



## Quick Software Configuration Guide

Catalyst 4500 Series  
Catalyst 2948G  
Catalyst 2948G-GE-TX  
Catalyst 2980G

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## Preface

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This preface describes who should read this *Quick Software Configuration Guide*, how it is organized, and its document conventions.

## Audience

This guide is intended for switch administrators who are familiar with Ethernet, Fast Ethernet, or Gigabit Ethernet LAN switches but may not have experience configuring Catalyst 4500 series, 2948G, 2948G-GE-TX, and 2980G switches.

For complete software configuration information, refer to the *Software Configuration Guide* and the *Command Reference* publications for your switch.

## Organization

This guide is organized as follows:

Chapter	Title	Description
Chapter 1	<a href="#">Basic Software Configuration</a>	Describes how to configure the switch for basic network connectivity
Chapter 2	<a href="#">Configuring VLANs</a>	Describes how to configure the VLAN Trunking Protocol (VTP) and virtual LANs (VLANs)
Chapter 3	<a href="#">Configuring EtherChannel and VLAN Trunks</a>	Describes how to configure Fast and Gigabit EtherChannel port bundles and VLAN trunks
Chapter 4	<a href="#">Administering the Switch</a>	Describes how to perform basic switch administration and maintenance
Chapter 5	<a href="#">Monitoring the Switch</a>	Describes how to monitor the switch using a variety of commands
Chapter 6	<a href="#">Default Configurations</a>	Lists default configuration information for the switch software

## Related Documentation

This guide does not fully describe the operation and options for the software features discussed. Refer to the following documents for complete information:

- Release notes for your software release
- *Catalyst 4500 Series, Catalyst 2948G, Catalyst 2948G-GE-TX, and Catalyst 2980G Switches Software Configuration Guide*
- *Catalyst 4500 Series, Catalyst 2948G, Catalyst 2948G-GE-TX, and Catalyst 2980G Switches Command Reference*
- Catalyst 4500 Series Technical Documentation:  
[http://www.cisco.com/en/US/products/hw/switches/ps4324/prod\\_technical\\_documentation.html](http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_technical_documentation.html)
- Catalyst 4000 Series Technical Documentation:  
[http://www.cisco.com/en/US/products/hw/switches/ps663/prod\\_technical\\_documentation.html](http://www.cisco.com/en/US/products/hw/switches/ps663/prod_technical_documentation.html)

## Conventions

Command descriptions use the following conventions:

<b>boldface font</b>	Commands and keywords are in <b>boldface</b> .
<i>italic font</i>	Arguments for which you supply values are in <i>italics</i> .
[ ]	Elements in square brackets are optional.
{ x   y   z }	Alternative keywords are grouped in braces and separated by vertical bars.
[ x   y   z ]	Optional alternative keywords are grouped in brackets and separated by vertical bars.

Screen examples use the following conventions:

screen font	Terminal sessions and information the system displays are in screen font.
<b>boldface screen font</b>	Information you must enter is in <b>boldface screen font</b> .
< >	Nonprinting characters, such as passwords are in angle brackets.
<...output truncated...>	Indicates that some screen output has been removed to preserve clarity.

Notes use the following conventions:



Note

---

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

---

## Obtaining Documentation

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

### Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

<http://www.cisco.com/univercd/home/home.htm>

You can access the Cisco website at this URL:

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International Cisco websites can be accessed from this URL:

[http://www.cisco.com/public/countries\\_languages.shtml](http://www.cisco.com/public/countries_languages.shtml)

### Documentation CD-ROM

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You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

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### Cisco TAC Website

The Cisco TAC website (<http://www.cisco.com/tac>) provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The Cisco TAC website is available 24 hours a day, 365 days a year.

Accessing all the tools on the Cisco TAC website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a login ID or password, register at this URL:

<http://tools.cisco.com/RPF/register/register.do>

### Opening a TAC Case

The online TAC Case Open Tool (<http://www.cisco.com/tac/caseopen>) is the fastest way to open P3 and P4 cases. (Your network is minimally impaired or you require product information). After you describe your situation, the TAC Case Open Tool automatically recommends resources for an immediate solution. If your issue is not resolved using these recommendations, your case will be assigned to a Cisco TAC engineer.

For P1 or P2 cases (your production network is down or severely degraded) or if you do not have Internet access, contact Cisco TAC by telephone. Cisco TAC engineers are assigned immediately to P1 and P2 cases to help keep your business operations running smoothly.

To open a case by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553-2447

For a complete listing of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

## TAC Case Priority Definitions

To ensure that all cases are reported in a standard format, Cisco has established case priority definitions.

Priority 1 (P1)—Your network is “down” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Priority 2 (P2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Priority 3 (P3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

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- The *Cisco Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the *Cisco Product Catalog* at this URL:  
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- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: *Internetworking Terms and Acronyms Dictionary*, *Internetworking Technology Handbook*, *Internetworking Troubleshooting Guide*, and the *Internetworking Design Guide*. For current Cisco Press titles and other information, go to Cisco Press online at this URL:  
<http://www.ciscopress.com>
- Packet magazine is the Cisco quarterly publication that provides the latest networking trends, technology breakthroughs, and Cisco products and solutions to help industry professionals get the most from their networking investment. Included are networking deployment and troubleshooting tips, configuration examples, customer case studies, tutorials and training, certification information, and links to numerous in-depth online resources. You can access Packet magazine at this URL:  
<http://www.cisco.com/go/packet>
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- Internet Protocol Journal is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:  
[http://www.cisco.com/en/US/about/ac123/ac147/about\\_cisco\\_the\\_internet\\_protocol\\_journal.html](http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html)
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# Basic Software Configuration

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Very little configuration is required to establish basic connectivity to the switch. This section describes the basic tasks that you need to get your switch up and running:

- 
- Step 1** [Preparing to Configure the Switch](#)—Gather the information that you need to configure the switch.
  - Step 2** [Establishing a Console Port Connection](#)—Connect to the switch through the console port to access the command-line interface (CLI).
  - Step 3** [Setting the Switch IP Configuration](#)—Assign an IP address, subnet mask, and default gateway to the switch interface.
  - Step 4** [Configuring Switch Ports](#)—Make sure that the switch ports are properly configured to communicate with connected devices.
- 

## Preparing to Configure the Switch

Before you configure the switch, make sure that the chassis, switching modules, and power supplies are installed and cabled to specification. Refer to the hardware documentation for your switch for information on installation.

Before you begin configuring the switch, you should gather the following information:

- A map or diagram of your network topology showing how the switch will be used in the network.
- The IP address and subnet mask for the switch. You will assign this address to the in-band (sc0) interface on the switch.
- The IP address of the default gateway for the network (typically, the IP address of a router that is connected to the same network).

## Establishing a Console Port Connection

Connecting a terminal to the supervisor engine console port allows you to access the switch CLI before the switch is configured and connected to the network.

Refer to the hardware documentation for your switch model for information on connecting a terminal to the console port.



**Note** You must enter privileged mode through the **enable** command to perform most of the tasks that are described in this publication.

