ZebOS-XP®
Network Platform

Version 1.4
Extended Performance

System Management
Command Reference

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Contents

Preface

This document describes the ZebOS-XP commands for system mangement.

Audience

This document is intended for network administrators and other engineering professionals who configure and manage network services in the Linux operating system.

Conventions

Table P-1 shows the conventions used in this guide.

Table P-1: Conventions

Convention	Description
Italics	Emphasized terms; titles of books
Note:	Special instructions, suggestions, or warnings
`monospaced type`	Code elements such as commands, functions, parameters, files, and directories

Contents

This document contains these chapters and appendices:

- Chapter 14, *Telnet*
- Chapter 15, *User Management*

Related Documents

The following guides are related to this document:

- *System Management Configuration Guide*
- *Integrated Management Interface Command Reference*
- *Installation Guide*

Note: All ZebOS-XP technical manuals are available to licensed customers at http://www.ipinfusion.com/support/document_list.

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CHAPTER 1 Command Line Interface

This chapter introduces the ZebOS-XP Command Line Interface (CLI) and how to use its features.

Overview

You use the CLI to configure, monitor, and maintain ZebOS-XP devices. The CLI is text-based and each command is usually associated with a specific task.

You can give the commands described in this manual locally from the console of a device running ZebOS-XP or remotely from a terminal emulator such as `putty` or `xterm`. You can also use the commands in scripts to automate configuration tasks.

Starting the Command Line Interface

You must start daemons as described in this section before you can use the CLI. The general steps are listed below. For details about the ZebOS-XP daemons, see the *Installation Guide.*

1. Start your terminal emulator and connect to the device or go to the console of the device running ZebOS-XP.
2. Connect to the directory where you installed the ZebOS-XP executables.
3. Start the Network Services Module (NSM).
   ```
   # ./nsm -d
   ```
4. Start the protocol module daemons that your organization uses, such as `mstpd`, `ospf6d`, or `ripd`.
   ```
   # ./mstpd -d
   ```
5. Start the Integrated Management Interface (IMI) daemon.
   ```
   # ./imi -d
   ```
6. Start the IMI shell.
   ```
   # ./imish
   ```
   Note: Your organization may use a ZebOS-XP build that does not include `imish`. If that is the case, you must connect to a port on which a protocol daemon is listening. For details, see the *Installation Guide.*

You can now begin using the CLI.

Command Line Interface Help

You access the CLI help by entering a full or partial command string and a question mark “?”. The CLI displays the command keywords or parameters along with a short description. For example, at the CLI command prompt, type:

```
> show ?
```

The CLI displays this keyword list with short descriptions for each keyword:

```
show ?
  application-priority            Application Priority
```

```
  arp                              Internet Protocol (IP)
  bfd                              Bidirectional Forwarding Detection (BFD)
  bgp                              Border Gateway Protocol (BGP)
  bi-lsp                           Bi-directional lsp status and configuration
  bridge                           Bridge group commands
  ce-vlan                          COS Preservation for Customer Edge VLAN
  class-map                        Class map entry
  cli                              Show CLI tree of current mode
  clns                             Connectionless-Mode Network Service (CLNS)
  control-adjacency                Control Adjacency status and configuration
  control-channel                  Control Channel status and configuration
  cspf                             CSPF Information
  customer                         Display Customer spanning-tree
  cvlan                            Display CVLAN information
  debugging                        Debugging functions (see also 'undebug')
  dot1x                            IEEE 802.1X Port-Based Access Control
  etherchannel                     LACP etherchannel
  ethernet                         Layer-2
...
```

If you type the ? in the middle of a keyword, the CLI displays help for that keyword only.

```
> show de?
debugging  Debugging functions (see also 'undebug')
```

If you type the ? in the middle of a keyword, but the incomplete keyword matches several other keywords, ZebOS-XP displays help for all matching keywords.

```
> show i? (CLI does not display the question mark).
interface  Interface status and configuration
ip         IP information
isis       ISIS information
```

Command Completion

The CLI can complete the spelling of a command or a parameter. Begin typing the command or parameter and then press the tab key. For example, at the CLI command prompt type `sh`:

```
> sh
```

Press the tab key. The CLI displays:

```
> show
```

If the spelling of a command or parameter is ambiguous, the CLI displays the choices that match the abbreviation. Type `show i` and press the tab key. The CLI displays:

```
> show i
  interface  ip         ipv6       isis
> show i
```

The CLI displays the `interface` and `ip` keywords. Type `n` to select `interface` and press the tab key. The CLI displays:

```
> show in
> show interface
```

Type ? and the CLI displays the list of parameters for the `show interface` command.

```
> show interface
  IFNAME  Interface name
  |       Output modifiers
```



```
>       Output redirection
<cr>
```

The CLI displays the only parameter associated with this command, the `IFNAME` parameter.

Command Abbreviations

The CLI accepts abbreviations that uniquely identify a keyword in commands. For example:

```
> sh in eth0
```

is an abbreviation for:

```
> show interface eth0
```

Command Line Errors

Any unknown spelling causes the CLI to display the error `Unrecognized command` in response to the ?. The CLI displays the command again as last entered.

```
> show dd?
% Unrecognized command
> show dd
```

When you press the Enter key after typing an invalid command, the CLI displays:

```
(config)#router ospf here
                          ^
% Invalid input detected at '^' marker.
```

where the ^ points to the first character in error in the command.

If a command is incomplete, the CLI displays the following message:

```
> show
% Incomplete command.
```

Some commands are too long for the display line and can wrap mid-parameter or mid-keyword, as shown below. This does *not* cause an error and the command performs as expected:

```
area 10.10.0.18 virtual-link 10.10.0.19 authent
ication-key 57393
```

Command Negation

Many commands have a `no` form that resets a feature to its default value or disables the feature. For example:

- The `ip address` command assigns an IPv4 address to an interface
- The `no ip address` command removes an IPv4 address from an interface

Syntax Conventions

Table 1-1 describes the conventions used to represent command syntax in this reference.

