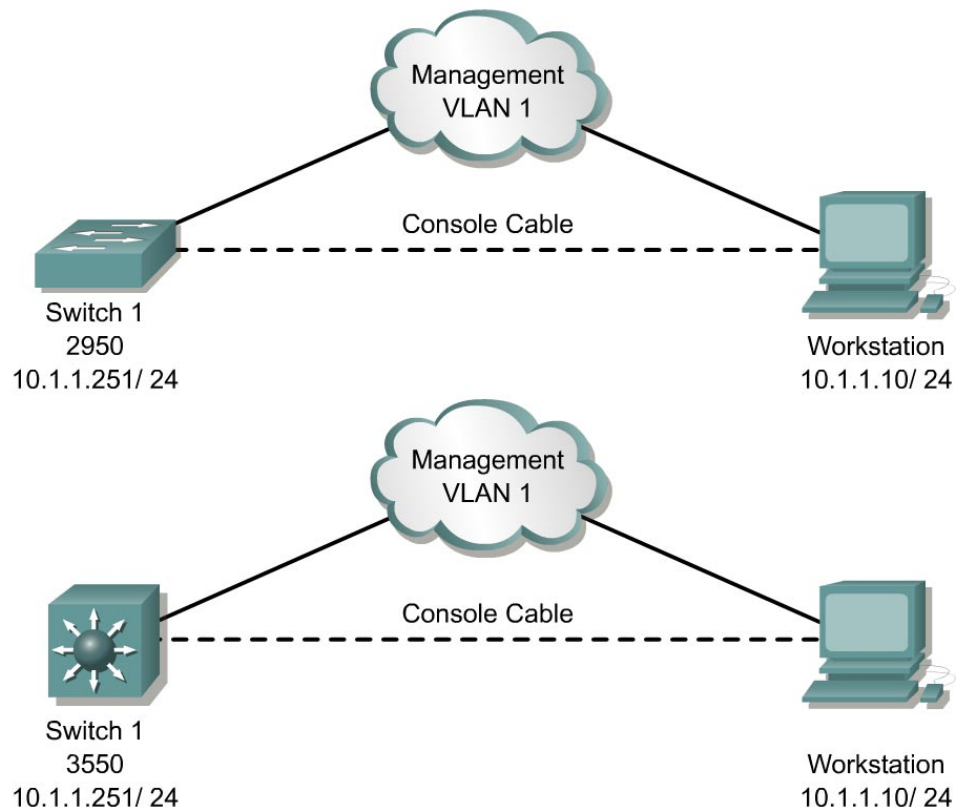


Lab 1.6.2 Catalyst 2950T and 3550 Configuration and IOS Files



Objective

Upload and download configuration files and the IOS System Image files.

Scenario

It is important to be familiar with the fundamental aspects of working with configuration files and the IOS file system for general housekeeping, maintenance, and backup purposes.

As was covered in the previous lab, both the 2950T and 3550 switches are standardized on IOS 12.1(11)EA1 with the Enhanced Multilayer image for the 3550 and the Enhanced image for the 2950T. The respective System Image file names are c3550-i5q312-mz.121-11.EA1.bin and c2950-i6q412-mz.121-11.EA1.bin.

Specifics will differ between certain aspects of the 2950T and 3550 series of switches. However, the basic process and procedure for uploading and downloading configuration files and software images are essentially the same. This is true regardless of the model.

Step 1

Select a 2950T or 3550 switch that was used in the previous lab. If necessary, power up the switch and use the standard process for establishing a HyperTerminal console connection from a workstation.

The configuration from the previous lab should already be in the switch. Issue a **show running-config** command to make sure that VLAN 1 has the appropriate IP address, which is 10.1.1.251, and that the interface is not shut down.

Make sure the workstation has been assigned the appropriate IP address, which is 10.1.1.10, and is connected to a switch port in VLAN 1. Validate connectivity with a **ping** from the workstation to the switch, which is 10.1.1.251, or from the switch to the workstation.

