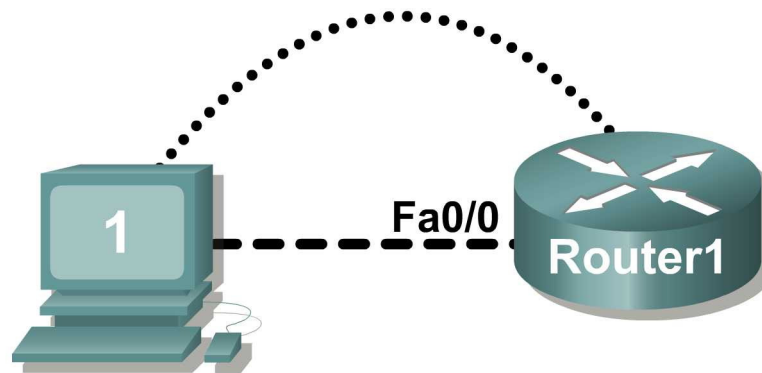


## Lab 11.5.2: Managing Device Configuration

### Topology Diagram



**Straight-through cable**



**Serial cable**



**Console (Rollover)**



**Crossover cable**



### Learning Objectives

- Configure network connectivity.
- Use TFTP to save and restore a Cisco IOS configuration.

### Background

Hardware	Qty	Description
Cisco Router	1	Part of CCNA Lab bundle.
Computer (host)	1	Lab computer.
Console (rollover) cable	1	Connects computer host 1 to Router console port.
Crossover cable	1	Connects host1 NIC to Router1 Fa0/1

Table 1. Equipment and hardware required for this lab.

Gather the necessary equipment and cables. To configure the lab, make sure the equipment listed in Table 1 is available.

The host computer will be used as a TFTP server. This lab requires the use of SolarWinds TFTP server software. SolarWinds is a free TFTP application for Windows.

## Scenario

In this lab, students will configure common settings on a Cisco Router, save the configuration to a TFTP server, then restore the configuration from a TFTP server.

Given an IP address of 10.250.250.0/24, and 6 bits used for subnets. Use the LAST valid subnet. Host1 should use the FIRST valid host address, and Router1 should use the LAST valid host address:

IP Address: 10.250.250.0		Subnet mask:	
Subnet	First host address	Last host address	Broadcast

## Task 1: Configure Network Connectivity.

### Step 1: Physically connect devices.

Refer to the Topology Diagram. Connect the console, or rollover, cable to the console port on the router and the other cable end to the host computer with a DB-9 or DB-25 adapter to the COM 1 port. Ensure power has been applied to both the host computer and router.

### Step 2: Logically connect devices.

Using the IP address information from the scenario, configure the host1 computer.

### Step 3: Connect host computer to router through HyperTerminal.

From the Windows taskbar, start the HyperTerminal program by clicking on Start | Programs | Accessories | Communications | Hyper Terminal.

When the HyperTerminal session window opens, press the **Enter** key until there is a response from the router.

### Step 4: Configure Router1.

Configure Router1. Configuration tasks for Router1 include the following:

Task- refer to Appendix 1 for help with commands
Specify Router name- Router1
Specify an encrypted privileged exec password- cisco
Specify a console access password- class
Specify a telnet access password- class
Configure the MOTD banner.
Configure Router1 interface Fa0/0- set the description set the Layer 3 address issue no shutdown

NOTE \*\*DO NOT SAVE THE CONFIGURATION IN NVRAM.

### Step 5: Verify connectivity.

Verify connectivity between host1 and Router1:

```
Router1# ping 10.250.250.249
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.250.250.249, timeout is 2 seconds:

..!!!!

Success rate is 80 percent (4/5), round-trip min/avg/max = 1/1/1 ms

