lab you will need to connect a PC workstation with HyperTerminal to a router using the router's console Interface with a roll-over cable. You will also need an Ethernet connection to the router. The instructor or lab assistant should have a Windows 9x PC with a TFTP server installed and have the latest downloaded IOS 12.0 image on the PC hard drive. Verify that the TFTP server is accessible by the router. The Cisco TFTP server and latest IOS updates can be downloaded from the web sites listed below. Although the instructions in this lab for downloading the IOS image software can only be done by someone with a CCO account, you should read through them to become familiar with the process.

You should review Chapter 16 in the Cisco Networking Academy First-Year Companion Guide and review semester 3 online curriculum lesson 1 prior to starting this lab. Work individually or in teams.

Resources Required:

- PC with Monitor, keyboard, mouse, and power cords etc.
- Windows operating system (Win 95, 98, NT or 2000) installed on PC
- HyperTerminal program configured for router console connection
- PC connected to the Router console port with a roll-over cable.
- PC connected to a hub that the router is connected to or a crossover cable directly to the router
- PC on a network, running a TFTP daemon (server), that the router can send and receive.

Web Site Resources

[Routing basics](#)
[General information on routers](#)
[2500 series routers](#)
[1600 series routers](#)
[Terms and acronyms](#)
[IP routing protocol IOS command summary](#)
[Cisco ConfigMaker information and download](#)
[Cisco TFTP Server \(Win 9x version\)](#)
[TFTP Command Syntax Cisco IOS images](#)

Notes:

Step 1 - Login to the router.

Connect to the router with the console connection and log in. Enter the password cisco if prompted. Enter privileged mode with the enable command. Use the password of class

Step 2 - Check the current IOS version.

Use the `show version` command to check the IOS version

1. What version of the IOS is the router currently running?

Step 3 - Check the IOS image file and flash memory.

Use the `show flash` command to obtain information about Flash memory and the IOS image.

2. Document the following information from the `show flash` command.

a. How much flash memory is used and available?

b. What is the file that is stored in flash memory?

c. What is the size in bytes of the flash memory?

Step 4 - Review IOS image memory requirements.

Your options for updating the router IOS will vary depending on the router model number, the version of IOS you are currently running, the amount of Flash memory and the amount of DRAM memory the router has. The following table shows various IOS images updates available and their memory requirements.

NOTE:

All images shown here run from Flash memory

Cisco Router Series	IOS Version / Feature Set	*Image Name	Image Size	Reqd. Flash Memory	Reqd. DRAM memory
		C1600-ny-			

1600	11.2(21) - **IP/IPX	l.112- 21.P.bin	3,729kB	4MB	2MB
1600	12.0(10) ? **IP/IPX	C1600-ny- l.120-10.bin	5,031kB	6MB	4MB
2500	11.2(21) - **IP/IPX/AT/DEC	C2500-d- l.112-21.bin	5,292kB	8MB	4MB
2500	12.0(10) **IP/IPX/AT/DEC	C2500-d- l.120-10.bin	6,730kB	8MB	6MB

NOTE:

The last character of the feature portion of the IOS image name (e.g. C1600-ny-l) is a lower case letter L not a number 1. ** Feature sets: IP = TCP/IP protocol, IPX = Novell IPX protocol, AT = AppleTalk protocol, DEC = DecNet protocol.

All images shown above run from Flash memory

Step 5 - Review options for obtaining the IOS image file.

You may obtain an IOS image by purchasing an IOS Software Feature Pack (SFP) or by downloading the IOS from the Cisco web site. You may also be able to use a backup image from another router if it has a newer version. All options must be in accordance with the IOS software licensing agreement.

A. Software Feature Pack (SFP)

The SFP typically comes in a package for a specific router series such as a 2500 and includes instructions, release notes and a CD with several IOS versions, the Cisco TFTP server for Win 9x and the Router Software Loader (RSL). RSL is a Windows 9x software application utility that helps with loading new IOS images and it will be covered later in this lab. SFPs can be obtained from Cisco or an authorized reseller. If you do not have an SFP with RSL you will need to download the IOS image from the Cisco web site and use the TFTP method. The RSL method of router IOS update will be covered in the next lab using the Software Feature Pack

B. Cisco web site

The latest IOS versions can be downloaded from the Cisco web site (www.cisco.com) and you can choose from several different feature sets for different router series (1600, 2500 etc.). There is also an abundance of information on IOS versions, feature sets, capabilities and requirements. Once you download the image you can use it to update the router using TFTP. The TFTP procedure will be covered in this lab. You will need a Cisco SmartNet Service agreement and a Cisco Connection Online (CCO) login account in order to download IOS files.

