CHAPTER 1

Using the Command-Line Interface

The 2900 and 3500 XL switches are supported by Cisco IOS software. These switches currently support Cisco IOS Release 12.0(5)XU. This chapter describes how to use the switch command-line interface (CLI) to configure features added for the switch. For a complete description of the commands that support these features, see Chapter 2, "Cisco IOS Commands." For more information on Cisco IOS Release 12.0, refer to the *Cisco IOS Release 12.0 Command Summary.*

The switches are preconfigured and begin forwarding packets as soon as they are attached to compatible devices.

By default, all ports belong to virtual LAN (VLAN) 1. Access to the switch itself is also through VLAN 1, which is the default management VLAN. The management VLAN is configurable.You manage the switch by using Telnet, web-based management, and SNMP through devices connected to ports assigned to the management VLAN.

Configuration Tasks

You can perform the following configuration tasks on your switches:

- Assign IP information to the switch
- Set port features, including creating Fast EtherChannel and Gigabit EtherChannel port groups
- Classify traffic and provide preferential treatment to certain types of traffic by following IEEE 802.1p Quality of Service (QoS)
- Manage the switch MAC-address table
- Configure Spanning Tree Protocol features
- Enable the Cisco Group Management Protocol (CGMP) Fast Leave feature
- Configure VLANs
  - Configure VLAN Trunk Protocol (VTP)
  - Assign ports for static-access, multi-VLAN, or dynamic VLAN membership
  - Configure a VLAN trunk
  - Add, modify, and remove a VLAN to or from the database
- Configure the management VLAN for clustered and nonclustered switches
- Configure a command switch, build a cluster, and enable command-switch redundancy by using the Hot Standby Router Protocol (HSRP)

- Configure the UniDirectional Link Detection Protocol (UDLD) to help with the detection of spanning-tree loops on logical, one-way connections and disable the affected ports
- Configure enhanced packet-storm suppression to control unicast, broadcast, and multicast storms
- Configure 10/100 Ethernet ports for connection to Cisco IP telephones (control the telephone power on 3524-PWR-XL switch, configure the voice VLAN, and cause the telephone to use the priority received on the other port)
- Configure Network Time Protocol (NTP)
- Configure authentication for user access

For detailed information about completing these tasks, see the *Cisco IOS Desktop Switching Software Configuration Guide*.

Type of Memory

The switch Flash memory stores the Cisco IOS software image, the startup configuration file, and helper files.

Platforms

Cisco IOS Release 12.0(5)XU runs on a variety of 2900 and 3500 XL switches and modules. For a complete list, see the *Release Notes for Catalyst 2900 Series XL and Catalyst 3500 Series XL, Cisco IOS Release 12.0(5)XU*.

CLI Command Modes

This section describes the CLI command mode structure. Command modes support specific Cisco IOS commands. For example, the **interface** *type_number* command works only when entered in global configuration mode. The Cisco IOS command modes are as follows:

- User EXEC mode
- Privileged EXEC mode
- VLAN database mode
- Global configuration mode
- Interface configuration mode
- Line configuration mode

Table 1-1 lists the command modes, how to access each mode, the prompt you will see in that mode, and how to exit that mode. The prompts listed assume the default names *Switch* and *ATM*. The *ATM* prompt is displayed only if you have an ATM module installed in the switch.

Table 1-1 Command Modes Summary

Command Mode	Access Method	Prompt	Exit or Access Next Mode
User EXEC	This is the first level of access. (For the switch) Change terminal settings, perform basic tasks, and list system information. (For ATM) Begin a session with the ATM module.	`Switch>` `ATM>`	Enter the **logout** command.
Privileged EXEC	From user EXEC mode, enter the **enable** user EXEC command.	`Switch#` `ATM#`	To exit to user EXEC mode, enter the **disable** command. To enter global configuration mode, enter the **configure** command.
VLAN database	From user EXEC mode, enter the **vlan database** command.	`Switch(vlan)#`	To exit to user EXEC mode, enter the **exit** command.
Global configuration	From privileged EXEC mode, enter the **configure** privileged EXEC command.	`Switch (config)#` `ATM (config)#`	To exit to privileged EXEC mode, enter the **exit** or **end** command, or press **Ctrl-Z**. To enter interface configuration mode, enter the **interface** configuration command.
Interface configuration	From global configuration mode, specify an interface by entering the **interface** command.	`Switch (config-if)#` `ATM (config-if)#`	To exit to privileged EXEC mode, enter the **end** command, or press **Ctrl-Z**. To exit to global configuration mode, enter the **exit** command. To enter subinterface configuration mode, specify a subinterface with the **interface** command. On the Asynchronous Transfer Mode (ATM) module, the LAN emulation (LANE) client is considered a subinterface.
Line configuration	From global configuration mode, specify a line by entering the **line** command.	`Switch (config-line)#` `ATM (config-line)#`	To exit to global configuration mode, enter the **exit** command. To return to privileged EXEC mode, enter the **end** command, or press **Ctrl-Z**.