Table 1-1: Syntax conventions

Convention	Description	Example
`monospaced font`	Command strings entered on a command line	`show aaa authentication`
`lowercase`	Keywords that you enter exactly as shown in the command syntax.	`show aaa authentication`
`UPPERCASE`	See Variable Placeholders	`IFNAME`
`()`	Optional parameters, from which you must select one. Vertical bars delimit the selections. Do not enter the parentheses or vertical bars as part of the command.	`(A.B.C.D|<0-4294967295>)`
`()`	Optional parameters, from which you select one or none. Vertical bars delimit the selections. Do not enter the parentheses or vertical bars as part of the command.	`(A.B.C.D|<0-4294967295>|)`
`()`	Optional parameter which you can specify or omit. Do not enter the parentheses or vertical bar as part of the command.	`(IFNAME|)`
`{}`	Optional parameters, from which you must select one or more. Vertical bars delimit the selections. Do not enter the braces or vertical bars as part of the command.	`{intra-area <1-255>|inter-area <1-255>|external <1-255>}`
`[]`	Optional parameters, from which you select zero or more. Vertical bars delimit the selections. Do not enter the brackets or vertical bars as part of the command. A '?' before a parameter in square brackets limits that parameter to one occurrence in a command string.	`[<1-65535>|AA:NN|internet|local-AS|no-advertise|no-export]`
`.`	Repeatable parameter. The parameter that follows a period can be repeated more than once. Do not enter the period as part of the command.	`set as-path prepend .<1-65535>`

Variable Placeholders

Table 1-2 shows the tokens used in command syntax use to represent variables for which you supply a value.

Table 1-2: Variable placeholders

Token	Description
`WORD`	A contiguous text string (excluding spaces)
`LINE`	A text string, including spaces; no other parameters can follow this parameter
`IFNAME`	Interface name whose format varies depending on the platform; examples are: `eth0`, `Ethernet0`, `ethernet0`, `xe0`
`A.B.C.D`	IPv4 address
`A.B.C.D/M`	IPv4 address and mask/prefix
`X:X::X:X`	IPv6 address
`X:X::X:X/M`	IPv6 address and mask/prefix
`HH:MM:SS`	Time format
`AA:NN`	BGP community value
`XX:XX:XX:XX:XX:XX`	MAC address

`<1-5>`
`<1-65535>`
`<0-2147483647>`
`<0-4294967295>`
	Numeric range

Command Description Format

Table 1-3 explains the sections used to describe each command in this reference.

Table 1-3: Command descriptions

Section	Description
Command Name	The name of the command, followed by what the command does and when should it be used
Command Syntax	The syntax of the command
Parameters	Parameters and options for the command
Default	The state before the command is executed
Command Mode	The mode in which the command runs; see Command Modes
Example	An example of the command being executed

Keyboard Operations

Table 1-4 lists the operations you can perform from the keyboard.

Table 1-4: Keyboard operations

Key combination	Operation
Left arrow or Ctrl+b	Moves one character to the left. When a command extends beyond a single line, you can press left arrow or Ctrl+b repeatedly to scroll toward the beginning of the line, or you can press Ctrl+a to go directly to the beginning of the line.
Right arrow or Ctrl-f	Moves one character to the right. When a command extends beyond a single line, you can press right arrow or Ctrl+f repeatedly to scroll toward the end of the line, or you can press Ctrl+e to go directly to the end of the line.
Esc, b	Moves back one word
Esc, f	Moves forward one word
Ctrl+e	Moves to end of the line
Ctrl+a	Moves to the beginning of the line
Ctrl+u	Deletes the line
Ctrl+w	Deletes from the cursor to the previous whitespace
Alt+d	Deletes the current word
Ctrl+k	Deletes from the cursor to the end of line
Ctrl+y	Pastes text previously deleted with Ctrl+k, Alt+d, Ctrl+w, or Ctrl+u at the cursor

Table 1-4: Keyboard operations (Continued)

Key combination	Operation
Ctrl+t	Transposes the current character with the previous character
Ctrl+c	Ignores the current line and redisplays the command prompt
Ctrl+z	Ends configuration mode and returns to exec mode
Ctrl+l	Clears the screen
Up Arrow or Ctrl+p	Scroll backward through command history
Down Arrow or Ctrl+n	Scroll forward through command history

Show Command Modifiers

You can use two tokens to modify the output of a `show` command. Enter a question mark to display these tokens:

```
# show users ?
  | Output modifiers
  > Output redirection
```

You can type the | (vertical bar character) to use output modifiers. For example:

```
> show rsvp | ?
  begin     Begin with the line that matches
  exclude   Exclude lines that match
  include   Include lines that match
  redirect  Redirect output
```

Begin Modifier

The `begin` modifier displays the output beginning with the first line that contains the input string (everything typed after the `begin` keyword). For example:

```
# show run | begin eth1
...skipping
interface eth1
 ipv6 address fe80::204:75ff:fee6:5393/64
!
interface eth2
 ipv6 address fe80::20d:56ff:fe96:725a/64
!
line con 0
 login
!
end
```

You can specify a regular expression after the `begin` keyword, This example begins the output at a line with either “eth3” or “eth4”:

```
# show run | begin eth[3-4]

...skipping
interface eth3
```

```
 shutdown
!
interface eth4
 shutdown
!
interface svlan0.1
 no shutdown
!
route-map myroute permit 3
!
route-map mymap1 permit 10
!
route-map rmap1 permit 3
!
line con 0
 login
line vty 0 4
 login
!
end
```

Include Modifier

The `include` modifier includes only those lines of output that contain the input string. In the output below, all lines containing the word “input” are included:

```
# show interface eth1 | include input
    input packets 80434552, bytes 2147483647, dropped 0, multicast packets 0
    input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 1, missed 0
```

You can specify a regular expression after the `include` keyword. This examples includes all lines with “input” or “output”:

```
#show int eth0 | include (in|out)put
    input packets 597058, bytes 338081476, dropped 0, multicast packets 0
    input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
    output packets 613147, bytes 126055987, dropped 0
    output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
```

Exclude Modifier

The `exclude` modifier excludes all lines of output that contain the input string. In the following output example, all lines containing the word “input” are excluded:

```
# show interface eth1 | exclude input
Interface eth1
  Scope: both
  Hardware is Ethernet, address is 0004.75e6.5393
  index 3 metric 1 mtu 1500 <UP,BROADCAST,RUNNING,MULTICAST>
  VRF Binding: Not bound
  Administrative Group(s): None
  DSTE Bandwidth Constraint Mode is MAM
  inet6 fe80::204:75ff:fee6:5393/64
    output packets 4438, bytes 394940, dropped 0
    output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
    collisions 0
```

