CHAPTER 3

Assigning the Switch IP Address and Default Gateway

This chapter describes how to create the initial switch configuration (for example, assigning the IP address and default gateway information) for the Catalyst 3560 switch by using a variety of automatic and manual methods. It also describes how to modify the switch startup configuration.

Note For complete syntax and usage information for the commands used in this chapter, see the command reference for this release and the *Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services* **Documentation > Cisco IOS Software 12.2 Mainline Command References**

This chapter consists of these sections:

Information in this chapter about configuring IP addresses and DHCP is specific to IP Version 4 (IPv4). If you plan to enable IP Version 6 (IPv6) forwarding on your switch, see Chapter 37, "Configuring IPv6 Unicast Routing" for information specific to IPv6 address format and configuration. To enable IPv6, the switch must be running the IP services image.

Understanding the Boot Process

Getting Started Guide

- Performs low-level CPU initialization. It initializes the CPU registers, which control where physical memory is mapped, its quantity, its speed, and so forth.

  Performs power-on self-test (POST) for the CPU subsystem. It tests the CPU DRAM and the portion of the flash device that makes up the flash file system.

  Loads a default operating system software image into memory and boots up the switch.

The boot loader provides access to the flash file system before the operating system is loaded. Normally, the boot loader is used only to load, uncompress, and launch the operating system. After the boot loader gives the operating system control of the CPU, the boot loader is not active until the next system reset or power-on.

The boot loader also provides trap-door access into the system if the operating system has problems serious enough that it cannot be used. The trap-door mechanism provides enough access to the system so that if it is necessary, you can format the flash file system, reinstall the operating system software image by using the Xmodem Protocol, recover from a lost or forgotten password, and finally restart the operating system. For more information, see the "Recovering from a Software Failure" section on page 47-2 and the "Recovering from a Lost or Forgotten Password" section on page 47-3.

You can disable password recovery. For more information, see the "Disabling Password Recovery" section on page 9-5.

Before you can assign switch information, make sure you have connected a PC or terminal to the console port, and configured the PC or terminal-emulation software baud rate and character format to match these of the switch console port:

Baud rate default is 9600.

Data bits default is 8.

If the data bits option is set to 8, set the parity option to none.

Stop bits default is 1.

Parity settings default is none.

Assigning Switch Information

Use the switch setup program if you want to be prompted for specific IP information. With this program, you can also configure a hostname and an enable secret password. It gives you the option of assigning a Telnet password (to provide security during remote management) and configuring your switch as a command or member switch of a cluster or as a standalone switch. For more information about the setup program, see the hardware installation guide.

Use a DHCP server for centralized control and automatic assignment of IP information after the server is configured.

Note

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Default Switch Information

Table 3-1 Default Switch Information

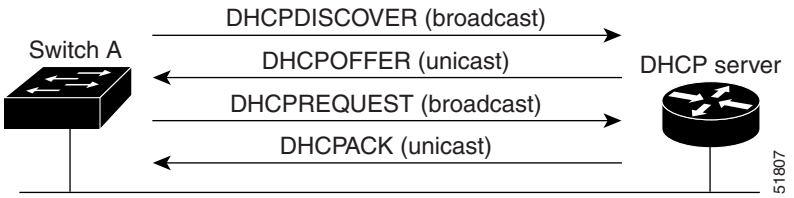
Feature	Default Setting
Enable secret password	No password is defined.
Hostname	The factory-assigned default hostname is *Switch*

Understanding DHCP-Based Autoconfiguration

DHCP Client Request Process

ip address dhcp

Figure 3-1 DHCP Client and Server Message Exchange



In a DHCPREQUEST broadcast message, the client returns a formal request for the offered configuration information to the DHCP server. The formal request is broadcast so that all other DHCP servers that received the DHCPDISCOVER broadcast message from the client can reclaim the IP addresses that they offered to the client.

The DHCP server confirms that the IP address has been allocated to the client by returning a DHCPACK unicast message to the client. With this message, the client and server are bound, and the client uses configuration information received from the server. The amount of information the switch receives depends on how you configure the DHCP server. For more information, see the "Configuring the TFTP Server" section on page 3-7.