User EXEC Mode

After you access the device, you are automatically in user EXEC command mode. The EXEC commands available at the user level are a subset of those available at the privileged level. In general, the user EXEC commands allow you to change terminal settings temporarily, perform basic tests, and list system information.

The supported commands can vary depending on the version of IOS software in use. To view a comprehensive list of commands, enter a question mark (**?**) at the prompt.

```
Switch> ?

ATM> ?
```

Privileged EXEC Mode

Because many of the privileged commands configure operating parameters, privileged access should be password-protected to prevent unauthorized use. The privileged command set includes those commands contained in user EXEC mode, as well as the **configure** command through which you access the remaining command modes.

If your system administrator has set a password, you are prompted to enter it before being granted access to privileged EXEC mode. The password is not displayed on the screen and is case sensitive.

The privileged EXEC mode prompt consists of the device name followed by the pound sign (#).

```
Switch#

ATM#
```

Enter the **enable** command to access privileged EXEC mode:

```
Switch> enable
Switch#

ATM> enable
ATM#
```

The supported commands can vary depending on the version of IOS software in use. To view a comprehensive list of commands, enter a question mark (**?**) at the prompt.

```
Switch# ?

ATM# ?
```

To return to user EXEC mode, enter the **disable** command.

VLAN Database Mode

The VLAN database commands allow you to modify VLAN parameters. Enter the **vlan database** command to access VLAN database mode:

```
Switch> vlan database

Switch(vlan)#
```

The supported commands can vary depending on the version of IOS software in use. To view a comprehensive list of commands, enter a question mark (**?**) at the prompt.

```
Switch(vlan)# ?
```

To return to privileged EXEC mode, enter the **abort** command to abandon the proposed database. Otherwise, enter **exit** to implement the proposed new VLAN database and return to privileged EXEC mode.

Global Configuration Mode

Global configuration commands apply to features that affect the device as a whole. Use the **configure** privileged EXEC command to enter global configuration mode. The default is to enter commands from the management console.

When you enter the **configure** command, the console prompts you for the source of the configuration commands:

```
Switch# configure
Configuring from terminal, memory, or network [terminal]?

ATM# configure
Configuring from terminal, memory, or network [terminal]?
```

You can specify either the terminal or NVRAM as the source of configuration commands.

The following example shows you how to access global configuration mode:

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.

ATM# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
```

The supported commands can vary depending on the version of IOS software in use. To view a comprehensive list of commands, enter a question mark (**?**) at the prompt.

```
Switch(config)# ?
Switch(config)#

ATM(config)# ?
ATM(config)#
```

To exit global configuration command mode and return to privileged EXEC mode, enter the **end** or **exit** command, or press **Ctrl-Z**.

Interface Configuration Mode

Interface configuration commands modify the operation of the interface. Interface configuration commands always follow a global configuration command, which defines the interface type.

Use the **interface** *type_number.subif* command to access interface configuration mode. The new prompt indicates interface configuration mode.

```
Switch(config-if)#

ATM(config-if)#
```

The supported commands can vary depending on the version of IOS software in use. To view a comprehensive list of commands, enter a question mark (**?**) at the prompt.