You can specify a regular expression after the `exclude` keyword. This example excludes lines with “output” or “input”:


```
# show interface eth0 | exclude (in|out)put
Interface eth0
  Scope: both
  Hardware is Ethernet  Current HW addr: 001b.2139.6c4a
  Physical:001b.2139.6c4a  Logical:(not set)
  index 2 metric 1 mtu 1500 duplex-full arp ageing timeout 3000
  <UP,BROADCAST,RUNNING,MULTICAST>
  VRF Binding: Not bound
  Bandwidth 100m
  DHCP client is disabled.
  inet 10.1.2.173/24 broadcast 10.1.2.255
  VRRP Master of :  VRRP is not configured on this interface.
  inet6 fe80::21b:21ff:fe39:6c4a/64
    collisions 0
```

Redirect Modifier

The `redirect` modifier writes the output into a file. The output is not displayed.

```
# show history | redirect /var/frame.txt
```

The output redirection token (>) does the same thing:

```
# show history >/var/frame.txt
```

Command Modes

Commands are grouped into modes arranged in a hierarchy. Each mode has its own set of commands. Table 1-5 lists the command modes common to all protocols.

Table 1-5: Common command modes

Name	Description
Executive mode	Also called *view* mode, this is the first mode to appear after you start the CLI. It is a base mode from where you can perform basic commands such as `show`, `exit`, `quit`, `help`, `list`, and `enable`.
Privileged executive mode	Also called *enable* mode, in this mode you can run additional basic commands such as `debug`, `write`, and `show`.
Configure mode	Also called *configure terminal* mode, in this mode you can run configuration commands and go into other modes such as interface, router, route map, key chain, and address family.
Interface mode	In this mode you can configure protocol-specific settings for a particular interface. Any setting you configure in this mode overrides a setting configured in router mode.
Router mode	This mode is used to configure router-specific settings for a protocol such as RIP or OSPF.

Command Mode Tree

The diagram below shows the common command mode hierarchy.

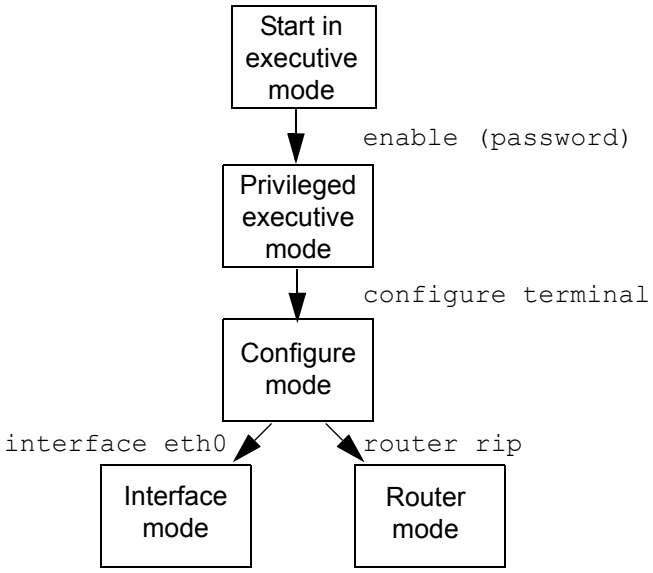

Figure 1-1: Common command modes

To change modes:

1. Enter privileged executive mode by entering `enable` in Executive mode.
2. Enter configure mode by entering `configure terminal` in Privileged Executive mode.

The example below shows starting `imish` and then moving from executive mode to privileged executive mode to configure mode and finally to router mode:

```
# ./imish
> enable mypassword
# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
(config)# router rip
(config-router)#
```

Note: Each protocol can have modes in addition to the common command modes. See the command reference for the respective protocol for details.

Debug Command

Whether the settings you make for a `debug` command persist between sessions depends on the mode where you make the settings:

- When you make settings for a `debug` command in executive mode, the configuration is valid for the current session only and is not saved in the `ZebOS.conf` file.
- When you make settings for a `debug` command in configuration mode, the configuration is retained and saved in `ZebOS.conf` and used even after the session restarts.

CHAPTER 2 Authentication, Authorization, and Accounting

This chapter is a reference for the authentication, authorization, and accounting (AAA) commands:

- *Authentication* identifies users by challenging them to provide a user name and password. This information can be encrypted if required, depending on the underlying protocol.
- *Authorization* provides a method of authorizing commands and services on a per user profile basis.
- *Accounting* collects detailed system and command information and stores it on a central server where it can be used for security and quality assurance purposes.

The AAA feature allows you to verify the identity of, grant access to, and track the actions of users managing devices. The AAA feature works with the access control protocols as described in these chapters:

- Chapter 6, *Lightweight Directory Access Protocol*
- Chapter 8, *Remote Authentication Dial In User Service*
- Chapter 13, *TACACS+*

This chapter describes these commands:

aaa accounting default

Use this command to set the AAA methods for accounting.

Use the `no` form of this command to set the default AAA method (local).

Command Syntax

```
aaa accounting default ((group LINE) | local)
no aaa accounting default ((group LINE) | local)
```

Parameters

`group`	Use a server group list for authentication
`LINE`	Specify a space-separated list of up to 8 configured RADIUS or TACACS+ server group names followed by `local`. The list can also include:
`radius`	All configured RADIUS servers
`local`	Use local authentication

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#aaa accounting default group radius
```

aaa authentication login

Use this command to set login authentication behavior.

Use the `no` form of this command to disable either authentication behavior.

Command Syntax

```
aaa authentication login (error-enable | (mschap enable))
no aaa authentication login (error-enable | (mschap enable))
```

Parameters

`error-enable`	Display login failure messages
`mschap enable`	Enable Microsoft Challenge Handshake Authentication Protocol (MS-CHAP) authentication

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#aaa authentication login error-enable
```

aaa authentication login console

Use this command to set the AAA authentication methods for console log ins.

Use the `no` form of this command to set the default AAA authentication method (local).