If the configuration parameters sent to the client in the DHCPOFFER unicast message are invalid (a configuration error exists), the client returns a DHCPDECLINE broadcast message to the DHCP server.

The DHCP server sends the client a DHCPNAK denial broadcast message, which means that the offered configuration parameters have not been assigned, that an error has occurred during the negotiation of the parameters, or that the client has been slow in responding to the DHCPOFFER message. (The DHCP server assigned the parameters to another client.)

A DHCP client might receive offers from multiple DHCP or BOOTP servers and can accept any of the offers; however, the client usually accepts the first offer it receives. The offer from the DHCP server is not a guarantee that the IP address is allocated to the. However, the server usually reserves the address until the client has had a chance to formally request the address. If the switch accepts replies from a BOOTP server and configures itself, the switch broadcasts, instead of unicasts, TFTP requests to obtain the switch configuration file.

Understanding DHCP-based Autoconfiguration and Image Update

DHCP Autoconfiguration

DHCP Auto-Image Update

Note

Cisco IOS IP Configuration Guide, Release 12.2

Limitations and Restrictions

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Note

write memory

copy running-configuration startup-configuration

If your DHCP server is a Cisco device, for additional information about configuring DHCP, see the "Configuring DHCP" section of the "IP Addressing and Services" section of the
from the Cisco.com page under **Documentation > Cisco IOS Software > 12.2 Mainline > Configuration Guides**

DHCP Server Configuration Guidelines

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Configuring the TFTP Server

switch's current hostname. The TFTP server addresses used include the specified TFTP server address (if any) and the broadcast address (255.255.255.255).

For the switch to successfully download a configuration file, the TFTP server must contain one or more configuration files in its base directory. The files can include these files:

- The configuration file named in the DHCP reply (the actual switch configuration file).
- The network-confg or the cisconet.cfg file (known as the default configuration files).
- The router-confg or the ciscortr.cfg file (These files contain commands common to all switches. Normally, if the DHCP and TFTP servers are properly configured, these files are not accessed.)

If you specify the TFTP server name in the DHCP server-lease database, you must also configure the TFTP server name-to-IP-address mapping in the DNS-server database.

If the TFTP server to be used is on a different LAN from the switch, or if it is to be accessed by the switch through the broadcast address (which occurs if the DHCP server response does not contain all the required information described previously), a relay must be configured to forward the TFTP packets to the TFTP server. For more information, see the "Configuring the Relay Device" section on page 3-8. The preferred solution is to configure the DHCP server with all the required information.

Configuring the DNS

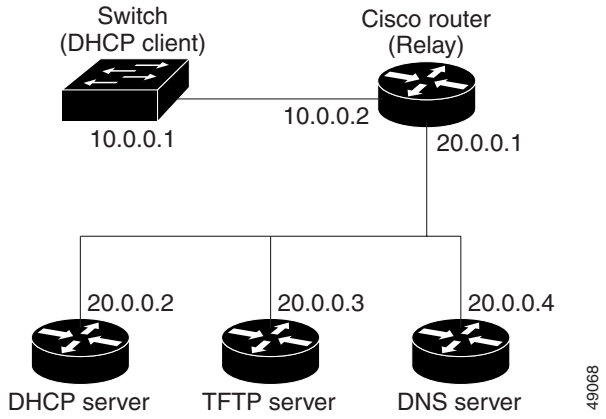
Configuring the Relay Device

relay agent

```
router(config-if)# ip helper-address 20.0.0.2
                   ip helper-address 20.0.0.3
                   ip helper-address 20.0.0.4


                   ip helper-address 10.0.0.1
```