```
Switch(config-subif)# ?
Switch(config-if)#

ATM(config-subif)# ?
ATM(config-if)#
```

To exit interface configuration mode and return to global configuration mode, enter the **exit** command. To exit interface configuration mode and return to privileged EXEC mode, enter the **end** command, or press **Ctrl-Z**.

Line Configuration Mode

Line configuration commands modify the operation of a terminal line. Line configuration commands always follow a line command, which defines a line number. These commands are used to change terminal parameter settings line-by-line or for a range of lines.

Use the **line vty** *line_number* [*ending_line_number*] command to enter line configuration mode. The new prompt indicates line configuration mode. The following examples shows how to enter line configuration mode for virtual terminal line 7:

```
Switch(config)# line vty 0 7

ATM(config)# line vty 0 7
```

The supported commands can vary depending on the version of IOS software in use. To view a comprehensive list of commands, enter a question mark (**?**) at the prompt.

```
Switch(config-line)# ?

ATM(config-line)# ?
```

To exit line configuration mode and return to global configuration mode, use the **exit** command. To exit line configuration mode and return to privileged EXEC mode, enter the **end** command, or press **Ctrl-Z**.

Command Summary

Table 1-2 lists and describes the Cisco IOS commands for the 2900 and 3500 XL switches. The commands are sorted by the command modes from which they are entered.

Table 1-2 Command Summary

Commands	Description
User EXEC mode	
rcommand	Executes commands on a cluster member from the command switch.
show cluster	Displays the cluster status and a summary of the cluster to which the switch belongs.
show cluster candidates	Displays switches that are not currently members of the cluster but could be.
show cluster members	Displays information about all members in a cluster.
show ntp associations	Displays the status of NTP associations.
show ntp status	Displays the status of NTP.
show spanning-tree	Displays Spanning Tree Protocol (STP) information.
show udld	Displays UniDirectional Link Detection (UDLD) status information for all or the specified port.
show vlan	Displays information about a VLAN.
show version	Displays the firmware version for the switch or module.
show vtp counters **show vtp status**	Displays general information about the VTP management domain, status, and counters.
Privileged EXEC mode	
clear cgmp	Deletes the multicast addresses and router ports maintained by Cisco Group Management Protocol (CGMP).
clear ip address	Deletes the IP address without disabling the IP processing.
clear mac-address-table	Deletes all addresses in the MAC address table.
clear vmps statistics	Clears the statistics maintained by the VLAN Query Protocol (VQP) client.
clear vtp counters	Clears the VLAN Trunk Protocol (VTP) counters.
cluster setup	Automatically builds a cluster.
delete	Deletes a file from the file system.
session	Logs into an ATM module.
show cgmp	Displays the current state of the CGMP-learned multicast groups and routers.
show env	Displays the status of the 3524-PWR-XL switch fans and temperature.
show file systems	Displays information about local and remote file systems.
show interface	Displays the administrative and operational status of a switching port.
show mac-address-table	Displays the MAC address table.
show port block	Displays the blocking of unicast and multicast filtering for the port.

Table 1-2 Command Summary (continued)

Commands	Description
show port group	Displays the ports that are assigned to groups.
show port led	Displays the switch port LED colors.
show port monitor	Displays the ports that have port monitoring enabled.
show port network	Displays the network ports on the switch.
show port protected	Displays the ports that are port protected mode.
show port security	Displays the ports that have port security enabled.
show port storm-control	Displays the setting of broadcast-storm control.
show power inline	Displays the power status for the specified port or all ports on the 3524-PWR-XL switch.
show rps	Displays the status of the Cisco Redundant Power System (RPS).
show tacacs	Displays various Terminal Access Controller Access Control System Plus (TACACS+) server statistics.
show vmps	Displays the VQP version, reconfirmation interval, retry count, server IP addresses, and current and primary servers.
show vmps statistics	Displays the VQP client-side statistics.
udld reset	Resets any port that has been shut down by UDLD.
vlan database	Enters VLAN database mode.
vmps reconfirm	Sends VQP queries to reconfirm all dynamic VLAN assignments with the VLAN Membership Policy Server (VMPS).
Global configuration mode	
cgmp	Enables CGMP and other CGMP options.