Command Syntax

```
aaa authentication login console ((group LINE) | local | none)
no aaa authentication login console ((group LINE) | local | none)
```

Parameters

`group`		Use a server group list for authentication
	`LINE`	Specify a space-separated list of up to 8 configured RADIUS, TACACS+, or LDAP server group names followed by `local` or `none` or both `local` and `none`. The list can also include:
		`radius` All configured RADIUS servers
		`tacacs+` All configured TACACS+ servers
		`ldap` All configured LDAP servers
`local`		Use local authentication
`none`		No authentication

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#aaa authentication login console group radius
```

aaa authentication login default

Use this command to set the AAA authentication methods.

Use the `no` form of this command to set the default AAA authentication method (local).

Command Syntax

```
aaa authentication login default ((group LINE) | local | none)
no aaa authentication login default ((group LINE) | local | none)
```

Parameters

`group`		Use a server group list for authentication
	`LINE`	Specify a space-separated list of up to 8 configured RADIUS, TACACS+, or LDAP server group names followed by `local` or `none` or both `local` and `none`. The list can also include:
		`radius` All configured RADIUS servers
		`tacacs+` All configured TACACS+ servers
		`ldap` All configured LDAP servers
`local`		Use local authentication
`none`		No authentication

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#aaa authentication login default group radius
```

aaa authentication login default fallback error

Use this command to enable fallback to local authentication for the default login if remote authentication is configured and all AAA servers are unreachable.

Use the `no` form of this command to disable fallback to local authentication.

Command Syntax

```
aaa authentication login default fallback error local
no aaa authentication login default fallback error local
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#aaa authentication login default fallback error local
```

aaa group server

Use this command to create a server group and enter server group configuration mode.

Use the `no` form of this command to remove a server group.

Command Syntax

```
aaa group server (radius|tacacs+|ldap) WORD
no aaa group server (radius|tacacs+|ldap) WORD
```

Parameters

`radius`	RADIUS server group
`tacacs+`	TACACS+ server group
`ldap`	LDAP server group
`WORD`	Server group name; maximum 127 characters

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#aaa group server ldap LdapGroup6
(config-ldap)#
```

aaa local authentication attempts max-fail

Use this command to set the number of unsuccessful authentication attempts before a user is locked out.

Use the `no` form of this command to disable the lockout feature.

Command Syntax

```
aaa local authentication attempts max-fail <1-25>
no aaa local authentication attempts max-fail <1-25>
```

Parameters

`<1-25>`	Range of number of unsuccessful authentication attempts

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#aaa local authentication attempts max-fail 2
```

debug aaa

Use this command to display AAA debugging information.

Use the `no` form of this command to stop displaying AAA debugging information.

Command Syntax

```
debug aaa (aaa-requests | all | conf-events | errors | events | mts)
no debug aaa (aaa-requests | all | conf-events | errors | events | mts)
```

Parameters

`aaa-requests`	AAA requests
`all`	All
`conf-events`	AAA configuration events
`errors`	AAA errors
`events`	AAA events
`mts`	AAA transmit and receive MTS packets

Command Mode

Executive mode and configure mode

Examples

```
#debug aaa
```

server

Use this command to add a server to a server group.

Use the `no` form of this command to remove from a server group.

Command Syntax

```
server (A.B.C.D | X:X::X:X | HOSTNAME)
no server (A.B.C.D | X:X::X:X | HOSTNAME)
```

Parameters

`A.B.C.D`	IPv4 address
`X:X::X:X`	IPv6 address
`HOSTNAME`	LDAP server group

Command Modes

RADIUS server group configure mode

TACACS+ server group configure mode

LDAP server group configure mode

Examples

```
#configure terminal
(config)#feature tacacs+
(config)#aaa group server tacacs+ TacacsGroup4
(config-tacacs)#server 203.0.113.127
```

show aaa

Use this command to display AAA server groups or user default role.

Command Syntax

```
show aaa (groups | (user default-role))
```

Parameters

`groups`	Server groups
`user default-role`	User default role

Command Modes

Executive mode

Examples

```
#show aaa user default-role
```

show aaa accounting

Use this command to display AAA accounting configuration.

Command Syntax

```
show aaa accounting
```

Parameters

None

Command Modes

Executive mode

Examples

```
#show aaa accounting
```

show aaa authentication

Use this command to display AAA authentication configuration.

Command Syntax

```
show aaa authentication
```

Parameters

None

Command Modes

Executive mode

Examples

```
#show aaa authentication
```

show aaa authentication login

Use this command to display AAA authentication configuration for login default and login console.

Command Syntax

```
show aaa authentication login (error-enable | mschap)
```

Parameters

`error-enable`	Display setting for login failure messages
`mschap`	Display setting for Microsoft Challenge Handshake Authentication Protocol (MS-CHAP) authentication

Command Modes

Executive mode

Examples

```
#show aaa authentication login error-enable
```

show running-config aaa

Use this command to display AAA settings in the running configuration.

Command Syntax

```
show running-config aaa (|all)
```

Parameters

`all`	Display both configured and default settings

Command Modes

Executive mode

Examples

```
#show running-config aaa
```

CHAPTER 3 Dynamic Host Configuration Protocol Client

This chapter describes the Dynamic Host Configuration Protocol (DHCP) client commands.

DHCP is used to configure devices that are connected to a network so they can communicate on that network using the Internet Protocol (IP). DHCP is implemented in a client-server model where DHCP clients request configuration data, such as an IP address, a default route, or DNS server addresses from a DHCP server.

This chapter contains these commands:

feature dhcp

Use this command to enable the DHCP client and DHCP relay on the device.

Use the `no` form of this command to disable the DHCP client and DHCP relay and delete any DHCP-related configuration.

Command Syntax

```
feature dhcp
```

```
no feature dhcp
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#feature dhcp
```

ip address dhcp

Use this command to get an IP address from a DHCP server for this interface.

Use the `no` form of this command to disable the DHCP client for this interface.

You can give the ip dhcp client request command before giving this command to request additional options.