To connect to the switch through the console port and enter privileged mode, perform this task:

	Task	Command
Step 1	Make sure that the terminal connected to the console port is configured as follows: 9600 baud, 8 data bits, no parity, 1 stop bit.	–
Step 2	Power up the switch. Output from the bootup script appears on the terminal screen.	–
Step 3	At the Enter Password prompt, press <b>Return</b> .	–
Step 4	Enter privileged mode.	<b>enable</b>
Step 5	At the Enter Password prompt, press <b>Return</b> .	–

This example shows the end of the bootup cycle and how to enter privileged mode. By default, both the normal and privileged mode passwords are not set; press **Return** at the Enter Password prompts. The output on your switch might look different, depending on the switch model that you are booting.

```
<...output truncated...>
Exiting Off-line Diagnostics

IP address for Catalyst not configured
BOOTP will commence after the ports are online
Ports are coming online ...

Cisco Systems, Inc. Console

Enter password:
2001 Apr 08 15:35:14 %SYS-5-MOD_OK:Module 1 is online
2001 Apr 08 15:35:17 %SYS-5-MOD_OK:Module 2 is online
2001 Apr 08 15:35:17 %SYS-5-MOD_OK:Module 3 is online
<Return>
Console> enable

Enter password: <Return>
Console> (enable)
```



**Note** When the switch boots with the in-band (sc0) interface address set to 0.0.0.0 (the default on a new switch or after the configuration is cleared), the switch attempts to obtain an IP address using Dynamic Host Configuration Protocol (DHCP)/Bootstrap Protocol (BOOTP) and Reverse Address Resolution Protocol (RARP). For more information, refer to the *Software Configuration Guide* for your switch.

# Setting the Switch IP Configuration

Before you can Telnet to your switch, you need to perform the following procedures to communicate with the switch using IP:

- Assign an IP address, a subnet mask, and a VLAN number to the in-band (sc0) interface
- Configure one or more default gateways



## Note

The Catalyst 4000 series, Catalyst 4500 series, 2948G, and 2948G-GE-TX switches have an out-of-band Ethernet management (me1) interface in addition to the in-band (sc0) interface. For information on configuring the me1 interface, refer to the *Software Configuration Guide* for your switch.

When configuring the switch for the first time, assign the in-band (sc0) interface to the default VLAN, VLAN 1. After you have configured additional VLANs, you can assign the interface to any VLAN. Make sure that the IP address that you specify belongs to the IP subnet that is associated with that VLAN, and that you configure an appropriate default gateway for that subnet.

To set the switch IP configuration, perform this task in privileged mode:

	Task	Command
Step 1	Assign an IP address and subnet mask to the switch.	<b>set interface sc0</b> <i>ip_addr netmask</i>
Step 2	(Optional) Assign the switch interface to a VLAN. (If you do not specify a VLAN, VLAN 1 is used.)	<b>set interface sc0</b> <i>vlan_num</i>
Step 3	Specify one or more default gateways to the switch. The default gateway address should be the address of a router in the same subnet/VLAN as the switch IP address.	<b>set ip route default</b> <i>gateway</i>
Step 4	Verify the in-band interface configuration.	<b>show interface</b>
Step 5	Verify the default gateway assignment.	<b>show ip route</b>

This example shows how to assign an IP address and default gateway to the switch, and verify the configuration:

```

Console> (enable) set interface sc0 10.10.1.20/24
Interface sc0 IP address set.
Console> (enable) set ip route default 10.10.1.1
Route added.
Console> (enable) show interface
s10: flags=50<DOWN,POINTOPOINT,RUNNING>
      slip 0.0.0.0 dest 0.0.0.0
sc0:  flags=63<UP,BROADCAST,RUNNING>
      vlan 1 inet 10.10.1.20 netmask 255.0.0.0 broadcast 10.255.255.255
me1:  flags=62<DOWN,BROADCAST,RUNNING>
      inet 0.0.0.0 netmask 255.0.0.0 broadcast 0.0.0.0
Console> (enable) show ip route
Fragmentation  Redirect  Unreachable
-----
enabled          enabled  enabled

```

```

The primary gateway: 10.10.1.1
Destination      Gateway          RouteMask      Flags    Use      Interface
-----
default          10.10.1.1       0x0            UG       0        sc0
10.0.0.0         10.10.1.20      0xff000000     U        11       sc0
Console> (enable)

```

## Configuring Switch Ports

When you connect Ethernet, Fast Ethernet, or Gigabit Ethernet ports on the switch to other devices, you should ensure that these conditions are met:

- Both ends of a link must use the same port speed and duplex
- Flow control and link negotiation parameters (if supported) must be compatible

In most cases, the default port configuration is adequate. If you have trouble communicating with the connected device, check the port configuration on both ends of the link.

Gigabit Ethernet ports (and some Fast Ethernet ports) support flow control and link negotiation. In most cases, you do not need to change the default configuration.

To change the port configuration, perform this task in privileged mode:

	Task	Command
Step 1	On 10/100-Mbps Fast Ethernet ports, you can set the port speed or you can use the <b>auto</b> keyword to allow the port to autonegotiate both port speed and duplex mode with the connected port.	<b>set port speed</b> <i>mod_num/port_num</i> { <b>10</b>   <b>100</b>   <b>1000</b>   <b>auto</b> }
Step 2	On Ethernet or Fast Ethernet ports, set the port duplex mode. Make sure that the duplex mode is the same on both ends of the link.	<b>set port duplex</b> <i>mod_num/port_num</i> { <b>full</b>   <b>half</b> }
Step 3	On Fast or Gigabit Ethernet ports (on supported hardware), set the flow control mode for transmit (Tx) and receive (Rx).	<b>set port flowcontrol</b> <i>mod_num/port_num</i> { <b>receive</b>   <b>send</b> } { <b>on</b>   <b>off</b>   <b>desired</b> }
Step 4	On Fast or Gigabit Ethernet ports (on supported hardware), configure link negotiation.	<b>set port flowcontrol</b> <i>mod_num/port_num</i> { <b>receive</b>   <b>send</b> } { <b>on</b>   <b>off</b>   <b>desired</b> }
Step 5	Set the port name, if desired.	<b>set port name</b> <i>mod_num/port_num</i> <i>name_string</i>
Step 6	Verify the port configuration.	<b>show port</b> <i>mod_num/port_num</i>

This example shows how to configure the port speed, duplex mode, and port name on a 10/100-Mbps Fast Ethernet port, and how to verify the port configuration:

```

Console> (enable) set port speed 3/1 100
Port(s) 6/1 speed set to 100Mbps.
Console> (enable) set port duplex 3/1 full
Port(s) 6/1 set to full-duplex.

```

```
Console> (enable) set port name 3/1 Sparc Ultra
Port 6/1 name set.
Console> (enable) show port 6/1
Port  Name                Status      Vlan      Level  Duplex Speed Type
-----
3/1   Sparc Ultra            connected  trunk    normal  full   100 10/100BaseTX

<...output truncated...>

Last-Time-Cleared
-----
Thu Apr 30 2001, 18:38:59
Console> (enable)
```





## Configuring VLANs

---

To configure VLANs on the switch, perform these tasks:

- 
- Step 1** [Configuring VLAN Trunking Protocol](#)—Create a VLAN Trunking Protocol (VTP) domain and set the VTP mode on the switch.
- Step 2** [Configuring VLANs](#)—Create VLANs in the VTP domain and assign switch ports to those VLANs.
- 

## Configuring VLAN Trunking Protocol

VTP propagates information about the VLAN configuration throughout the switched network.