cluster commander-address	Automatically provides the command switch MAC address to member switches. This command is automatically issued.
cluster discovery hop-count	Sets the hop-count limit for extended discovery of cluster candidates.
cluster enable	Enables the cluster command switch and names the cluster.
cluster holdtime	Sets the timer that determines when a command switch declares the other switch down after not receiving a heartbeat message. Used with the **cluster timer** command.
cluster management-vlan	Changes the management VLAN for the entire cluster.
cluster member	Adds members to the cluster.
cluster run	Enables clustering on a switch.
cluster standby-group	Enables command switch redundancy by binding an Hot Standby Router Protocol (HSPR) standby group to the cluster.

Table 1-2 Command Summary (continued)

Commands	Description
cluster timer	Sets the interval between heartbeat messages between the command and member switches. Used with the **cluster holdtime** command.
enable last-resort	Specifies what happens if the Terminal Access Controller Access Control System (TACACS) and Extended TACACS servers used by the **enable** command do not respond.
enable use-tacacs	Enables the use of TACACS to determine whether a user can access the privileged command level.
interface	Selects an interface to configure. Creates a new management VLAN interface.
mac-address-table aging-time	Sets the length of time that a dynamic entry remains in the address table.
mac-address-table dynamic	Adds a dynamic address entry to the address table.
mac-address-table secure	Adds a secure address entry to the address table.
mac-address-table static	Adds a static address entry to the address table.
ntp access-group	Controls access to the system's NTP services.
ntp authenticate	Enables NTP authentication.
ntp authentication-key	Defines an authentication key for NTP.
ntp broadcastdelay	Sets the estimated round-trip delay between the Cisco IOS software and an NTP broadcast server.
ntp clock-period	Determines the clock error.
ntp max-associations	Sets the maximum number of NTP associations that are allowed on a server.
ntp peer	Configures the router system clock to synchronize a peer or to be synchronized by a peer.
ntp server	Allows the router system clock to be synchronized by a time server.
ntp source	Uses a particular source address in NTP packets.
ntp trusted-key	Authenticates the identity of a system to which NTP will synchronize.
shutdown vlan	Shuts down local traffic on the specified VLAN.
snmp-server enable traps vlan-membership	Enables SNMP notification for VMPS changes.
snmp-server enable traps vtp	Enables SNMP notification for VTP changes.
snmp-server host	Specifies the host that receives SNMP traps.
spanning-tree	Enables an instance of STP.
spanning-tree forward-time	Specifies the forward delay interval for the switch.
spanning-tree hello-time	Specifies the interval between hello Bridge Protocol Data Units (BPDUs).

Table 1-2 Command Summary (continued)

Commands	Description
spanning-tree max-age	Changes the interval the switch waits to receive BPDUs from the root switch.
spanning-tree priority	Configures the bridge priority for the specified spanning-tree instance.
spanning-tree protocol	Defines the type of STP.
spanning-tree uplinkfast	Accelerates the choice of a new root port when a link or switch fails or when STP reconfigures itself.
tacacs-server attempts	Controls the number of login attempts that can be made on a line set up for TACACS, Extended TACACS, or TACACS+ verification.
tacacs-server directed-request	Sends only a username to a specified server when a direct request is issued in association with TACACS, Extended TACACS, and TACACS+.
tacacs-server dns-alias-lookup	Enables IP Domain Name System alias lookup for TACACS+.
tacacs-server extended	Enables an extended TACACS mode.
tacacs-server host	Specifies a TACACS, Extended TACACS, or TACACS+ host.
tacacs-server key	Sets the authentication encryption key used for all TACACS+ communications between the access server and the TACACS+ daemon.
tacacs-server last-resort	Causes the network access server to request the privileged password as verification for TACACS or Extended TACACS or to allow successful login without further input from the user.
tacacs-server login-timeout	Specifies the maximum amount of time in seconds to wait for a TACACs login.
tacacs-server optional-passwords	Specifies that the first TACACS request to a TACACS or Extended TACACS server be made without password verification.
tacacs-server retransmit	Specifies the number of times the Cisco IOS software searches the list of TACACS or Extended TACACS server hosts before giving up.
tacacs-server timeout	Sets the interval that the server waits for a TACACS, Extended TACACS, or TACACS+ server to reply.
udld enable	Enables UDLD on all switch ports.
vmps reconfirm	Changes the reconfirmation interval for the VQP client.