Step 2

Issue the **show file systems** command from the privileged mode to display the available file systems in the switch. The following output is a sample.

```
Switch1#show file systems
File Systems:

      Size(b)      Free(b)      Type  Flags  Prefixes
*   15998976      7104512      flash   rw    flash:
      -            -            opaque   ro    bs:
      -            -            opaque   rw    vb:
      15998976      7104512      unknown  rw    zflash:
      393216        391712       nvram    rw    nvram:
      -            -            opaque   rw    null:
      -            -            opaque   rw    system:
      -            -            network  rw    tftp:
      -            -            opaque   ro    xmodem:
      -            -            opaque   ro    ymodem:
      -            -            network  rw    rcp:
      -            -            network  rw    ftp:
```

Additional information about file systems may be obtained from www.cisco.com/univercd/cc/td/doc/product/lan/c3550/1214ea1/3550scg/swiosfs.pdf.

The various switch files should be saved externally to the switch to protect against the internal files becoming corrupt or other factors that would require the files to be restored. The switch files that should be saved are the System Image files, which is the IOS that resides in Flash memory and the startup configuration file that resides in the NVRAM section of Flash memory. The running or operating configuration resides in DRAM and does not need to be the same as the startup configuration. Temporary changes may be made to the running configuration and an external copy should be retained.

Step 3

There are several ways to retain an external copy of the running and startup configurations. A text file can be generated through the HyperTerminal capture process or the output from a **show running-config** or **show startup-config** command can be copied and pasted into a text editing program such as Notepad or a word processing program. Other ways to retain a binary version of a configuration file include Trivial File Transfer Protocol (TFTP), File Transfer Protocol (FTP), and Remote Copy Protocol (RCP).

The method used to copy configuration files from the switch depends on the type of server being used. The FTP and RCP mechanisms provide faster and more reliable delivery because they are built on and use the TCP/IP stack, which is connection-oriented. This lab will use the TFTP process, which is a very simple FTP that is implemented in UDP.

If necessary, download, install, and start TFTP server software and designate the directory to which the switch configuration file will be saved on the workstation or TFTP file server.

Note: The Cisco TFTP Server Software may be downloaded from www.tucows.com or www.downloads.com. The workstation being used to console into the switch does not need to be the TFTP server to which files will be saved. Another workstation acting as the TFTP file server or running the TFTP server software may be used to store and retrieve files. For the purposes of this lab, one workstation is being used as a console connection for working with both the switch and the TFTP file server.

Step 4

Copying a switch file to an external file server is called uploading, and copying a file from an external file server to the switch is called downloading. The basic command format for both of these is the same. The format is copy from source to destination. The source and destination determine if the copy is an upload, a download, or between internal files.

Issue a `copy ?` command from the privileged mode. The following output is a sample.

```
Switch1#copy ?
bs:          Copy from bs: file system
flash:       Copy from flash: file system
ftp:         Copy from ftp: file system
null:        Copy from null: file system
nvram:       Copy from nvram: file system
rcp:         Copy from rcp: file system
running-config Copy from current system configuration
startup-config Copy from startup configuration
system:      Copy from system: file system
tftp:        Copy from tftp: file system
vb:          Copy from vb: file system
xmodem:      Copy from xmodem: file system
ymodem:      Copy from ymodem: file system
zflash:      Copy from zflash: file system
```

Although the descriptions all say Copy from, this does not indicate if the copy direction is an upload or a download. The source and destination will ultimately determine the direction and the basic format is to copy from the source to the destination.

Issue a `copy startup-config ?` command from the privileged mode. A sample output follows.

```
Switch1#copy startup-config ?
bs:          Copy to bs: file system
flash:       Copy to flash: file system
ftp:         Copy to ftp: file system
null:        Copy to null: file system
nvram:       Copy to nvram: file system
rcp:         Copy to rcp: file system
running-config Update (merge with) current system configuration
startup-config Copy to startup configuration
system:      Copy to system: file system
tftp:        Copy to tftp: file system
xmodem:      Copy to xmodem: file system
ymodem:      Copy to ymodem: file system
zflash:      Copy to zflash: file system
```

The second part of the command is represented by a question mark (?), which designates the destination.

The command `copy startup-config tftp` will copy the startup configuration from the switch to the TFTP file server, which is an upload. The command `copy tftp startup-config` will copy a startup configuration from the TFTP file server to the switch, which is a download.