**Note**

---

VTP only exchanges VLAN information over VLAN trunk links. For information on configuring trunk links, see [Chapter 3, “Configuring EtherChannel and VLAN Trunks.”](#)

---

The switch can operate in any one of these three VTP modes:

- **Server**—VTP servers advertise their VLAN configuration to other switches in the same VTP domain and synchronize their VLAN configuration with other switches based on advertisements received over trunk links. The VTP server is the default mode.
- **Client**—VTP clients are similar to VTP servers, except that you cannot create, change, or delete VLANs on a VTP client.
- **Transparent**—VTP transparent switches do not participate in VTP. A VTP transparent switch does not advertise its VLAN configuration and does not synchronize its VLAN configuration based on received advertisements.



**Note**

---

Before you configure VLANs on the switch, you should decide whether to use VTP. If you decide to use VTP, you need to decide whether the switch should function as a VTP client or a VTP server. If you are connecting the switch to an existing network, make sure that your VTP configuration is compatible with the rest of the network.

---

## Configure the Switch as a VTP Server

When you configure a switch as a VTP server, you must define a VTP domain before you can create VLANs.

To configure a switch as a VTP server, perform this task in privileged mode:

	Task	Command
Step 1	Assign a name to the VTP management domain.	<b>set vtp domain <i>name</i></b>
Step 2	Set the VTP mode.	<b>set vtp mode server</b>
Step 3	Verify the VTP configuration.	<b>show vtp domain</b>

This example shows how to configure a switch as a VTP server:

```

Console> (enable) set vtp domain BigCorp
VTP domain BigCorp modified
Console> (enable) set vtp mode server
VTP domain BigCorp modified
Console> (enable) show vtp domain
Domain Name                Domain Index VTP Version Local Mode Password
-----
BigCorp                    1           2           server      -

Vlan-count Max-vlan-storage Config Revision Notifications
-----
5          1023             0           disabled

Last Updater V2 Mode Pruning PruneEligible on Vlans
-----
0.0.0.0      disabled disabled 2-1000
Console> (enable)

```

## Configure the Switch as a VTP Client

When you configure a switch as a VTP client, you cannot configure VLANs on the switch; instead, you configure VLANs on a VTP server in the same VTP domain as the client. The VTP client synchronizes its VLAN configuration to the configuration of the server.

To configure a switch as a VTP client, perform this task in privileged mode:

	Task	Command
Step 1	Assign a name to the VTP management domain.	<b>set vtp domain <i>name</i></b>
Step 2	Set the VTP mode.	<b>set vtp mode client</b>
Step 3	Verify the VTP configuration. (It might take a few minutes before a VTP client learns the VTP and VLAN configuration information from neighboring switches.)	<b>show vtp domain</b>

This example shows how to configure a switch as a VTP client:

```

Console> (enable) set vtp domain BigCorp
VTP domain BigCorp modified
Console> (enable) set vtp mode client
VTP domain BigCorp modified
Console> (enable) show vtp domain
Domain Name                               Domain Index VTP Version Local Mode Password
-----
BigCorp                                   1             2             client      -

Vlan-count Max-vlan-storage Config Revision Notifications
-----
5           1023             0             disabled

Last Updater V2 Mode Pruning PruneEligible on Vlans
-----
0.0.0.0      disabled disabled 2-1000
Console> (enable)

```

## Configure the Switch as VTP Transparent

When you configure a switch as VTP transparent, you must configure VLAN information manually on the switch. A VTP-transparent switch does not advertise its VLAN configuration information to other switches and will ignore VTP updates from VTP clients and servers.

To configure a switch for VTP transparent mode, perform this task in privileged mode:

	Task	Command
Step 1	Set the VTP mode.	<b>set vtp mode transparent</b>
Step 2	Verify the VTP configuration.	<b>show vtp domain</b>

This example shows how to configure a switch as VTP transparent:

```

Console> (enable) set vtp mode transparent
VTP domain modified
Console> (enable) show vtp domain
Domain Name                               Domain Index VTP Version Local Mode Password
-----
                                   1             2             Transparent -

Vlan-count Max-vlan-storage Config Revision Notifications
-----
5           1023             0             disabled

Last Updater V2 Mode Pruning PruneEligible on Vlans
-----
0.0.0.0      disabled disabled 2-1000
Console> (enable)

```

## Configuring VLANs

When you configure the switch for VTP, you can create, modify, and delete VLANs on the switch (unless you configured the switch as a VTP client). When you configure a VLAN on a VTP server, the configuration information is distributed to switches throughout the VTP domain.

VTP clients and servers in the same domain update their VLAN configuration based on the advertised configuration. VTP transparent switches do not act on VTP updates; you must manually make changes to the VLAN configuration on such switches.

Typically, in an IP network, each VLAN is associated with a single IP subnetwork. That is, all of the hosts in a given VLAN belong to a single subnet, use the same subnet mask, and use one or more default gateways that are connected to that subnetwork. Stations in different VLANs cannot communicate with one another without a router configured to route between the different VLANs.

The supervisor engine software supports many VLAN types. This section describes only how to configure Ethernet VLANs. For information about configuring other types of VLANs, refer to the *Software Configuration Guide* for your switch.

## Create VLANs

To configure an Ethernet VLAN in a VTP domain, perform this task in privileged mode:

	Task	Command
Step 1	Create a VLAN by assigning it a VLAN number and, if desired, a VLAN name.	<b>set vlan</b> <i>vlan_num</i> [ <b>name</b> <i>name</i> ]
Step 2	Verify the VLAN configuration.	<b>show vlan</b> <i>vlan_num</i>

This example shows how to create a VLAN and verify the VLAN configuration:

```

Console> (enable) set vlan 10 name Corporate
Vlan 10 configuration successful
Console> (enable) show vlan 10
VLAN Name                Status    IfIndex Mod/Ports, Vlans
-----
10    Corporate              active    103

VLAN Type  SAID      MTU    Parent  RingNo  BrdgNo  Stp    BrdgMode  Trans1  Trans2
-----
10    enet    100010   1500   -       -       -     -         0       0

VLAN DynCreated
-----
10    static

VLAN AREHops STEHops Backup CRF lq VLAN
-----
Console> (enable)

```

## Assign Switch Ports to VLANs

After you create a VLAN, you can assign one or more switch ports to the VLAN. Devices that are connected to those ports will belong to that VLAN. Make sure that the connected device is properly configured with an IP address, subnet mask, and default gateway in the subnet that is associated with the VLAN.

To add a switch port to a VLAN, perform this task in privileged mode:

	Task	Command
Step 1	Add one or more switch ports to a VLAN.	<b>set vlan</b> <i>vlan_num</i> <i>mod_num/port_num</i>
Step 2	Verify that the ports are properly assigned to the VLAN.	<b>show vlan</b> <i>vlan_num</i>
Step 3	Check to which VLAN a particular port belongs.	<b>show port</b> [ <i>mod_num/port_num</i> ]

This example shows how to assign ports to a VLAN and verify to which VLAN the ports belong:

```

Console> (enable) set vlan 10 3/1-2
VLAN 10 modified.
VLAN 1 modified.
VLAN Mod/Ports
-----
10    3/1-2

Console> (enable) show vlan 10
VLAN Name                Status      IfIndex Mod/Ports, Vlans
-----
10    Corporate             active     103    3/1-2

<... output truncated ...>
Console> (enable) show port 3
Port Name                Status      Vlan      Level Duplex Speed Type
-----
3/1                      connected  10        normal full  1000 1000BaseSX
3/2                      connected  10        normal full  1000 1000BaseSX
<... output truncated ...>
Console> (enable)

```





## Configuring EtherChannel and VLAN Trunks

---

To configure EtherChannel VLAN trunks on the switch, perform these tasks:

- 
- Step 1 [Configuring EtherChannel](#)—Configure multiple ports between switches as a single virtual link.
  - Step 2 [Configuring VLAN Trunks](#)—Configure the EtherChannel link as a trunk port to transport traffic for multiple VLANs.
- 

### Configuring EtherChannel

EtherChannel port bundles provide increased bandwidth between network devices by grouping multiple Fast or Gigabit Ethernet ports into a single logical transmission path.