Command Syntax

```
ip address dhcp
no ip address dhcp
```

Parameters

None

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth0
(config-if)#ip address dhcp
(config-if)#
```

ip dhcp client request

Use this command to add an option to a DHCP request.

Use the `no` form of this command to remove an option from a DHCP request.

Command Syntax

```
ip dhcp client request dns-nameserver
ip dhcp client request host-name
ip dhcp client request log-server
ip dhcp client request ntp-server
no ip dhcp client request dns-nameserver
no ip dhcp client request host-name
no ip dhcp client request log-server
no ip dhcp client request ntp-server
```

Parameters

`dns-nameserver`	List of DNS name servers (DHCP option 6)
`host-name`	Name of the client (DHCP option 12)
`ntp-server`	List of NTP servers (DHCP option 42)
`log-server`	List of log servers (DHCP option 7)

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth0
(config-if)#ip dhcp client request ntp-server
```

ipv6 address dhcp

Use this command to get an IP address from a DHCP server for this interface.

Use the `no` form of this command to disable the DHCP client for this interface.

You can give the ipv6 dhcp client request dns-nameserver command before giving this command to request additional options.

Command Syntax

```
ipv6 address dhcp
```

```
no ipv6 address dhcp
```

Parameters

None

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth0
(config-if)#ipv6 address dhcp
```

ipv6 dhcp client request dns-nameserver

Use this command to request a list of DNS name servers (DHCP option 6) from a DHCP server.

Use the `no` form of this command to remove this option from a DHCP request.

Command Syntax

```
ipv6 dhcp client request dns-nameserver
no ipv6 dhcp client request dns-nameserver
```

Parameters

None

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth0
(config-if)#ip dhcp client request dns-nameserver
```

CHAPTER 4 Dynamic Host Configuration Protocol Relay

This chapter describes the Dynamic Host Configuration Protocol (DHCP) relay commands.

In small networks with only one IP subnet, DHCP clients communicate directly with DHCP servers. To allow DHCP clients on subnets not directly served by DHCP servers to communicate with DHCP servers, DHCP relay agents can be installed on these subnets. The DHCP client broadcasts on the local link and the relay agent receives the broadcast and transmits it to one or more DHCP servers using unicast. The DHCP server replies to the client and the relay agent then retransmits the response on the local network.

This chapter contains these commands:

ip dhcp relay

Use this command to enable the DHCP relay agent.

Use the `no` form of this command to disable the DHCP relay agent.

Command Syntax

```
ip dhcp relay
```

```
no ip dhcp relay
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ip dhcp relay
```

```
#configure terminal
(config)#no ip dhcp relay
```

ip dhcp relay address

Use this command to set an IP address of a DHCP server on an interface.

Use the `no` form of this command to remove the IP address of a DHCP server.

You must give the ip dhcp relay command before you give this command.

Command Syntax

```
ip dhcp relay address A.B.C.D
no ip dhcp relay address A.B.C.D
```

Parameters

`A.B.C.D`	IPv4 address of the DHCP server

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth2
(config-if)#ip address 2.2.2.2/24
(config-if)#ip dhcp relay address 198.51.100.127
```

ip dhcp relay information option

Use this command to enable the device to insert and remove option-82 information on DHCP packets forwarded by the relay agent.

Use the `no` form of this command to disable inserting and removing option-82 information.

Command Syntax

```
ip dhcp relay information option
no ip dhcp relay information option
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ip dhcp relay information option

#configure terminal
(config)#no ip dhcp relay information option
```

ipv6 dhcp relay

Use this command to enable the DHCP relay agent.

Use the `no` form of this command to disable the DHCP relay agent.

Command Syntax

```
ipv6 dhcp relay
```

```
no ipv6 dhcp relay
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ipv6 dhcp relay
```

```
#configure terminal
(config)#no ipv6 dhcp relay
```

ipv6 dhcp relay address

Use this command to set an IPv6 address of a DHCP server on an interface.

Use the `no` form of this command to remove an IPv6 address of a DHCP server.

You must give the ip dhcp relay command before you give this command.

Note: Global IPv6 address should be configured before configuring DHCPv6 relay address on an interface.

Command Syntax

```
ipv6 dhcp relay address X:X::X:X
ipv6 dhcp relay address X:X::X:X interface IFNAME
no ipv6 dhcp relay address X:X::X:X
no ipv6 dhcp relay address X:X::X:X interface IFNAME
```

Parameters

`X:X::X:X`	IPv6 address of the DHCP server
`IFNAME`	Source interface name

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth2
(config-if)#ipv6 address 1000:ad1::30/64
(config-if)#ipv6 dhcp relay address 2001:db8::7F
```

show ip dhcp relay

Use this command to display DHCP snooping relay status including DHCP server addresses configured on interfaces.

Command Syntax

```
show ip dhcp relay
```

Parameters

None

Command Mode

Executive mode

Examples

```
#show ip dhcp relay
```

show ip dhcp relay address

Use this command to display DHCP server addresses configured on interfaces.

Command Syntax

```
show ip dhcp relay address
```

Parameters

None

Command Mode

Executive mode

Examples

```
#show ip dhcp relay address
```

show ip dhcp relay address interface

Use this command to display DHCP server addresses configured on the device.

Command Syntax

```
show ip dhcp relay address interface ethernet
show ip dhcp relay address interface ethernet <1-4096>
show ip dhcp relay address interface port-channel
show ip dhcp relay address interface port-channel <1-4096>
show ip dhcp relay address interface vlan
show ip dhcp relay address interface vlan <1-4096>
```

Parameters

`ethernet`	Display DHCP server addresses configured on Ethernet interfaces
`<1-4096>`	Ethernet interface number
`port-channel`	Display DHCP server addresses configured on port-channel interfaces
`<1-4096>`	Port-channel number
`vlan`	Display DHCP server addresses configured on VLAN interfaces
`<1-4096>`	VLAN identifier

Command Mode

Executive mode

Examples

```
aeroz#show ip dhcp relay address interface ethernet 1
Interface            Relay Address
--------             -------------
Ethernet1            10.10.10.2
```

show ipv6 dhcp relay

Use this command to display DHCP snooping relay status including DHCP server addresses configured on interfaces.

Command Syntax

```
show ipv6 dhcp relay
```

Parameters

None

Command Mode

Executive mode

Examples

```
#show ipv6 dhcp relay
```

show ipv6 dhcp relay address

Use this command to display DHCP server addresses configured on interfaces.

Command Syntax

```
show ipv6 dhcp relay address
```

Parameters

None

Command Mode

Executive mode

Examples

```
#show ipv6 dhcp relay address
```

show ipv6 dhcp relay address interface

Use this command to display DHCP server addresses configured on the device.