Step 5

Different command formats can be used to copy the running and startup configurations. TFTP can be used for this process. One command format includes all parameters while the other will prompt for additional information. The full command syntaxes for copying the running and startup configurations to a TFTP file server are as follows.

```
copy system:running-config tftp:[[/location]/directory]/filename]
copy nvram:startup-config tftp:[[/location]/directory]/filename]
```

If all the optional parameters in the commands are entered, a prompt will confirm the copy operation.

```
Switch1#copy nvram:startup-config tftp://10.1.1.10/Switch1-switch-confg
Write file Switch1-switch-confg on host      10.1.1.10? [confirm]
!!!!
664 bytes copied in 3.264 secs (221 bytes/sec)
```

The exclamation points (!) indicate the file is being copied.

If using an abbreviated version of the copy command, prompts for the location and filename will also appear.

```
Switch1#copy startup-config tftp
Address or name of remote host []? 10.1.1.10
Destination filename [Switch1-switch-confg]?
!!!!
664 bytes copied in 3.264 secs (221 bytes/sec)
```

Some coordination may be necessary between the settings of the TFTP server software and where to save the uploaded configuration file. Regardless of the command used to copy a configuration file to a TFTP file server, the default directory should be designated in the TFTP file server with the TFTP server software, which is described in Step 3.

Copy or upload the startup configuration of the switch to the TFTP file server using either of the following commands.

```
Switch1#copy nvram:startup-config tftp:[[/location]/directory]/filename]
Switch1#copy startup-config tftp
```

Step 6

Download the configuration file from the TFTP file server to the startup configuration of the switch and change the filename in the commands as needed. Use either of the following commands.

```
Switch1#copy tftp:Switch1-switch-confg nvram:startup-config
Address or name of remote host []? 10.1.1.10
Source filename [Switch1-switch-confg]?
Destination filename [startup-config]?
Accessing tftp://10.1.1.10/Switch1-switch-confg...
Loading Switch1-switch-confg from 10.1.1.10 (via Vlan1): !
[OK - 664/1024 bytes]
[OK]
1682 bytes copied in 20.632 secs (84 bytes/sec)
Switch1#
01:42:30: %SYS-5-CONFIG_I: Configured from tftp://10.1.1.10/switch1-switch-
confg by console

Switch1#copy tftp startup-config
```

```

Address or name of remote host []? 10.1.1.10
Source filename []? Switch1-switch-config
Destination filename [startup-config]?
Accessing tftp://10.1.1.10/Switch1-switch-config...
Loading Switch1-switch-config from 10.1.1.10 (via Vlan1): !
[OK - 664/1024 bytes]
[OK]
1682 bytes copied in 20.632 secs (84 bytes/sec)
Switch1#
01:42:30: %SYS-5-CONFIG_I: Configured from tftp://10.1.1.10/switch1-switch-
config by console

```

The startup configuration can be copied to the running configuration internally or from an external source. Certain commands in the running configuration will be replaced while other commands may be added. This will result in a mixture of configurations. Copying to the running configuration should be thought of as a merge of files rather than a replacement of the configuration. Copying to a running configuration is generally not recommended. Copying to a startup configuration will always result in the replacement or overwriting of any existing configuration.

Step 7

The IOS image file may be uploaded for backup purposes, downloaded to replace the current image, or added with the current image kept in Flash if there is sufficient memory. If there is more than one image file in Flash, it is possible to designate that should be used in the boot process with the following configuration command:

```
boot system [directory/filename]
```

Just as with the configuration files, uploading and downloading the IOS image file may be done with TFTP, FTP, or RCP, and the process is very similar.

To see the version and filename of the IOS image currently running, the privileged mode commands **show version** or **dir** can be used. Sample outputs for the 2950T-24-EI and 3550-24-EMI switches are shown.

Note: The **dir** command is an abbreviated version of **dir flash:** or **dir flash:/** and will display the names of files in the root Flash directory and the names of any subdirectories. The IOS image file in a new 3550 switch may be located in a Flash subdirectory with the same name as the image file. If so, the output of the **show version** and **dir** commands will differ slightly from the 3550-24 EMI switch outputs that were generated with the IOS image file in the root Flash directory. If the IOS image file is in a subdirectory, the output of the **show version** command will show the Flash subdirectory name followed by the name of the IOS image file, which is flash:directory name/IOS image file name. The output of the **dir** command will show the name of the Flash subdirectory that the IOS image file is in instead of the IOS image file name.