C. IOS Backup from another router

If you have a router of the same series and model number with a newer IOS you can sometimes copy the existing IOS from flash memory of that router to a TFTP server. You can then load this image into the new router from the TFTP server. The TFTP procedure will be covered in this lab.

Step 6 - Download the IOS image file.

A. Login at www.cisco.com web site.

Start your browser, go to the www.cisco.com web site and login. You must have a CCO account. If you do not log in with a CCO account you will not get download rights. All Cisco academies should have SmartNet Service Agreement for their router lab equipment. If you have a SmartNet agreement you or your academy representative (instructor or main contact) should also have a CCO login account.

B. Navigate to download location

Click on **Software Center** under **Service and Support**. At the **Software Center** click on **IOS Upgrade Planner** and then click **IOS 12.0**.

NOTE:

You may want to download version 11.2 as well to practice upgrading an older IOS.

C. Select Platform and Release

Select the Platform (router series) for the IOS you will be downloading (e.g. 1601-1604 or 2501-2525). Then select the latest **Major Release Update (e.g. IOS 12.0 release 10 or 12.0.10)**. New releases come out regularly and you should use the latest major release available as a general rule. Avoid the early deployment releases if possible which end with the letter T (e.g. 12.0.5T).

D. Select Software Features

Select the Software Feature set you want. Select the IP/IPX feature set. The next screen confirms the Platform, the IOS version, Release and the feature set you have chosen. It also lets you know the minimum recommended Flash memory and DRAM memory this version requires. Verify that the router you will be updating has enough memory to support this version. The following information is displayed:

NOTE:

The more features the more memory that version of the IOS usually takes.

NOTE:

Most 1600 series router have only 6MB of flash and 4MB RAM, most 2500 routers series have 8MB of flash and 8MB of RAM.

1601-1604 12.0.10 IP/IPX

Minimum Recommended Memory to download image - 6 MB Flash and 4 MB RAM

Click on the button: "I have read the above requirements and agree with them"

Start IOS image download Confirm the IOS image information displayed (see

below) and click on the File Name to start the download. Read the Software License Agreement and then click YES that you agree. Select the HTTP (or FTP) download site. Click the "Save to Disk" button and then select the local directory where you want the IOS image file to be downloaded.

Software Download

File name	Description	Size 'Bytes'	Date Published	More Info
c1600-ny-l.120-10.bin	IP/IPX	5151224	03/27/2000 05:46:22	?

Once the download is complete you can load the IOS image into the router using TFTP.

Step 7 - Verify connection between router and TFTP server.

From the router you are going to update, enter `ping xxx.xxx.xxx.xxx` (the IP address of the workstation running the TFTP server).

3. What was the result of the `ping` command?

Step 8 - Verify TFTP server file location.

Check the TFTP server root directory location since this is where the backup copy of the existing IOS and the new IOS image file should be stored. **Be sure to copy the new downloaded IOS image to this directory on the PC before starting the IOS update.** Click View/Options and note the location or browse and change the location to another directory.

4. What is the default location for the TFTP server root directory?

Step 9 - Backup the existing IOS software image.

Enter `copy flash tftp` at the router prompt

The router will ask for the IP address or hostname of the tftp host. Enter the IP address of the tftp server.

5. What was the IP address of the TFTP server?

6. What was the file that was written to the TFTP server?

7. How did the router respond when copying the file?

Step 10 - Verify the backup IOS file copied to the TFTP server.

Check the TFTP server using Windows Explorer, the DIR command or ls UNIX command for the file you just wrote.

8. What is the size of the file that was written in bytes?

Step 11 - Load the new downloaded IOS image from the TFTP server.

Enter `copy tftp flash` at the router prompt. The router will ask for the IP address or hostname of the tftp host. Enter the IP address of the tftp server. Enter the name of the new IOS image that was previously downloaded when prompted. You will also be prompted to erase flash before starting. This process will copy the new IOS software from a tftp host to router flash.

9. Write down some of the prompts and responses you saw on the router screen.

NOTE:

You can use HyperTerminal or Windows copy / paste to capture the copy process as it progresses.

Step 12 - Check the IOS version after update.

Use the `show version` command to check the IOS version

10. What version of the IOS is the router now running after the update?

Step 13 - Check the IOS image file and flash memory after the update.

Use the `show flash` command to obtain information about Flash memory and the IOS image.

11. Document the following information from the `show flash` command after the IOS update.

a. How much flash memory is used and available?

b. What is the file that is stored in flash memory?

c. What is the size in bytes of the flash memory?