Figure 3-2 Relay Device Used in Autoconfiguration



Obtaining Configuration Files

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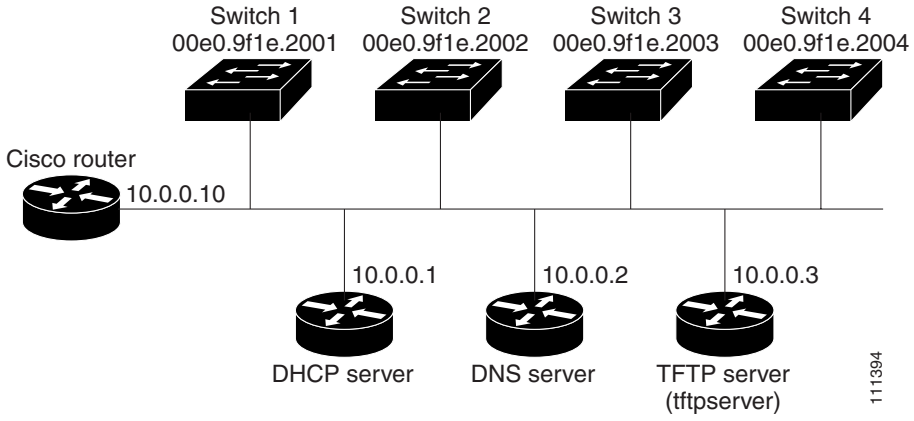
Example Configuration

shows a sample network for retrieving IP information by using DHCP-based autoconfiguration.

DHCP-Based Autoconfiguration Network Example



	Switch A	Switch B	Switch C	Switch D
	10.0.0.3	*tftpserver* *10.0.0.3*	*tftpserver* *10.0.0.3*	*tftpserver* *10.0.0.3*

DNS Server Configuration

tftpserver

TFTP Server Configuration (on UNIX)

The TFTP server base directory is set to /tftpserver/work/. This directory contains the network-confg file used in the two-file read method. This file contains the hostname to be assigned to the switch based on its IP address. The base directory also contains a configuration file for each switch (*switcha-confg switchb-confg*

```
prompt> cd /tftpserver/work/
        ls
network-confg
switcha-confg
switchb-confg
switchc-confg
switchd-confg
prompt> cat network-confg
ip host switcha 10.0.0.21
ip host switchb 10.0.0.22
ip host switchc 10.0.0.23
ip host switchd 10.0.0.24
```

DHCP Client Configuration

Configuration Explanation

Configuring the DHCP Auto Configuration and Image Update Features

Configuring DHCP Autoconfiguration (Only Configuration File)

	Command	Purpose
Step 1		
Step 2		
Step 3	**bootfile**	
Step 4	**network** *network-number mask prefix-length*	
Step 5	*address*	
Step 6	**option 150**	
Step 7	**exit**	
Step 8		
Step 9		
Step 10		
Step 11		
Step 12		
Step 13		

```
Switch# configure terminal
                ip dhcp pool pool1
                     network 10.10.10.0 255.255.255.0
                     bootfile config-boot.text
                     default-router 10.10.10.1
                     option 150 10.10.10.1
                     exit
                tftp-server flash:config-boot.text
                interface gigabitethernet0/4
                   no switchport
                   ip address 10.10.10.1 255.255.255.0
                   end
```

Configuring DHCP Auto-Image Update (Configuration File and Image)

Note Before following the steps in this table, you must create a text file (for example, autoinstall_dhcp) that will be uploaded to the switch. In the text file, put the name of the image that you want to download (for example, c3560-ipservices-mz.122-44.3.SE.tar). This image must be a tar and not a bin file.

tftp-server flash:	
tftp-server flash:	
tftp-server flash:	
interface	
no switchport	
ip address	
end	
copy running-config startup-config	

This example shows how to configure a switch as a DHCP server so it downloads a configuration file:

```
0000.0009.0a05.08661.7574.6f69.6e73.7461.6c6c.5f64.686370
```

```
     exit
tftp-server flash:config-boot.text
tftp-server flash:c3560-ipservices-mz.122-44.3.SE.tar
tftp-server flash:boot-config.text
tftp-server flash: autoinstall_dhcp
interface gigabitethernet0/4
   no switchport
   ip address 10.10.10.1 255.255.255.0
   end
```

banner config-save ^C ^C	
end	
show boot	

```
        configure terminal
              boot host dhcp
              boot host retry timeout 300
              banner config-save ^C Caution - Saving Configuration File to NVRAM May Cause
You to Nolonger Automatically Download Configuration Files at Reboot^C
                vlan 99
Switch(config-vlan)#
Switch(config-if)#
Switch(config-if)#
Switch#
BOOT path-list:
Config file:          flash:/config.text
Private Config file:  flash:/private-config.text
Enable Break:         no
Manual Boot:          no
HELPER path-list:
NVRAM/Config file
      buffer size:    32768
Timeout for Config
          Download:    300 seconds
Config Download
       via DHCP:       enabled (next boot: enabled)
Switch#
```