Command Syntax

```
show ipv6 dhcp relay address interface ethernet
show ipv6 dhcp relay address interface ethernet <1-4096>
show ipv6 dhcp relay address interface vlan
show ipv6 dhcp relay address interface vlan <1-4096>
show ipv6 dhcp relay address interface port-channel
show ipv6 dhcp relay address interface port-channel <1-4096>
```

Parameters

`ethernet`	Display DHCP server addresses configured on Ethernet interfaces
`<1-4096>`	Ethernet interface number
`port-channel`	Display DHCP server addresses configured on port-channel interfaces
`<1-4096>`	Port-channel number
`vlan`	Display DHCP server addresses configured on VLAN interfaces
`<1-4096>`	VLAN identifier

Command Mode

Executive mode

Examples

```
#show ipv6 dhcp relay address interface ethernet 1
Interface            Relay Address                           Output Interface
--------             -------------                           ---------------
Ethernet1            3ffe::2
```

show running-config dhcp

Use this command to display DHCP settings in the running configuration.

Command Syntax

```
show running-config dhcp
```

Parameters

None

Command Mode

Executive mode

Examples

```
#show running-config dhcp
```

CHAPTER 5 Domain Name System

This chapter describes Domain Name System (DNS) commands. DNS translates easily-to-remember domain names into numeric IP addresses needed to locate computer services and devices. By providing a worldwide, distributed keyword-based redirection service, DNS is an essential component of the Internet.

The DNS database is hierarchical. When a client such as a Web browser gives a request that specifies a host name, the DNS resolver on the client first contacts a DNS server to determine the server's IP address. If the DNS server does not contain the needed mapping, it forwards the request to a different DNS server at the next higher level in the hierarchy. After potentially several forwarding and delegation messages are sent within the DNS hierarchy, the IP address for the given host eventually arrives at the resolver, that in turn completes the request over Internet Protocol (IP).

The chapter contains these commands:

debug dns client

Use this command to display DNS debugging messages.

Use the `no` form of this command to stop displaying DNS debugging messages.

Command Syntax

```
debug dns client
no debug dns client
```

Parameters

None

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Examples

```
#configure terminal
(config)#debug dns client
```

ip domain-list

Use this command to define a list of default domain names used to complete unqualified host names. Each domain in the list is to be tried in turn.

The `ip domain-list` command is similar to the `ip domain-name` command, except that with the `ip domain-list` command you can define a list of domains, each to be tried in turn.

If there is no domain list, the default domain name specified with the `ip domain-name` command is used. If there is a domain list, the default domain name is not used.

Use the `no` form of this command to remove a domain.

Command Syntax

```
ip domain-list DOMAIN-NAME
no ip domain-list DOMAIN-NAME
```

Parameters

`DOMAIN-NAME`	Domain name, such as company.com

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ip domain-list ipi.com
```

ip domain-lookup

Use this command to enable DNS host name-to-address translation.

Use the `no` form of this command to disable DNS.

Command Syntax

```
ip domain-lookup
no ip domain-lookup
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ip domain-lookup
```

ip domain-name

Use this command to set the default domain name used to complete unqualified host names (names without a dotted-decimal domain name).

The `ip domain-list` command is similar to the `ip domain-name` command, except that with the `ip domain-list` command you can define a list of domains, each to be tried in turn.

If a domain list has been created with `ip domain-list`, the default domain name is not used. If there is no domain list, the default domain name is used.

Use the `no` form of this command to disable DNS.

Command Syntax

```
ip domain-name DOMAIN-NAME
no ip domain-name DOMAIN-NAME
```

Parameters

`DOMAIN-NAME`	Domain name, such as company.com

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ip domain-name company.com
```

ip host

Use this command to define static hostname-to-address mappings in DNS. You can specify one or two mappings in a command.

Use the `no` form of this command remove a hostname-to-address mapping.

Command Syntax

```
ip host WORD A.B.C.D
ip host WORD A.B.C.D A.B.C.D
ip host WORD (X:X::X:X | A.B.C.D)
ip host WORD (X:X::X:X | A.B.C.D) (X:X::X:X | A.B.C.D)
no ip host WORD A.B.C.D
no ip host WORD A.B.C.D A.B.C.D
no ip host WORD (X:X::X:X | A.B.C.D)
no ip host WORD (X:X::X:X | A.B.C.D) (X:X::X:X | A.B.C.D)
```

Parameters

`WORD`	Hostname, such as company.com
`A.B.C.D`	IPv4 address of the host
`X:X::X:X`	IPv6 address of the host

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ip host company.com 192.0.2.1
```

ip name-server

Use this command to add 1-3 DNS server addresses that are used to translate hostnames to IP addresses.

Use the `no` form of this command to remove 1-3 DNS server addresses.

Command Syntax

```
ip name-server A.B.C.D
ip name-server (A.B.C.D) (A.B.C.D)
ip name-server (A.B.C.D) (A.B.C.D) (A.B.C.D)
ip name-server (X:X::X:X | A.B.C.D)
ip name-server (X:X::X:X | A.B.C.D) (X:X::X:X | A.B.C.D)
ip name-server (X:X::X:X | A.B.C.D) (X:X::X:X | A.B.C.D) (X:X::X:X | A.B.C.D)
no ip name-server A.B.C.D
no ip name-server A.B.C.D A.B.C.D
no ip name-server A.B.C.D A.B.C.D A.B.C.D
no ip name-server (X:X::X:X | A.B.C.D)
no ip name-server (X:X::X:X | A.B.C.D) (X:X::X:X | A.B.C.D)
no ip name-server (X:X::X:X | A.B.C.D) (X:X::X:X | A.B.C.D) (X:X::X:X | A.B.C.D)
```

Parameters

`A.B.C.D`	IPv4 address of the name server
`X:X::X:X`	IPv6 address of the name server

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ip name-server 123.70.0.23
```

show hosts

Use this command to display the DNS name servers and domain names.

Command Syntax

```
show hosts
```

Parameters

None

Command Mode

Exec mode and Privilege Exec mode

Example

The following is a sample output of this command displaying two name servers: 10.10.0.2 and 10.10.0.88.

```
#show hosts
Default domain is ipinfusion.com
Domain list: ipi.com
Name/address lookup uses domain service
Name servers are 10.10.0.2 10.10.0.88
```

show running-config dns

Use this command to show the DNS settings the running configuration.