An EtherChannel bundle contains two or more Fast or Gigabit Ethernet-capable ports. EtherChannel capabilities and flexibility vary, depending on your hardware and software. Use the **show port capabilities** command to determine the supported channeling capabilities on your switch.

The Port Aggregation Protocol (PAgP) negotiates EtherChannel port groups automatically. By default, Ethernet ports are set to **auto**. If a group of EtherChannel ports that are set to **auto** is connected to a group of ports that are set to **desirable** or **on**, PAgP automatically creates an EtherChannel connection between those ports. For complete information on the various EtherChannel modes, refer to the *Software Configuration Guide*.

You can configure ports to negotiate an EtherChannel bundle with the neighboring device automatically (using the **auto** and **desirable** modes), or you can place the ports in **on** mode on both ends of the link. Ports in **on** mode will not form a channel with ports in **auto** or **desirable** mode. By default, Fast and Gigabit Ethernet ports are in **auto** mode.



#### Note

---

There are additional configuration restrictions that are associated with EtherChannel port bundles. For complete information, refer to the *Software Configuration Guide* for your switch.

---

To configure a group of Fast Ethernet or Gigabit Ethernet ports as an EtherChannel port bundle, perform this task in privileged mode:

	Task	Command
Step 1	If you are unsure which ports support EtherChannel or how the ports are grouped, verify the port groups for the module or switch that you are configuring.	<b>show port capabilities</b> [ <i>mod_num</i> [/ <i>port_num</i> ]]
Step 2	Create a channel on the desired ports.	<b>set port channel</b> <i>port_list</i> <b>mode</b> { <b>on</b>   <b>off</b>   <b>desirable</b>   <b>auto</b> } [ <b>silent</b>   <b>non-silent</b> ]
Step 3	Verify the channeling configuration.	<b>show port channel</b> [ <i>mod_num</i> [/ <i>port_num</i> ]]

This example shows how to configure a two-port Gigabit EtherChannel bundle and verify the EtherChannel configuration (this example assumes that there are no configuration mismatches between the local and neighboring ports, and that the ports on the other end of the link are in **auto** or **desirable** mode):

```
Console> (enable) set port channel 2/1-2 mode desirable
Port(s) 2/1-2 are assigned to admin group 21.
Port(s) 2/1-2 channel mode set to desirable.
```

```
Console> (enable) show port channel
```

```
Port  Status      Channel      Admin Ch
      Mode                Group  Id
-----
 2/1  connected  desirable  silent      21    833
 2/2  connected  desirable  silent      21    833
-----
```

```
Port  Device-ID          Port-ID          Platform
-----
 2/1  003812064          1/1              WS-C4006
 2/2  003812064          1/2              WS-C4003
-----
```

```
Console> (enable)
```

## Configuring VLAN Trunks

VLAN trunks carry the traffic of multiple VLANs. Fast Ethernet and Gigabit Ethernet ports (including EtherChannel port bundles) can use Inter-Switch Link (ISL) or IEEE 802.1Q encapsulation for VLAN trunking. Other media use other encapsulation schemes (for example, LAN Emulation on ATM).

By default, Fast Ethernet and Gigabit Ethernet ports are in **auto** mode. If the port on the other end of the link is in **desirable** mode or **on**, a port in **auto** mode automatically becomes a trunk port.

What the default trunk encapsulation is depends on which encapsulation the hardware supports:

- **negotiate** (on hardware supporting both ISL and 802.1Q)
- **isl** (on hardware supporting ISL only)
- **dot1q** (on hardware supporting 802.1Q only)



**Note** For complete information on the various trunk modes and encapsulation types, refer to the *Software Configuration Guide* for your switch.

To configure a Fast Ethernet or Gigabit Ethernet port as a trunk, perform this task in privileged mode:

	Task	Command
Step 1	If you are unsure which encapsulation types that a port supports, verify the port capabilities.	<b>show port capabilities</b> [ <i>mod_num</i> [/ <i>port_num</i> ]]
Step 2	Configure a Fast or a Gigabit Ethernet port as a trunk. If you are configuring an EtherChannel port bundle as a trunk, specify any one of the ports in the channel.	<b>set trunk <i>mod_num</i>/<i>port_num</i> {on   desirable   auto} {isl   dot1q   negotiate}</b>
Step 3	Verify that the trunk configuration is correct.	<b>show trunk</b>

This example shows how to configure a port to become a trunk and how to verify the trunk configuration (this example assumes that the port on the other end of the link is in **auto**, **desirable**, or **on** mode and supports IEEE 802.1Q encapsulation):

```

Console> (enable) set trunk 2/1 desirable dot1q
Port(s) 2/1-2 trunk mode set to desirable.
Port(s) 2/1-2 trunk type set to dot1q.
Console> (enable) show trunk
Port      Mode           Encapsulation  Status      Native vlan
-----
2/1      desirable     dot1q          trunking    1
2/2      desirable     dot1q          trunking    1

Port      Vlans allowed on trunk
-----
2/1      1-1005
2/2      1-1005

Port      Vlans allowed and active in management domain
-----
2/1      1,10,20,30,40,50,60
2/2      1,10,20,30,40,50,60

Port      Vlans in spanning tree forwarding state and not pruned
-----
2/1      1,10,20,30,40,50,60
2/2      1,10,20,30,40,50,60
Console> (enable)

```





# Administering the Switch

These sections describe some of the common administrative tasks that you need to perform on your switch:

- [Configuring the Global System Settings](#)—How to set system information, the time and date, and the login and enable passwords.
- [Configuring the Login Banner](#)—How to change message-of-the-day displays.
- [Configuring DNS](#)—How to configure the switch to use the Domain Name System (DNS).
- [Managing Configuration Files](#)—How to work with switch configuration files.
- [Managing System Images](#)—How to upload and download system image files.
- [Working with the Flash File System](#)—How to use the Flash file system.

## Configuring the Global System Settings

You can specify a variety of useful global system settings for your switch, such as system information, current date and time, system prompt, and passwords.