The following sample output is for a 2950T-24-EI Switch.

```

Switch1#show version
Cisco Internetwork Operating System Software
IOS (tm) C2950 Software (C2950-I6Q4L2-M), Version 12.1(11)EA1, RELEASE
SOFTWARE(fc1)
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Wed 28-Aug-02 10:25 by antonino
Image text-base: 0x80010000, data-base: 0x80528000

ROM: Bootstrap program is CALHOUN boot loader

Switch1 uptime is 33 minutes
System returned to ROM by power-on
System image file is "flash:/c2950-i6q4l2-mz.121-11.EA1.bin"

```

cisco WS-C2950T-24 (RC32300) processor (revision G0) with 20402K bytes of memory.

Processor board ID FHK0652W0J6

Last reset from system-reset

Running Enhanced Image

24 FastEthernet/IEEE 802.3 interface(s)

2 Gigabit Ethernet/IEEE 802.3 interface(s)

32K bytes of flash-simulated non-volatile configuration memory.

Base ethernet MAC Address: 00:0B:BE:C6:B7:80

Motherboard assembly number: 73-6114-08

Power supply part number: 34-0965-01

Motherboard serial number: FOC065201SN

Power supply serial number: PHI064709UP

Model revision number: G0

Motherboard revision number: A0

Model number: WS-C2950T-24

System serial number: FHK0652W0J6

Configuration register is 0xF

Switch#**dir**

Directory of flash:/

2	-rwx	2664051	Mar 01 1993 00:03:18	c2950-i6q4l2-mz.121-11.EA1.bin
3	-rwx	270	Jan 01 1970 00:01:46	env_vars
4	-rwx	1641	Mar 01 1993 00:12:24	config.text
5	-rwx	5	Mar 01 1993 00:12:24	private-config.text
7	drwx	704	Mar 01 1993 00:03:54	html
19	-rwx	109	Mar 01 1993 00:03:55	info
20	-rwx	109	Mar 01 1993 00:03:55	info.ver

7741440 bytes total (3777024 bytes free)

The following sample output is for a 3550-24-EMI Switch.

Switch1#**show version**

Cisco Internetwork Operating System Software

IOS (tm) C3550 Software (C3550-I5Q3L2-M), Version 12.1(11)EA1, RELEASE

SOFTWARE(fc1)

Copyright (c) 1986-2002 by cisco Systems, Inc.

Compiled Wed 28-Aug-02 10:03 by antonino

Image text-base: 0x00003000, data-base: 0x0071D658

ROM: Bootstrap program is C3550 boot loader

Switch1 uptime is 36 minutes

System returned to ROM by power-on

System image file is "flash:c3550-i5q3l2-mz.121-11.EA1.bin"

cisco WS-C3550-24 (PowerPC) processor (revision G0) with 65526K/8192K bytes of memory.

Processor board ID CHK0650V0SY

Last reset from warm-reset

Bridging software.