Command Syntax

```
show running-config dns
```

Parameters

None

Command Mode

Exec mode and Privilege Exec mode

Example

```
#show running-config dns
```

CHAPTER 6 Lightweight Directory Access Protocol

This chapter describes Lightweight Directory Access Protocol (LDAP) commands.

LDAP is an protocol for accessing and maintaining distributed directory information services over an IP network. LDAP is specified is in RFC 4511.

For ZebOS-XP, LDAP is used for authentication.

This chapter contains these commands:

clear ldap-server statistics

Use this command to reset the LDAP server statistics.

Command Syntax

```
clear ldap-server statistics (|HOST)
```

Parameters

HOST	Server host name, IPv4 address, or IPv6 address; if not specified, all hosts are displayed

Command Mode

Exec mode

Examples

```
#clear ldap-server statistics
```

debug ldap

Use this command to display LDAP debugging information.

Use the `no` form of this command stop displaying LDAP debugging information.

Command Syntax

```
debug ldap (aaa-request | aaa-request-lowlevel | all | config | config-lowlevel |
  server-monitor | server-monitor-errors)
no debug ldap (aaa-request | aaa-request-lowlevel | all | config | config-lowlevel
  | server-monitor | server-monitor-errors)
```

Parameters

`aaa-request`	LDAP AAA requests
`aaa-request-lowlevel`	LDAP AAA low-level requests
`all`	All
`config`	LDAP configuration
`config-lowlevel`	LDAP low-level configuration
`server-monitor`	LDAP server monitor
`server-monitor-errors`	LDAP server monitor errors

Command Mode

Executive mode and configure mode

Examples

```
#debug ldap
```

feature ldap

Use this command to enable LDAP on the device.

Use the `no` form of this command to disable LDAP.

Command Syntax

```
feature ldap
no feature ldap
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#feature ldap
```

ldap-server deadtime

Use this command to set the LDAP server deadtime period which is the duration for which a non-reachable server is skipped.

Use the `no` form of this command to set the LDAP server deadtime period to zero.

Command Syntax

```
ldap-server deadtime <1-1440>
no ldap-server deadtime <1-1440>
```

Parameters

`<1-1440>`	LDAP server deadtime period in minutes

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ldap-server deadtime 270
```

ldap-server host

Use this command to set the LDAP server host name or IP address.

Use the `no` form of this command to remove an LDAP server (if only a host name or IP address is specified as a parameter) or to remove all an LDAP server's configuration settings (if any other parameters are also specified).

Command Syntax

```
ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X)
ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X) enable-ssl
ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X) timeout <1-60>
ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X) port <1-65535> (|timeout <1-60>)
ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X) rootDN ROOTDN (password WORD |)
  (port <1-65535>|) (timeout <1-60>|)
ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X) test rootDN ROOTDN (username
  WORD|) (password WORD |) (idle-time <1-1440> |)
no ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X)
no ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X) enable-ssl
no ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X) timeout <1-60>
no ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X) port <1-65535> (|timeout <1-
  60>)
no ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X) rootDN ROOTDN (password WORD |)
  (port <1-65535>|) (timeout <1-60>|)
no ldap-server host (HOSTNAME | A.B.C.D | X:X::X:X) test rootDN ROOTDN (username
  WORD|) password WORD |) (idle-time <1-1440> |)
```

Parameters

`HOSTNAME`	Host name
`A.B.C.D`	IPv4 address
`X:X::X:X`	IPv6 address
`enable-ssl`	Establish an SSL session before sending a bind or search request
`timeout`	Period to wait for a response from the server before the client declares a timeout failure
`<1-60>`	Timeout value in seconds; the default is 5 seconds
`port`	LDAP server port
`<1-65535>`	LDAP server port number; the default is 389
`rootDN`	Root Designated Name (DN) for the LDAP server database
`ROOTDN`	Root Designated Name value; maximum length 128 characters
`password`	Bind password for root
`WORD`	Password value; maximum length 32 characters
`test`	Verify the LDAP server state
`username`	User name used in test packets

WORD	User name value; maximum length 32 characters
password	Password used in test packets
WORD	Password value; maximum length 32 characters
idle-time	If a response is not received after this time, the server is assumed dead
<1-1440>	Idle-time value; the default is 60

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ldap-server host 203.0.113.132 timeout 10
```

ldap-server port

Use this command to set the port number on which the LDAP server listens for connections. The default port on which the LDAP server listens is 389.

You can only give this command when the LDAP server is enabled. See the feature ldap command.

USe the `no` form of this command to set the LDAP server port to its default value (389).

Command Syntax

```
ldap-server port <1-65535>
no ldap-server port <1-65535>
```

Parameters

`<1-65535>`	Port number

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ldap-server port 934
```

ldap-server timeout

Use this command to set the period to wait for a response from the server before the client declares a timeout failure. The default timeout value is 5 seconds.

You can only give this command when the LDAP feature is enabled. See the feature ldap command.

Use the `no` form of this command to set the timeout value to its default value (5 seconds).

Command Syntax

```
ldap-server timeout <1-60>
no ldap-server timeout <1-60>
```

Parameters

`<1-60>`	Timeout value in seconds

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ldap-server timeout 35
```

show debug ldap

Use this command to display whether LDAP debugging is enabled.

You can only give this command when the LDAP server is enabled. See the feature ldap command.

Command Syntax

```
show debug ldap
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show debug ldap
```

show ldap-server

Use this command to display the LDAP server group configuration information.

Command Syntax

```
show ldap-server ((groups (GROUP|)|) | (statistics (HOST|)|))
```

Parameters

`groups`	Groups
`GROUP`	Server group name; if not specified, all groups are displayed
`statistics`	Statistics
`HOST`	Server host name, IPv4 address, or IPv6 address; if not specified, all hosts are displayed

Command Mode

Exec mode

Examples

```
#show ldap-server groups
```

show running-config ldap

Use this command to display LDAP settings in the running configuration.

You can only give this command when the LDAP server is enabled. See the feature ldap command.