To configure the global system settings, perform this task in privileged mode:

	Task	Command
Step 1	Set the system name. The prompt changes to the system name.	<b>set system name</b> <i>name_string</i>
Step 2	Set the system location.	<b>set system location</b> <i>location_string</i>
Step 3	Set the system contact.	<b>set system contact</b> <i>contact_string</i>
Step 4	Set the current date and time.	<b>set time</b> <i>mm/dd/yy hh:mm:ss</i>
Step 5	Set the system prompt (overriding the prompt string generated by the <b>set system name</b> command).	<b>set module name</b> <i>mod_num</i> [ <i>name_string</i> ]
Step 6	Set the system prompt (overriding the prompt string generated by the <b>set system name</b> command).	<b>set prompt</b> <i>prompt_string</i>

	Task	Command
Step 7	Set the console password (used to access the switch CLI).	<b>set password</b>
Step 8	Set the enable password (used to access privileged configuration mode).	<b>set enablepass</b>

This example shows how to configure the global system settings:

```

Console> (enable) set system name 4003-ER-F1
System name set.
4003-ER-F1> (enable) set system location Bldg 1 Equip Room
System location set.
4003-ER-F1> (enable) set system contact sysadmin@bigcorp.com
System contact set.
4003-ER-F1> (enable) set time 04/30/1999 9:45:00
Fri Apr 30 1999, 09:45:00
4003-ER-F1> (enable) set module name 2 Gig Uplinks
Module name set.
4003-ER-F1> (enable) set module name 3 Gig Server Links
Module name set.
4003-ER-F1> (enable) set password
Enter old password: <old_password>
Enter new password: <new_password>
Retype new password: <new_password>
Password changed.
4003-ER-F1> (enable) set enablepass
Enter old password: <old_enablepass>
Enter new password: <new_enablepass>
Retype new password: <new_enablepass>
Password changed.
4003-ER-F1> (enable)

```

## Configuring the Login Banner

The login banner, or message of the day, is the text that appears onscreen when you open a Telnet session or console port connection to the switch. The login banner can be up to 255 characters.

To configure the login banner, perform this task in privileged mode:

Task	Command
Enter the message of the day (where <i>c</i> is a character that signifies the beginning and end of the message).	<b>set banner motd c [text] c</b>

You can verify the login banner configuration by ending your session and reconnecting, or by viewing the configuration using the **show configuration** command.

This example shows how to configure the login banner and how to verify the banner configuration (when connected through the console port):

```

Console> (enable) set banner motd %
4003-ER-F1 (Catalyst 4003)
Access Restricted
%
MOTD banner set

```

```
Console> (enable) exit
Session Disconnected...
```

```
Cisco Systems, Inc. Console
```

```
Thu Apr 30 1999, 16:37:03
```

```
4003-ER-F1 (Catalyst 4003)
Access Restricted
```

```
Enter password:
```

## Configuring DNS

Domain Name System (DNS) allows you to use host names instead of IP addresses to refer to other devices on the network. To use DNS, you must have one or more name servers that are connected to the network.

To configure DNS, perform this task in privileged mode:

	Task	Command
Step 1	Set the address of the DNS server. The first address entered is considered the primary server. If more than one server is entered, you can use the <b>primary</b> keyword to make a particular name server the primary server.	<b>set ip dns server</b> <i>ip_addr</i> [ <b>primary</b> ]
Step 2	Set the domain name.	<b>set ip dns domain</b> <i>name</i>
Step 3	Enable DNS.	<b>set ip dns enable</b>
Step 4	Verify the DNS configuration. Use the <b>noalias</b> keyword to show IP addresses instead of server names.	<b>show ip dns</b> [ <b>noalias</b> ]

This example shows how to configure the switch to use DNS and how to verify the DNS configuration:

```
Console> (enable) set ip dns server 10.10.10.100
10.10.10.100 added to DNS server table as primary server.
Console> (enable) set ip dns domain bigcorp.com
Default DNS domain name set to bigcorp.com
Console> (enable) set ip dns enable
DNS is enabled
Console> (enable) show ip dns
DNS is currently enabled.
The default DNS domain name is: bigcorp.com

DNS name server                status
-----
dns-server-1.bigcorp.com      primary
Console> (enable)
```

# Managing Configuration Files

Configuration files contain the switch configuration information. Often, you will want to view the current configuration, back up the existing configuration before making changes, or configure the switch using a backup configuration.

## Displaying the Current Configuration

To display the current configuration on screen, use the **show config** command, as follows:

```

Console> (enable) show config
.....
.....
.....
..

begin
!
#version 5.1(1)
!
set password $1$FMFQ$HfZR5DUszVHIRhrz4h6V70
set enablepass $1$FMFQ$HfZR5DUszVHIRhrz4h6V70
set prompt Console>
set length 24 default
set logout 20
set banner motd ^C
4003-ER-F1 (Catalyst 4003)
Access Restricted
^C

<...output truncated...>

end
Console> (enable)

```

## Backing Up the Current Configuration

To copy the current configuration to a file on a Trivial File Transfer Protocol (TFTP) server, write the configuration file to a remote host using the **copy config tftp** command, as follows:

```

Console> (enable) copy config tftp
IP address or name of remote host []? 10.10.10.150
Name of file to copy to []? 4003-ER-F1.cfg

Upload configuration to tftp:4003-ER-F1.cfg, (y/n) [n]? y
.....
.....
.....
..
/
Configuration has been copied successfully.
Console> (enable)

```

## Configuring the Switch Using a Backup Configuration

To configure the switch using a configuration file on a TFTP server, copy the configuration file to a remote host using the **copy tftp config** command, as follows:

```

Console> (enable) copy tftp config
IP address or name of remote host []? 10.10.10.150
Name of file to copy from []? dns_config.cfg

Configure using tftp:dns_config.cfg (y/n) [n]? y

Finished network download. (135 bytes)
>>
>> set ip dns server 10.10.10.100 primary
10.10.10.100 added to DNS server table as primary server.
>> set ip dns enable
DNS is enabled
>> set ip dns domain bigcorp.com
Default DNS domain name set to bigcorp.com
Console> (enable)

```

## Managing System Images

To change the system software image on your switch, obtain the appropriate software image file for your switch, place it on a TFTP server, and use the procedure for your switch to copy the image to the switch and reboot using the new image.

To copy a system software image from a TFTP server and reboot the switch using the new software image, perform this task in privileged mode:

	Task	Command
Step 1	Copy a system image file from a remote host.	<b>copy tftp flash</b>
Step 2	Modify the BOOT variable, prepending the new image to the BOOT string.	<b>set boot system flash <i>file_id</i> prepend</b>
Step 3	You must reset the switch to run the new software, which will disconnect any Telnet sessions that are established with the switch (a console port session will remain connected).	<b>reset system</b>
Step 4	Check the software version number to confirm that the switch is running the new software.	<b>show version</b>

This example shows how to copy a software image from a TFTP server, reset the switch, and check the version of the installed software image:

```

Console> (enable) copy tftp flash
IP address or name of remote host []? 10.10.10.150
Name of file to copy from []? cat4000.5-1-1.bin
Flash device [bootflash]?
Name of file to copy to [cat4000.5-1-1.bin]?

8784112 bytes available on device bootflash, proceed (y/n) [n]? y
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCC
File has been copied successfully.
Console> (enable) set boot system flash bootflash:cat4000.5-1-1.bin prepend
BOOT variable = bootflash:cat4000.5-1-1.bin,1;bootflash:cat4000.4-4-1.bin,1;
Console> (enable) reset system
This command will reset the system.
Do you want to continue (y/n) [n]? y
1999 Mar 26 22:01:56 %SYS-5-SYS_RESET 0:00.505752: Please set IPAddr variable
0:00.506320: Please set Netmask variable
0:00.506675: Please set Broadcast variable
0:00.507176: Network is not configured
WS-X4012 bootrom version 4.4(1), built on 1998.12.28 10:22:22
H/W Revisions: Meteor: 4 Comet: 8 Board: 2
Supervisor MAC addresses: 00:10:7b:f7:2f:00 through 00:10:7b:f7:32:ff (1024 addresses)
Installed memory: 32 MB
Testing LEDs.... done!
The system will autoboot in 5 seconds.
Type control-C to prevent autobooting.
rommon 1 >
The system will now begin autobooting.
Autobooting image: "bootflash:cat4000.5-1-1.bin"
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCC#####
Starting Off-line Diagnostics

<...output truncated...>

Cisco Systems, Inc. Console

4003-ER-F1
Access Restricted

Enter password: <password>
Console> show version 1
Mod Port Model Serial # Versions
-----
1 0 WS-X4012 JAB023806LN Hw : 0.1
Gsp: 5.1(1)
Nmp: 5.1(1)

Console>

```

# Working with the Flash File System

You can use the Flash file system to store system-software images and configuration files locally on the switch (instead of saving to a TFTP server).