```
Router1#
```

## Task 2: Use TFTP to Save and Restore a Cisco IOS Configuration.

### Step 1: Install SolarWinds TFTP application.

Double click on the SolarWinds TFTP application to begin installation. Select Next. Agree to the license agreement, and accept default settings. After SolarWinds has finished installation, click on Finish.

### Step 2: Start TFTP server.

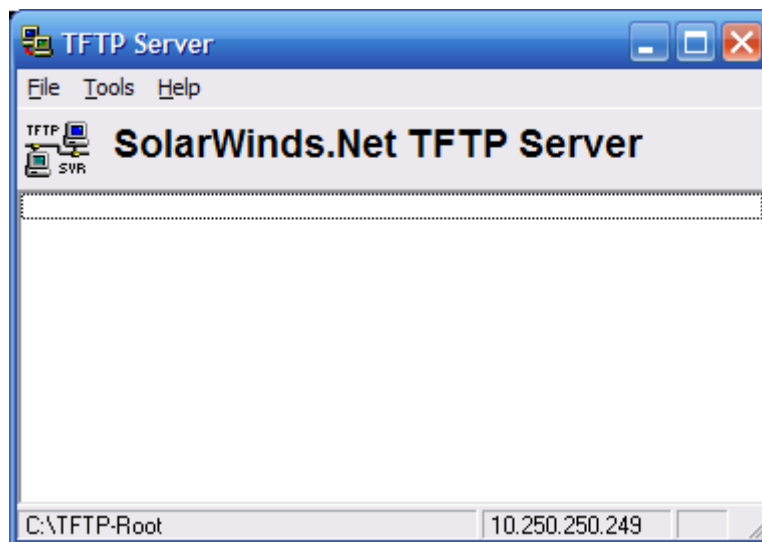


Figure 2. TFTP Server window.

Start the TFTP server by selecting Start | Programs | SolarWinds Free Tools | TFTP Server. Figure 2 shows an active TFTP Server window.

### Step 3: Configure the TFTP server.

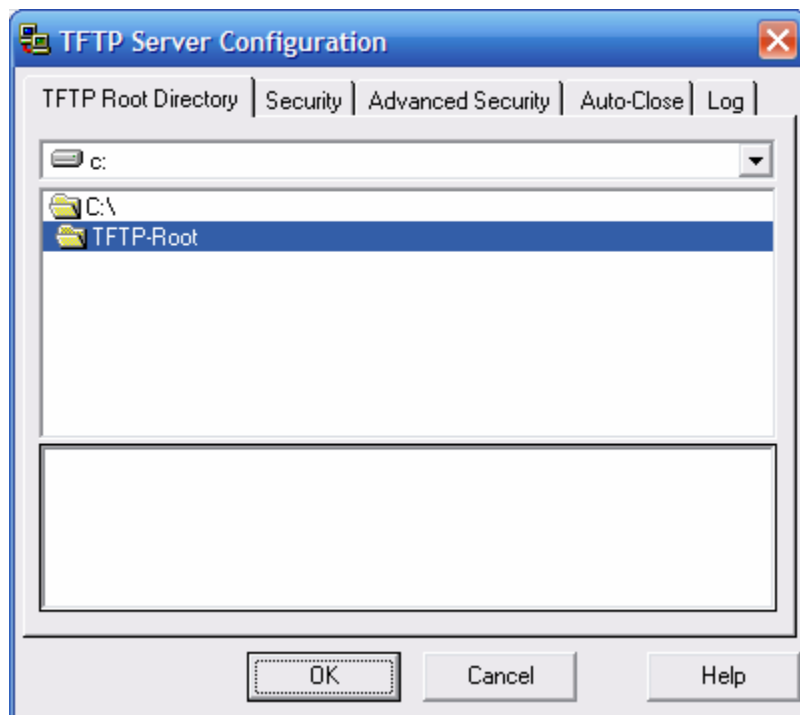


Figure 3. TFTP Server window.

To configure TFTP server, select menu option File | configure. Refer to Figure 3. Verify the following settings:

Setting	Value
TFTP Root Directory:	TFTP-Root
Security	Transmit and Receive Files
Advanced Security	10.250.250.250 To 10.250.250.250
Auto-Close	Never
Log	Enable Log Requests to the Following File. Leave the default file.

When finished, select OK.

### Step 4. Save Router1 configuration to TFTP server.

From HyperTerminal, begin a TFTP upload to the TFTP server:

```
Router1#copy running-config tftp:
Address or name of remote host []? 10.250.250.249
Destination filename [router1-config]? <ENTER>
!!
1081 bytes copied in 2.008 secs (538 bytes/sec)
Router1#
```

Verify a successful upload transfer. Open Log file c:\Program Files\SolarWinds\Free Tools\TFTP-Server.txt. Contents should be similar to the following:

```
3/25/2007 12:29 :Receiving router1-config from (10.250.250.250)
3/25/2007 12:29 :Received router1-config from (10.250.250.250), 1081 bytes
```

Verify the transferred file. Use Microsoft Word or Wordpad to examine the contents of file c:\TFTP-Root\router1-config. Contents should be similar to the following configuration:

```
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router1
!
boot-start-marker
boot-end-marker
!
enable secret 5 $1$D02B$AuX05n0HPT239yYRoQ0oE.
!
no aaa new-model
ip cef
!
interface FastEthernet0/0
description connection to host1
ip address 10.250.250.250 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet0/1
no ip address
shutdown
duplex auto
speed auto
!
interface Serial0/1/0
no ip address
shutdown
no fair-queue
!
interface Serial0/1/1
no ip address
shutdown
clock rate 2000000
!
ip http server
no ip http secure-server
!
control-plane
!
banner motd
*** ABC COMPANY NETWORK DEVICE ****
*** Authorized access only *****
```

```
*** Logging is enabled ****
!
line con 0
  password class
  login
line aux 0
line vty 0 4
  password class
  login
!
scheduler allocate 20000 1000
End
```

### Step 5: Restore Router1 configuration from TFTP server.

Verify that NVRAM is clear, then reboot Router1:

```
Router1# show startup-config
startup-config is not present
Router1# reload
Proceed with reload? [confirm] <ENTER>
```

Connectivity must be established with the TFTP server. Router1 fa0/0 must be configured with an IP address, and the interface enabled:

```
Router> enable
Router# conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface fa0/0
Router(config-if)# ip address 10.250.250.250 255.255.255.252
Router(config-if)# no shutdown
Router(config-if)# exit
```