Running Layer2/3 Switching Image

Ethernet-controller 1 has 12 Fast Ethernet/IEEE 802.3 interfaces

Ethernet-controller 2 has 12 Fast Ethernet/IEEE 802.3 interfaces

Ethernet-controller 3 has 1 Gigabit Ethernet/IEEE 802.3 interface

Ethernet-controller 4 has 1 Gigabit Ethernet/IEEE 802.3 interface

```

24 FastEthernet/IEEE 802.3 interface(s)
2 Gigabit Ethernet/IEEE 802.3 interface(s)

The password-recovery mechanism is enabled.
384K bytes of flash-simulated non-volatile configuration memory.
Base ethernet MAC Address: 00:0B:BE:4F:BC:00
Motherboard assembly number: 73-5700-09
Power supply part number: 34-0966-02
Motherboard serial number: CAT06490ERT
Power supply serial number: DCA06471TBA
Model revision number: G0
Motherboard revision number: A0
Model number: WS-C3550-24-EMI
System serial number: CHK0650V0SY
Configuration register is 0x10F

Switch#dir
Directory of flash:/

2  -rwx          273   Jan 01 1970  00:01:21  system_env_vars
3  -rwx           5   Mar 12 1993  21:42:57  private-config.text
4  -rwx           0   Jan 01 1970  00:01:21  env_vars
5  -rwx       3703698  Mar 01 1993  22:53:42  c3550-i5q3l2-mz.121-11.EA1.bin
8  -rwx       1504   Mar 12 1993  21:42:57  config.text

15998976 bytes total (7104512 bytes free)

```

Step 8

To view the System Image filename and other Flash files that could be copied from the root directory, issue the **copy flash:?** command.

```

Switch1#copy flash:?
flash:c2950-i6q4l2-mz.121-11.EA1.bin          flash:config.text
flash:env_vars                                flash:html      flash:info
flash:info.ver                                flash:private-config.text

Switch1#copy flash:?
flash:c3550-i5q3l2-mz.121-11.EA1.bin          flash:config.text
flash:env_vars                                flash:private-config.text  flash:system_env_vars

```

Note that there are several files in Flash memory. Refer to www.cisco.com/univercd/cc/td/doc/product/lan/c3550/1214ea1/3550scg/swiosfs.pdf or other sources for more information about the various files.

Copy or upload the IOS image from Flash to the TFTP file server and use the appropriate filename for the 2950T or the 3550 switch. Just as with copying configuration files, the filename parameter may be included with the initial copy command or in response to prompts. Remember to include the subdirectory name if the IOS image is not in the root directory.

```

Switch1#copy flash:c2950-i6q4l2-mz.121-11.EA1.bin tftp
Address or name of remote host []?10.1.1.10
Destination filename [c2950-i6q4l2-mz.121-6.EA2c.bin]?
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
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!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
2253443 bytes copied in 25.616 secs (90137 bytes/sec)

```

```
Switch#copy flash tftp
Source filename []? c2950-i6q4l2-mz.121-11.EA1.bin
Address or name of remote host []? 10.1.1.10
Destination filename [c2950-i6q4l2-mz.121-11.EA1.bin]?
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
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!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
2253443 bytes copied in 28.444 secs (80480 bytes/sec)
```

The exclamation points (!) indicate the file is being copied.

Step 9

Copy or download the IOS image file from the TFTP file server to Flash and use the appropriate filename for the 2950T or 3550 switch. This will download the file that was just uploaded. A message will indicate that the file already exists. Confirm to overwrite since this will restore the same file for practice.

```
Switch1#copy tftp flash:c2950-i6q4l2-mz.121-11.EA1.bin
Address or name of remote host []? 10.1.1.10
Source filename []? c2950-i6q4l2-mz.121-11.EA1.bin
Destination filename [c2950-i6q4l2-mz.121-11.EA1.bin]?
%Warning:There is a file already existing with this name
Do you want to over write? [confirm]
Accessing tftp://10.1.1.10/ c2950-i6q4l2-mz.121-11.EA1.bin...
Loading c2950-i6q4l2-mz.121-11.EA1.bin from 10.1.1.10 (via Vlan1): !!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
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!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 2253443/4506624 bytes]

2253443 bytes copied in 61.504 secs (36941 bytes/sec)

Switch1#copy tftp flash
Address or name of remote host []? 10.1.1.10
Source filename [c2950-i6q4l2-mz.121-11.EA1.bin]?
Destination filename [c2950-i6q4l2-mz.121-11.EA1.bin]?
%Warning:There is a file already existing with this name
Do you want to over write? [confirm]
Accessing tftp://10.1.1.10/c2950-i6q4l2-mz.121-11.EA1.bin...
Loading c2950-i6q4l2-mz.121-11.EA1.bin from 10.1.1.10 (via Vlan1):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
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!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 2253443/4506624 bytes]

2253443 bytes copied in 72.48 secs (31297 bytes/sec)
```

This will successfully complete the procedure for uploading and downloading the switch startup configuration and IOS System Image files.

Reflection

Why should a copy of the switch startup configuration and IOS System Image files be saved?