Note

The Catalyst 4500 series, 2980G, and 2948G switches support the **bootflash:** Flash device.

To format the **bootflash:**, perform this task in privileged mode:

Task	Command
Format the desired Flash device.	<b>format</b> [ <i>m/</i> ] <i>device:</i>

This example shows how to format a Flash PC card:

```
Console> (enable) format slot0:

All sectors will be erased, proceed (y/n) [n]? y

Enter volume id (up to 30 characters): Supe III Flash Card

Formatting sector 1
Format device slot0 completed
Console> (enable)
```

To copy Flash files between **bootflash:** and a TFTP server, perform one of these tasks in privileged mode:

Task	Command
Copy the current configuration to a Flash device or a TFTP server.	<b>copy config</b> { <b>bootflash:</b>   <i>file-id</i>   <b>tftp</b> }
Copy a Flash file on the current default Flash device to a TFTP server.	<b>copy</b> <i>file-id</i> <b>tftp</b>
Copy a file from a TFTP server to a Flash device (you are prompted for the Flash device name).	<b>copy tftp</b> <i>file-id</i>

This example shows how to copy the current configuration to the current default Flash device:

```
Console> (enable) copy config flash
Flash device [bootflash]?
Name of file to copy to []? bootflash-ER-F1.cfg

Upload configuration to slot0:4003-ER-F1.cfg
13259828 bytes available on device bootflash, proceed (y/n) [n]? y
.....
.....

Configuration has been copied successfully.
Console> (enable)
```

This example shows how to copy a file from the current default Flash device to a TFTP server:

```
Console> (enable) copy 5509-ER-F1.cfg tftp
IP address or name of remote host []? 10.10.10.150
Name of file to copy to [4003-ER-F1.cfg]?
-
File has been copied successfully.
console> (enable)
```

This example shows how to copy a file from a TFTP server to a Flash device:

```
Console> (enable) copy tftp flash
IP address or name of remote host []? 10.10.10.150
Name of file to copy from []? 4003-ER-F1.cfg
Flash device [bootflash]?
Name of file to copy to [4003-ER-F1.cfg]?

16376740 bytes available on device bootflash, proceed (y/n) [n]? y
-
File has been copied successfully.
Console> (enable)
```

To display a list of files on the **bootflash:**, perform this task in privileged mode:

Task	Command
Display a list of files on the <b>bootflash:</b>	<b>dir [all   deleted   long]</b>

This example shows how to list the files on a Flash device:

```
Console> (enable) dir
-#- -length- ----date/time----- name
  2      7004 Apr 19 1998 10:06:37 4003-ER-F1.cfg
  3  3102520 Apr 19 1998 10:09:42 cat4000.5-1-1.bin

13259956 bytes available (3124044 bytes used)
Console> (enable)
```



# Monitoring the Switch

These sections describe how to monitor the switch using a variety of commands:

- [Checking System Status](#)—Display global system status information for the switch.
- [Checking Module Status](#)—Display module-specific status information.
- [Checking Port Status](#)—Display port-specific status information.
- [Checking Port Capabilities](#)—Display feature support information for switch ports.
- [Checking Network Connectivity](#)—Test connectivity to other devices using **ping** and **tracert**.
- [Displaying Spanning Tree Information](#)—Display the spanning tree state and other information for ports and VLANs.
- [Displaying Neighbor Information](#)—Display information about directly connected Cisco devices.
- [Displaying the Forwarding Table](#)—Display the contents of the Layer 2 forwarding table.
- [Displaying User Sessions](#)—Display information about active user sessions on the switch.
- [Displaying Version Information](#)—Display hardware, firmware, and software version information.

## Checking System Status

Use the **show system** command to display global system status information for the switch.

To check the system status, perform this task in privileged mode:

Task	Command
Display system status information.	<b>show system</b>

This example shows how to check the system status:

```
Switch> (enable) show system
PS1-Status PS2-Status Fan-Status Temp-Alarm Sys-Status Uptime d,h:m:s Logout
-----
ok          none          ok           off          ok           1,19:43:11  20 min

PS1-Type   PS2-Type   Modem   Baud   Traffic Peak Peak-Time
-----
WS-C4008  none      disable 9600   0%     0% Fri Apr 9 1999, 18:54:17

System Name           System Location           System Contact
-----
```

```
4003-ER-F1          Bldg 1 Equip Room      sysadmin@bigcorp.com
Switch> (enable)
```

## Checking Module Status

Use the **show module** command to display module status information for the switch. Specify a module number to display information for that module only.

To check module status, perform this task in privileged mode:

Task	Command
Display switching module status information.	<b>show module</b> [ <i>mod_num</i> ]

This example shows how to check the status of all modules in the switch:

```
Console> (enable) show module
Mod Slot Ports Module-Type           Model           Status
-----
1   1   0   Switching Supervisor      WS-X4012        ok
2   2   6   1000BaseX Ethernet       WS-X4306        ok
3   3   6   1000BaseX Ethernet       WS-X4306        ok

Mod Module-Name           Serial-Num
-----
1                           JAB023806JR
2                           JAB0240004D
3                           JAB024000YY

Mod MAC-Address(es)      Hw   Fw   Sw
-----
1  00-10-7b-f8-03-00 to 00-10-7b-f8-06-ff 0.1  4.4(1)  5.1(1)
2  00-10-7b-f6-b1-a8 to 00-10-7b-f6-b1-ad 0.2
3  00-10-7b-f6-b2-1a to 00-10-7b-f6-b2-1f 0.2
Console> (enable)
```

This example shows how to check the status of an individual module in the switch:

```
Console> (enable) show module 2
Mod Slot Ports Module-Type           Model           Status
-----
2   2   6   1000BaseX Ethernet       WS-X4306        ok

Mod Module-Name           Serial-Num
-----
2                           JAB0240004D

Mod MAC-Address(es)      Hw   Fw   Sw
-----
2  00-10-7b-f6-b1-a8 to 00-10-7b-f6-b1-ad 0.2
Console> (enable)
```

## Checking Port Status

Use the **show port** command to display switch port status information. Specify a module number to display information for ports on that module only. Specify a module number and port number to display information for that port only.

