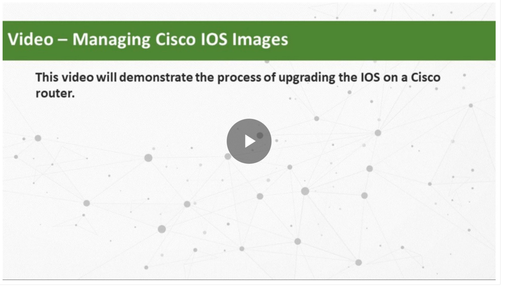
IOS Image Management

10.7.1

Video - Managing Cisco IOS Images

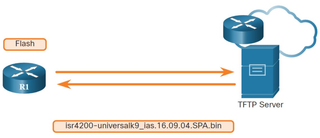
Click Play in the figure to view a demonstration of managing Cisco IOS images.



10.7.2

TFTP Servers as a Backup Location

In the previous topic you learned the ways to copy and paste a configuration. This topic takes that idea one step further with IOS software images. As a network grows, Cisco IOS Software images and configuration files can be stored on a central TFTP server, as shown in the figure. This helps to control the number of IOS images and the revisions to those IOS images, as well as the configuration files that must be maintained.



Production internetworks usually span wide areas and contain multiple routers. For any network, it is good practice to keep a backup copy of the Cisco IOS Software image in case the system image on the router becomes corrupted or accidentally erased.

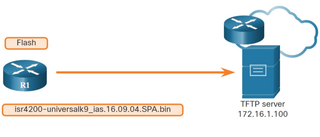
Widely distributed routers need a source or backup location for Cisco IOS Software images. Using a network TFTP server allows image and configuration uploads and downloads over the network. The network TFTP server can be another router, a workstation, or a host system.

10.7.3

Backup IOS Image to TFTP Server Example

To maintain network operations with minimum down time, it is necessary to have procedures in place for backing up Cisco IOS images. This allows the network administrator to quickly copy an image back to a router in case of a corrupted or erased image.

In the figure, the network administrator wants to create a backup of the current image file on the router (isr4200-universalk9_ias.16.09.04.SPA.bin) to the TFTP server at 172.16.1.100.



Click each button for the steps to create a backup of the Cisco IOS image to a TFTP server.

Step 1. Ping the TFTP server.

Step 2. Verify image size in flash.

Step 3. Copy the image to the TFTP server.

Step 1. Ping the TFTP server.

Ensure that there is access to the network TFTP server. Ping the TFTP server to test connectivity, as shown in the example.

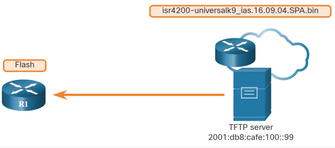
```
R1# ping 172.16.1.100
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.100, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5),
round-trip min/avg/max = 56/56/56 ms
```

10.7.4

Copy an IOS Image to a Device Example

Cisco consistently releases new Cisco IOS software versions to resolve caveats and provide new features. This example uses IPv6 for the transfer to show that TFTP can also be used across IPv6 networks.

The figure illustrates copying a Cisco IOS software image from a TFTP server. A new image file (isr4200-universalk9_ias.16.09.04.SPA.bin) will be copied from the TFTP server at 2001:DB8:CAFE:100::99 to the router.



Select a Cisco IOS image file that meets the requirements in terms of platform, features, and software. Download the file from cisco.com and transfer it to the TFTP server. Click each button for the steps to upgrade the IOS image on the Cisco router.

Step 1. Ping the TFTP server.

Step 2. Verify the amount of free flash.

Step 3. Copy the new IOS image to flash.

Step 1. Ping the TFTP server.

Ensure that there is access to the network TFTP server. Ping the TFTP server to test connectivity, as shown in the example.

```
R1# ping 2001:db8:cafe:100::99
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:CAFE:100::99,
timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5),
round-trip min/avg/max = 56/56/56 ms
```

10.7.5

The boot system Command

To upgrade to the copied IOS image after that image is saved on the flash memory of the router, configure the router to load the new image during bootup by using the **boot system** command, as shown in the example. Save the configuration. Reload the router to boot the router with new image. At the **[confirm]** prompt, press **Enter** to continue. Otherwise press **Control-C** to cancel.

```
R1# configure terminal
R1(config)# boot system flash0:isr4200-universalk9_ias.16.09.04.SPA.bin
R1(config)# exit
R1#
R1# copy running-config startup-config
R1#
R1# reload
Proceed with reload? [confirm]

*Mar  1 12:46:23.808: %SYS-5-RELOAD: Reload requested by console. Reload Reason: Reload Command.
```

During startup, the bootstrap code parses the startup configuration file in NVRAM for the **boot system** commands that specify the name and location of the Cisco IOS Software image to load. Several **boot system** commands can be entered in sequence to provide a fault-tolerant boot plan.

If there are no **boot system** commands in the configuration, the router defaults to loading the first valid Cisco IOS image in flash memory and runs it.

After the router has booted, to verify that the new image has loaded, use the **show version** command, as displayed in the example.

```
R1# show version
Cisco IOS XE Software, Version 16.09.04
Cisco IOS Software [Fuji], ISR Software (X86_64_LINUX_IOSD-UNIVERSALK9_IAS-M), Version 16.9.4, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2019 by Cisco Systems, Inc.
Compiled Thu 22-Aug-19 18:09 by mcpre
Cisco IOS-XE software, Copyright (c) 2005-2019 by cisco Systems, Inc.
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software code licensed under GPL Version 2.0 is free software that comes
with ABSOLUTELY NO WARRANTY.  You can redistribute and/or modify such
GPL code under the terms of GPL Version 2.0.  For more details, see the
documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.

ROM: IOS-XE ROMMON
Router uptime is 2 hours, 19 minutes
Uptime for this control processor is 2 hours, 22 minutes
System returned to ROM by PowerOn
System image file is "flash:isr4200-universalk9_ias.16.09.04.SPA.bin"
(output omitted)
```

10.7.6

Packet Tracer - Use a TFTP Server to Upgrade a Cisco IOS Image

A TFTP server can help manage the storage of IOS images and revisions to IOS images. For any network, it is good practice to keep a backup copy of the Cisco IOS Software image in case the system image in the router becomes corrupted or accidentally erased. A TFTP server can also be used to store new upgrades to the IOS and then deployed throughout the network where it is needed. In this activity, you will upgrade the IOS images on Cisco devices by using a TFTP server. You will also backup an IOS image with the use of a TFTP server.

Use a TFTP Server to Upgrade a Cisco IOS Image

Use a TFTP Server to Upgrade a Cisco IOS Image