vmps retry	Configures the per-server retry count for the VQP client.
vmps server	Configures the primary VMPS and up to three secondary servers.
vtp file	Modify the VTP configuration storage filename.
VLAN database mode	

Table 1-2 Command Summary (continued)

Commands	Description
abort	Abandons the proposed new VLAN database, and return to privileged EXEC mode.
apply	Implements the proposed new VLAN database, propagate it throughout the administrative domain, and remain in VLAN database mode.
exit	Implements the proposed new VLAN database, propagate it throughout the administrative domain, and return to privileged EXEC mode.
reset	Abandons the proposed new VLAN database, and remain in VLAN database mode.
show changes	Displays the differences between the currently implemented VLAN database on the switch and the proposed new VLAN database.
show current	Displays the currently implemented VLAN database on the switch or a single selected VLAN from it.
show proposed	Displays the proposed new VLAN database or a single selected VLAN from it.
vlan	Configures a VLAN by its VLAN ID.
vtp	Configures the VTP mode.
vtp domain	Configures the VTP administrative domain.
vtp password	Configures the VTP password.
vtp pruning	Enables pruning in the VTP administrative domain.
vtp v2-mode	Enables VTP version 2 mode in the administrative domain.
Interface configuration mode	
duplex	Specifies the duplex mode of operation for a port.
flowcontrol	Controls traffic rates during congestion.
management	Shuts down the current management VLAN interface.
ntp broadcast client	Allows the system to receive NTP broadcast packets on a port.
ntp broadcast destination	Configures an NTP server or peer to restrict broadcast of NTP frames to the IP address of a designated client or a peer.
ntp broadcast key	Configures an NTP server or peer to broadcast NTP frames with the authentication key embedded into the NTP packet.
ntp broadcast version	Specifies a port to send NTP broadcast packets.
ntp disable	Prevents a port from receiving NTP packets.
ip address	Sets a primary or secondary IP address of a VLAN interface.
port block	Prevents the flooding of unknown destination MAC addresses and multicast addresses on this port.

Table 1-2 Command Summary (continued)

Commands	Description
port group	Places a port into a port aggregation group.
port monitor	Implements port monitoring on this port.
port network	Enables a port as the network port for a VLAN.
port protected	Isolates unicast, multicast, and broadcast traffic at Layer 2 from other protected ports on the same switch.
port security	Enables port security on a port.
port storm-control	Disables broadcast, multicast, or unicast traffic if too many packets are seen on this port.
power inline	Sets how inline power is applied to the device on the specified Fast Ethernet port of the 3524-PWR-XL switch.
rmon collection stats	Collects Ethernet group statistics, which includes utilization statistics about broadcast and multicast packets, and error statistics about Cyclic Redundancy Check (CRC) alignment errors and collisions.
shutdown	Disables a port.
spanning-tree cost	Sets a different path cost.
spanning-tree portfast	Enables the Port Fast option on the switch.
spanning-tree port-priority	Configures the STP priority of a port.
spanning-tree rootguard	Enables the root guard feature for all the VLANs associated with the specified port. Controls which ports are allowed to be STP root ports.
speed	Specifies the speed of a port.
switchport access	Configures a port as an access or dynamic VLAN port.
switchport mode	Configures the VLAN membership mode of a port.
switchport multi	Configures a port to be a multi-VLAN port.
switchport priority	Configures a port priority for untagged (native Ethernet) frames to provide quality of service (QoS). Also sets the priority of frames received by the appliance connected to the specified port.
switchport trunk allowed vlan	Controls which VLANs can receive and transmit traffic on the trunk.
switchport trunk encapsulation	Sets the encapsulation format on the trunk.
switchport trunk native	Sets the native VLAN for untagged traffic when in IEEE 802.1Q trunking mode.
switchport trunk pruning	Sets the list of VLANs enabled for VTP pruning when the port is in trunking mode.
switchport voice vlan	Sets the voice VLAN on the port.
udld	Enables or disables UDLD on a port.
Line configuration mode	
login authentication	Applies the authentication list to a line or set of lines.

Table 1-2 Command Summary (continued)

Commands	Description
login local	Changes a login username.
login tacacs	Configures your switch to use TACACS user authentication.

For detailed command syntax and descriptions, see Chapter 2, "Cisco IOS Commands." For task-oriented configuration steps, see the software configuration documentation that came with the product.