To check port status, perform this task in privileged mode:

Task	Command
Display switch port status information.	<b>show port</b> [ <i>mod_num</i> [/ <i>port_num</i> ]]

This example shows how to check the status of all ports on module 3:

```

Console> (enable) show port 3
Port Name                Status      Vlan      Level Duplex Speed Type
-----
 3/1                    connected  10        normal full  1000 1000BaseSX
 3/2                    connected  10        normal full  1000 1000BaseSX
 3/3                    connected  20        normal full  1000 1000BaseSX
 3/4                    connected  40        normal full  1000 1000BaseSX
 3/5                    notconnect 1         normal full  1000 No GBIC
 3/6                    notconnect 1         normal full  1000 No GBIC

Port Security Secure-Src-Addr Last-Src-Addr Shutdown Trap IfIndex
-----
 3/1 disabled
 3/2 disabled
 3/3 disabled
 3/4 disabled
 3/5 disabled
 3/6 disabled
           No disabled 15
           No disabled 16
           No disabled 17
           No disabled 18
           No disabled 19
           No disabled 20

Port Send FlowControl Receive FlowControl RxPause TxPause Unsupported
      admin oper      admin oper      opcodes
-----
 3/1 desired on      desired on      0 0 0
 3/2 desired on      desired on      0 0 0
 3/3 desired on      desired on      0 0 0
 3/4 desired on      desired on      0 0 0
 3/5 desired off     off off      0 0 0
 3/6 desired off     off off      0 0 0

Port Status Channel Channel Neighbor Neighbor
      Status mode  status device  port
-----
 3/1 connected off not channel
 3/2 connected off not channel
 3/3 connected off not channel
 3/4 connected off not channel
 3/5 notconnect off not channel
 3/6 notconnect off not channel

Port Align-Err FCS-Err Xmit-Err Rcv-Err UnderSize
-----
 3/1 - 0 0 0 0
 3/2 - 0 0 0 0
 3/3 - 0 0 0 0
 3/4 - 0 0 0 0
 3/5 - 0 0 0 0
 3/6 - 0 0 0 0

```

```

Port   Single-Col  Multi-Coll  Late-Coll  Excess-Col  Carri-Sen  Runts    Giants
-----
3/1    0           0           0           0           0           0         0
3/2    0           0           0           0           0           0         0
3/3    0           0           0           0           0           0         0
3/4    0           0           0           0           0           0         0
3/5    0           0           0           0           0           0         0
3/6    0           0           0           0           0           0         0

Last-Time-Cleared
-----
Fri Apr 30 1999, 18:54:17
Console> (enable)

```

## Checking Port Capabilities

Use the **show port capabilities** command to display information about feature support for a specific port. Specify a module number to display information for ports on that module only. Specify a module number and port number to display information for that port only.

To check port capabilities, perform this task in privileged mode:

Task	Command
Display switch port capability information.	<b>show port capabilities</b> [ <i>mod_num</i> [/ <i>port_num</i> ]]

This example shows how to check the port capabilities of a specific port:

```

Console> (enable) show port capabilities 3/1
Model                WS-X4306
Port                 3/1
Type                 1000BaseSX
Speed                1000
Duplex               full
Trunk encap type     802.1Q
Trunk mode           on,off,desirable,auto,nonegotiate
Channel              3/1-2
Flow control         receive-(off,on,desired),send-(off,on,desired)
Security             yes
Membership           static,dynamic
Fast start           yes
QOS                  n/a
Rewrite              no
UDLD                 Capable
Console> (enable)

```

## Checking Network Connectivity

After you assign an IP address and a default gateway, and at least one switch port is connected to the network and properly configured, you should be able to communicate with other nodes on the network.

To check whether the switch is properly connected and configured, perform this task in privileged mode:

	Task	Command
Step 1	Ping another node on the network.	<b>ping</b> [-s] <i>host</i> [ <i>packet_size</i> ] [ <i>packet_count</i> ]
Step 2	(Optional) Trace the route of packets through the network to another node (only Layer 3 devices, such as routers, will appear in the path).	<b>tracert</b> [-q <i>nqueries</i> ] <i>host</i> [ <i>data_size</i> ]
Step 3	If the host is unresponsive, check the IP address, subnet mask, broadcast address, and VLAN assignment of the in-band (sc0) switch interface.	<b>show interface</b>
Step 4	If the interface is properly configured, check the default gateway assignment.	<b>show ip route</b>

This example shows how to check connectivity out a switch port using the **ping** and **tracert** commands:

```

Console> (enable) ping 10.10.1.10
10.10.1.10 is alive
Console> (enable) ping -s 5509-ER-F1 1200 4
PING 10.10.1.10: 1200 data bytes
1208 bytes from 10.10.1.10: icmp_seq=0. time=9 ms
1208 bytes from 10.10.1.10: icmp_seq=1. time=11 ms
1208 bytes from 10.10.1.10: icmp_seq=2. time=16 ms
1208 bytes from 10.10.1.10: icmp_seq=3. time=10 ms

----10.10.1.10 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 9/11/16
Console> (enable) traceroute 10.10.10.100
traceroute to dns-server-1.bigcorp.com (10.10.10.100), 30 hops max, 40 byte packets
 1 rsm-vlan1-if.bigcorp.com (10.10.1.1)  2 ms  2 ms  1 ms
 2 dns-server-1.bigcorp.com (10.10.10.100) 2 ms  2 ms  1 ms
Console> (enable) traceroute dns-server-1 1400
traceroute to dns-server-1.bigcorp.com (10.10.10.100), 30 hops max, 1440 byte packets
 1 rsm-vlan1-if.bigcorp.com (10.10.1.1)  1 ms  2 ms  1 ms
 2 dns-server-1.bigcorp.com (10.10.10.100) 2 ms  2 ms  2 ms
Console> (enable)

```

## Displaying Spanning Tree Information

Spanning tree prevents the formation of network loops. The switch maintains an instance of spanning tree for every VLAN.

To display spanning tree information for the switch, perform this task in privileged mode:

Task	Command
Display spanning tree information.	<b>show spantree</b> [ <i>vlan</i>   <i>mod_num/port_num</i> ] [ <b>active</b> ]

This example shows how to display spanning tree information for VLAN 10:

```

Console> (enable) show spantree 10
VLAN 10
Spanning tree enabled
Spanning tree type          ieee

Designated Root            00-10-7b-f8-03-09
Designated Root Priority    32768
Designated Root Cost       0
Designated Root Port       1/0
Root Max Age 20 sec      Hello Time 2 sec  Forward Delay 15 sec

Bridge ID MAC ADDR         00-10-7b-f8-03-09
Bridge ID Priority          32768
Bridge Max Age 20 sec      Hello Time 2 sec  Forward Delay 15 sec

Port      Vlan  Port-State    Cost  Priority  Fast-Start  Group-Method
-----
2/1-2    10    forwarding    3     32     disabled   channel
3/1      10    forwarding    4     32     enabled
3/2      10    forwarding    4     32     enabled
Console> (enable)

```

## Displaying Neighbor Information

Use the **show cdp neighbors** command to display information about directly connected Cisco devices. Specify a module number to display information for that module only. Specify a module number and port number to display information for that port only. The **vlan**, **duplex**, and **capabilities** keywords display different information about neighbor devices. The **detail** keyword shows detailed neighbor information.