Manually Assigning IP Information

Note

	Command	Purpose
Step 1		
Step 2		
Step 3		
Step 4		
Step 5		**Note**
Step 6		
Step 7		
Step 8		
Step 9		

Checking and Saving the Running Configuration

```
Current configuration: 1363 bytes
!
version 12.2
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Switch A
!
enable secret 5 $1$ej9.$DMUvAUnZOAmvmgqBEzIxE0
!
.
<output truncated>
.
interface gigabitethernet0/1
no switchport
ip address 172.20.137.50 255.255.255.0
!
interface gigabitethernet0/2
mvr type source

<output truncated>

...!
interface VLAN1
 ip address 172.20.137.50 255.255.255.0
 no ip directed-broadcast
!
ip default-gateway 172.20.137.1 !
!
snmp-server community private RW
snmp-server community public RO
snmp-server community private@es0 RW
snmp-server community public@es0 RO
snmp-server chassis-id 0x12
!
end



Switch#
Destination filename [startup-config]?
Building configuration...
```

Modifying the Startup Configuration

Default Boot Configuration

Feature	Default Setting

Automatically Downloading a Configuration File

Specifying the Filename to Read and Write the System Configuration

	Command	Purpose
Step 1		
Step 2	boot config-file flash:/	
Step 3	end	
Step 4	show boot	boot config-file
Step 5	copy running-config startup-config	

Booting Manually

	Command	Purpose
Step 1	configure terminal	
Step 2	boot manual	
Step 3	end	
Step 4	show boot	boot manual boot :/ • : flash: •
Step 5	copy running-config startup-config	

Booting a Specific Software Image

	Command	Purpose
Step 1		
Step 2		• •
Step 3		
Step 4		
Step 5		

no boot system

Controlling Environment Variables

Table 3-4 Environment Variables

Variable	Boot Loader Command	Cisco IOS Global Configuration Command
BOOT	**set BOOT :/**	**boot system** *ilesystem:/file-url ...*
MANUAL_BOOT	**set MANUAL_BOOT yes**	**boot manual** **boot flash: :/**
CONFIG_FILE	**set CONFIG_FILE flash:/**	**boot config-file flash:/**

Scheduling a Reload of the Software Image

Note

Configuring a Scheduled Reload

- **reload in** [ ] [ ]

  This command schedules a reload of the software to take affect in the specified minutes or hours and minutes. The reload must take place within approximately 24 days. You can specify the reason for the reload in a string up to 255 characters in length.

  [|] [ ]

  This command schedules a reload of the software to take place at the specified time (using a 24-hour clock). If you specify the month and day, the reload is scheduled to take place at the specified time and date. If you do not specify the month and day, the reload takes place at the specified time on the current day (if the specified time is later than the current time) or on the next day (if the specified time is earlier than the current time). Specifying 00:00 schedules the reload for midnight.

  Use the keyword only if the switch system clock has been set (through Network Time Protocol (NTP), the hardware calendar, or manually). The time is relative to the configured time zone on the switch. To schedule reloads across several switches to occur simultaneously, the time on each switch must be synchronized with NTP.

The command halts the system. If the system is not set to manually boot up, it reboots itself. Use the command after you save the switch configuration information to the startup configuration ( ).

If your switch is configured for manual booting, do not reload it from a virtual terminal. This restriction prevents the switch from entering the boot loader mode and thereby taking it from the remote user's control.

If you modify your configuration file, the switch prompts you to save the configuration before reloading. During the save operation, the system requests whether you want to proceed with the save if the CONFIG_FILE environment variable points to a startup configuration file that no longer exists. If you proceed in this situation, the system enters setup mode upon reload.

This example shows how to reload the software on the switch on the current day at 7:30 p.m:

```
Reload scheduled for 19:30:00 UTC Wed Jun 5 1996 (in 2 hours and 25 minutes)
Proceed with reload? [confirm]
```

This example shows how to reload the software on the switch at a future time:

```
Switch# reload at 02:00 jun 20
```