```
*Mar 25 16:43:03.095: %SYS-5-CONFIG_I: Configured from console by console
*Mar 25 16:43:04.967: %LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up
```

Configure the hostname of the router to TEST

```
Router(config-if)#exit
Router(config)#hostname TEST
Router(config-if)#end
TEST#
```

Verify connectivity with the ping command:

```
Router# ping 10.250.250.249
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.250.250.249, timeout is 2 seconds:
.!!!!
Success rate is 80 percent(4/5), round-trip min/avg/max = 1/1/1ms
Router#
```

Download Router1 configuration file from the TFTP server:

```
Router# copy tftp startup-config
Address or name of remote host []? 10.250.250.249
Source filename []? router1-config
Destination filename [startup-config]? <ENTER>
Accessing tftp://10.250.250.249/router1-config...
Loading router1-config from 10.250.250.249 (via FastEthernet0/0): !
[OK - 1081 bytes]

1081 bytes copied in 9.364 secs (115 bytes/sec)
Router1#
*Mar 25 16:55:26.375: %SYS-5-CONFIG_I: Configured from
tftp://10.250.250.249/router1-config by console
Router1#
```

View the configuration in NVRAM to verify an accurate transfer. The configuration should be the same as what was configured in Task 1, Step 4.

Reload the router select no at the prompt that says "Configuration has been modified".  
The previous the configuration should be restored and the router's hostname should now be Router1.

### Task 3: Reflection

TFTP is a fast, efficient way to save and load Cisco IOS configuration files.

### Task 4: Challenge

Similar to uploading a configuration file, the IOS can also be stored off-line for future use. To discover the IOS filename, issue the Cisco IOS command **show version**. The filename is highlighted, below:

```
Router1# show version
Cisco IOS Software, 1841 Software (C1841-ADVIPSERVICESK9-M), Version
12.4(10b),
RELEASE SOFTWARE (fc3)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Fri 19-Jan-07 15:15 by prod_rel_team

ROM: System Bootstrap, Version 12.4(13r)T, RELEASE SOFTWARE (fc1)

Router1 uptime is 17 minutes
System returned to ROM by reload at 16:47:54 UTC Sun Mar 25 2007
System image file is "flash:c1841-advipservicesk9-mz.124-10b.bin"
```

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:

<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to [export@cisco.com](mailto:export@cisco.com).

Cisco 1841 (revision 6.0) with 174080K/22528K bytes of memory.  
Processor board ID FHK110918KJ  
2 Serial(sync/async) interfaces  
DRAM configuration is 64 bits wide with parity disabled.  
191K bytes of NVRAM.  
62720K bytes of ATA CompactFlash (Read/Write)

Configuration register is 0x2102

Router1#

The commands to upload the IOS are similar to uploading the configuration file:

```
Router1# copy flash tftp
Source filename []? c1841-advipservicesk9-mz.124-10b.bin
Address or name of remote host []? 10.250.250.249
Destination filename [c1841-advipservicesk9-mz.124-10b.bin]?
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!
22063220 bytes copied in 59.564 secs (370412 bytes/sec)
Router1#
```

## Task 5: Cleanup

Before turning off power to the router, remove the NVRAM configuration file if it was loaded. Use the privileged exec command **erase startup-config**.

Remove SolarWinds TFTP server from the host computer. Select Start | Control Panel. Open Add or Remove Applications. Select SolarWinds, then Remove. Accept defaults.

Delete any configuration files saved on the host computers.

Unless directed otherwise by the instructor, restore host computer network connectivity, then turn off power to the host computers. Remove anything that was brought into the lab, and leave the room ready for the next class.



## Appendix 1

Purpose	Command
Enter the global configuration mode.	<b>configure terminal</b> Example: Router> <b>enable</b> Router# <b>configure terminal</b> Router(config)#
Specify the name for the router.	<b>hostname name</b> Example: Router(config)# <b>hostname Router1</b> Router(config)#
Specify an encrypted password to prevent unauthorized access to the privileged exec mode.	<b>enable secret password</b> Example: Router(config)# <b>enable secret cisco</b> Router(config)#
Specify a password to prevent unauthorized access to the console.	<b>password password</b> <b>login</b> Example: Router(config)# <b>line con 0</b> Router(config-line)# <b>password class</b> Router(config-line)# <b>login</b> Router(config)#
Specify a password to prevent unauthorized telnet access. Router vty lines: 0 4 Switch vty lines: 0 15	<b>password password</b> <b>login</b> Example: Router(config)# <b>line vty 0 4</b> Router(config-line)# <b>password class</b> Router(config-line)# <b>login</b> Router(config-line)#
Configure the MOTD banner.	<b>Banner motd %</b> Example: Router(config)# <b>banner motd %</b> Router(config)#
Configure an interface. Router- interface is OFF by default Switch- interface is ON by default	Example: Router(config)# <b>interface fa0/0</b> Router(config-if)# <b>description description</b> Router(config-if)# <b>ip address address mask</b> Router(config-if)# <b>no shutdown</b> Router(config-if)#
Save the configuration to NVRAM.	<b>copy running-config startup-config</b> Example: Router# <b>copy running-config startup-config</b> Router#