To display neighbor information, perform this task in privileged mode:

Task	Command
Display neighbor device information.	<b>show cdp neighbors</b> [ <i>mod_num</i> [/ <i>port_num</i> ]] [ <b>vlan</b>   <b>duplex</b>   <b>capabilities</b>   <b>detail</b> ]

This example shows how to display summary information for all neighboring Cisco devices:

```

Console> (enable) show cdp neighbors
* - indicates vlan mismatch.
# - indicates duplex mismatch.
Port      Device-ID                Port-ID                Platform
-----
2/1       003812064                1/1                    WS-C5509
2/2       003812064                1/2                    WS-C5509
Console> (enable)

```

This example shows how to display detailed neighbor information for Cisco devices that are connected to a particular port:

```

Console> (enable) show cdp neighbors 2/1 detail
Port (Our Port): 2/1
Device-ID: 003812064
Device Addresses:
  IP Address: 10.10.1.10
Holdtime: 129 sec
Capabilities: TRANSPARENT_BRIDGE SR_BRIDGE SWITCH
Version:
  WS-C5509 Software, Version McpSW: 5.1(1) NmpSW: 5.1(1)
  Copyright (c) 1995-1999 by Cisco Systems
Platform: WS-C5509
Port-ID (Port on Neighbors's Device): 1/1
VTP Management Domain: BigCorp
Native VLAN: 1
Duplex: full
Console> (enable)

```

## Displaying the Forwarding Table

The switch makes forwarding decisions using a table that maps switch ports to MAC addresses. To display the contents of the table, use the **show cam** command.

To display the contents of the forwarding table, perform this task in privileged mode:

Task	Command
Display forwarding table entries.	<pre> <b>show cam [count] {dynamic   static   permanent   system} [vlan]</b>  <b>show cam {dynamic   static   permanent   system} mod_num/port_num</b>  <b>show cam mac_addr [vlan]</b> </pre>

This example shows how to display all dynamically learned forwarding table entries for VLAN 10:

```

Console> (enable) show cam dynamic 10
* = Static Entry. + = Permanent Entry. # = System Entry. R = Router Entry.
X = Port Security Entry

VLAN  Dest MAC/Route Des      [CoS]  Destination Ports or VCs / [Protocol Type]
-----
10     00-10-0d-3e-8c-00          2/1 [ALL]
10     00-01-70-2c-75-80          3/1 [ALL]
10     00-01-70-3d-60-10          3/2 [ALL]
Total Matching CAM Entries Displayed = 3
Console> (enable)

```

## Displaying User Sessions

To display the current user sessions on the switch, perform this task in privileged mode:

Task	Command
Display the current user sessions.	<b>show users</b> [noalias]

This example shows how to display information about user sessions on the switch:

```
Console> (enable) show users
  Session  User              Location
  -----
  console
  telnet           sam-pc.bigcorp.com
  * telnet         jake-nt.bigcorp.com
Console> (enable)
```

This example shows how to display information about user sessions using the **noalias** keyword to display the IP addresses of connected hosts:

```
Console> (enable) show users noalias
  Session  User              Location
  -----
  console
  telnet           10.10.10.12
  * telnet         10.10.20.46
Console> (enable)
```

## Displaying Version Information

To display the version information for the switch, perform this task in privileged mode:

Task	Command
Display version information for the switch.	<b>show version</b> [mod_num]

This example shows how to display version information for the switch:

```
Console> (enable) show version
WS-C4003 Software, Version NmpSW: 5.1(1)
Copyright (c) 1995-2000 by Cisco Systems, Inc.
NMP S/W compiled on May 1 1999, 05:20:04
GSP S/W compiled on May 1 1999, 23:59:01

System Bootstrap Version: 4.4(1)

Hardware Version: 0.1  Model: WS-C4003  Serial #: JAB023806JR

Mod Port Model      Serial #          Versions
-----
1   0   WS-X4012  JAB023806JR      Hw : 0.1
                               Gsp: 5.1(1)
                               Nmp: 5.1(1)
2   48  WS-X4148  JAB023402QH      Hw : 1.0
```

```
3 6 WS-X4306 JAB024000YY Hw : 0.2

      DRAM          FLASH          NVRAM
Module Total  Used   Free   Total  Used   Free   Total Used  Free
-----
1      32768K 17886K 14882K 12288K 6873K 5415K 480K 128K 352K

Uptime is 1 day, 20 hours, 2 minutes
Console> (enable)
```





## Default Configurations

---

This chapter shows the following default global configurations:

- [Default Global System Configuration](#)
- [Default Switch Port Configuration](#)
- [Default VTP Configuration](#)
- [Default VLAN Configuration](#)
- [Default EtherChannel and VLAN Trunk Configuration](#)

### Default Global System Configuration

The default global system configuration is as follows:

Feature	Default Setting
Console port	The console port is configured as follows: 9600 baud, 8 data bits, no parity, 1 stop bit.
Passwords	There is no default password for normal and privileged modes. Press <b>Return</b> at the Enter Password prompt.
In-band (sc0) interface configuration	The in-band (sc0) interface is in VLAN 1; the IP address, subnet mask, and broadcast address are set to 0.0.0.0.
Default gateway	Default gateway address is 0.0.0.0 with a metric of 0.
System name, location, and contact	None configured.
System prompt	Console>

## Default Switch Port Configuration

The default Ethernet, Fast Ethernet, and Gigabit Ethernet switch port configuration is as follows:

Feature	Default Setting
Port enable state	All ports are enabled
Port name	None
Port priority level	Normal
Port speed (on 10/100-Mbps Fast Ethernet)	<b>auto</b> (autonegotiate both speed and duplex)
Port duplex setting	<ul style="list-style-type: none"> <li>• <b>auto</b> on 10/100-Mbps Fast Ethernet configured for <b>auto</b> port speed (to modify, set port speed manually)</li> <li>• <b>half</b> on 10-Mbps Ethernet, 100-Mbps Fast Ethernet, and 10/100-Mbps Fast Ethernet with speed configured manually</li> <li>• <b>full</b> on Gigabit Ethernet ports (cannot be modified)</li> </ul>
VLAN	All ports are on VLAN 1
Flow control <sup>1</sup>	<ul style="list-style-type: none"> <li>• Fast Ethernet—Flow control set to <b>off</b> for receive (Rx) and <b>on</b> for transmit (Tx)</li> <li>• Gigabit Ethernet—Flow control set to <b>off</b> for receive (Rx) and <b>desired</b> for transmit (Tx)</li> </ul>
Link negotiation <sup>1</sup>	Enabled

1. Not all modules support flow control and link negotiation.

## Default VTP Configuration

The default VTP configuration is as follows:

Feature	Default Setting
VTP	Disabled (switch is in a no-management domain state)
VTP version 2	Disabled
VTP domain name	Not specified
VTP mode	Server
VTP pruning	Disabled
VTP password	None (management domains are set to nonsecure mode)

## Default VLAN Configuration

The default Ethernet VLAN configuration is as follows:

Feature	Default Setting
Native VLAN	VLAN 1
MTU size	1500 bytes
Pruning eligibility	VLANs 2–1000 are pruning eligible
VLAN SAID value	100,000 plus the VLAN number. The SAID for VLAN 1 is 100001, for VLAN 2 100002, for VLAN 3 100003, and so on.

## Default EtherChannel and VLAN Trunk Configuration

The default EtherChannel and VLAN trunk configuration on Fast Ethernet and Gigabit Ethernet ports is as follows:

Feature	Default Setting
EtherChannel mode	<b>auto silent</b> <sup>1</sup>
VLAN trunk encapsulation	<ul style="list-style-type: none"> <li>• <b>negotiate</b> (on hardware supporting both ISL and 802.1Q)</li> <li>• <b>dot1q</b> (on hardware supporting 802.1Q only)</li> </ul>
VLAN trunk mode	<b>auto</b>
Allowed VLANs	All VLANs are allowed for trunking

1. The **silent** and **non-silent** modes are supported in software release 5.2 and later.





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