Command Syntax

```
show running-config ldap
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show running-config ldap
```

CHAPTER 7 Network Time Protocol

This chapter is a reference for Network Time Protocol (NTP) commands.

NTP synchronizes clocks between computer systems over packet-switched networks. NTP can synchronize all participating computers to within a few milliseconds of Coordinated Universal Time (UTC).

NTP uses a hierarchical, layered system of time sources. Each level of this hierarchy is called a “stratum” and is assigned a number starting with zero at the top. The number represents the distance from the reference clock and is used to prevent cyclical dependencies in the hierarchy.

This chapter contains these commands:

clear ntp statistics

Use this command to reset NTP statistics.

Command Syntax

```
clear ntp statistics (all-peers | io | local | memory)
```

Parameters

`all-peers`	Counters associated with all peers
`io`	Counters maintained in the input-output module
`local`	Counters maintained in the local protocol module
`memory`	Counters related to memory allocation

Command Mode

Exec mode and Privileged Exec mode

Example

```
#clear ntp statistics all-peers
```

feature ntp

Use this command to enable NTP.

Use the `no` form of this command to disable NTP.

Command Syntax

```
feature ntp
ntp enable
no feature ntp
no ntp enable
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#feature ntp

(config)#no feature ntp
```

ntp authenticate

Use this command to enable NTP authentication.

Use the `no` form of this command to disable authentication.

Command Syntax

```
ntp authenticate
no ntp authenticate
```

Parameters

None

Command Mode

Configure mode

Example

```
#configure terminal
(config)#ntp authenticate
```

ntp authentication-key

Use this command to set an NTP authentication key.

Use the `no` form of this command to delete an authentication key.

Command Syntax

```
ntp authentication-key <1-65534> md5 WORD
no ntp authentication-key <1-65534> md5 WORD
```

Parameters

`<1-65534>`	Authentication key number
`md5`	Use Message Digest Algorithm 5 (MD5) authentication scheme
`WORD`	MD5 string (maximum 8 characters)

Command Mode

Configure mode

Example

```
#configure terminal
(config)#ntp authentication-key 535 md5 J@u-b;l2
```

ntp enable

Use this command to enable NTP.

Use the `no` form of this command to disable NTP.

Command Syntax

```
ntp enable
```

```
no ntp enable
```

Parameters

None

Command Mode

Configure mode

Example

```
#configure terminal
(config)#ntp enableg
```

ntp logging

Use this command to log NTP events.

Use the `no` form of this command to disable NTP logging.

Command Syntax

```
ntp logging
no ntp logging
```

Parameters

None

Command Mode

Configure mode

Example

```
#configure terminal
(config)#ntp logging
```

ntp peer

Use this command to configure a peer association. In a peer association, this system can synchronize with the other system or the other system can synchronize with this system.

Use the `no` command to remove a peer association.

Command Syntax

```
ntp peer (A.B.C.D | HOSTNAME) ({prefer|key <1-65534>|minpoll <4-16>|maxpoll <4-
  16>}|)
ntp peer (A.B.C.D | X:X::X:X | HOSTNAME) ({prefer|key <1-65534>|minpoll <4-
  16>|maxpoll <4-16>}|)
no ntp peer(A.B.C.D | HOSTNAME) ({prefer|key <1-65534>|minpoll <4-16>|maxpoll <4-
  16>}|)
no ntp peer (A.B.C.D | X:X::X:X | HOSTNAME) ({prefer|key <1-65534>|minpoll <4-
  16>|maxpoll <4-16>}|)
```

Parameters

`A.B.C.D`	IPv4 address of the peer
`HOSTNAME`	Host name of the peer
`X:X::X:X`	IPv6 address of the peer
`prefer`	Prefer this peer; preferred peer responses are discarded only if they vary dramatically from other time sources
`key`	Peer authentication key
`<1-65534>`	Peer authentication key
`minpoll`	Minimum poll interval
`<4-16>`	Minimum poll interval
`maxpoll`	Maximum poll interval
`<4-16>`	Maximum poll interval

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ntp peer 10.10.0.23
(config)#ntp peer 10.10.0.23 prefer key 12345

(config)#no ntp peer 10.10.0.23
```

ntp server

Use this command to configure an NTP server. This means that this system synchronizes with the server, but not vice versa.

Use the `no` option with this command to remove an NTP server.

Command Syntax

```
ntp server (A.B.C.D | HOSTNAME) ({prefer|key <1-65534>|minpoll <4-16>|maxpoll <4-
  16>}|)
ntp server (A.B.C.D | X:X::X:X | HOSTNAME) ({prefer|key <1-65534>|minpoll <4-
  16>|maxpoll <4-16>}|)
no ntp server (A.B.C.D | HOSTNAME) ({prefer|key <1-65534>|minpoll <4-16>|maxpoll
  <4-16>}|)
no ntp server (A.B.C.D | X:X::X:X | HOSTNAME) ({prefer|key <1-65534>|minpoll <4-
  16>|maxpoll <4-16>}|)
```

Parameters

`A.B.C.D`	IPv4 address of the server
`HOSTNAME`	Host name of the server
`X:X::X:X`	IPv6 address of the server
`prefer`	Prefer this server; preferred server responses are discarded only if they vary dramatically from other time sources
`key`	Server authentication key
`<1-65534>`	Server authentication key
`minpoll`	Minimum poll interval
`<4-16>`	Minimum poll interval
`maxpoll`	Maximum poll interval
`<4-16>`	Maximum poll interval

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ntp server 10.10.0.23
(config)#ntp server 10.10.0.23 prefer key 12345

(config)#no ntp server 10.10.0.23
```

ntp sync-retry

Use this command to retry synchronization with the configured NTP servers.

Command Syntax

```
ntp sync-retry
```

Parameter

None

Command Mode

Exec mode and Privileged Exec mode

Example

```
#ntp sync-retry
```

ntp trusted-key

Use this command to define a “trusted” authentication key. If a key is trusted, the device will synchronize with a system that specifies this key in its NTP packets.

Use the `no` option with this command to remove a trusted key.

Command Syntax

```
ntp trusted-key <1-65534>
no ntp trusted-key <1-65534>
```

Parameter

`<1-65534>`	Authentication key number

Command Mode

Configure mode

Example

```
#configure terminal
(config)#ntp trusted-key 234676
```

show ntp authentication-keys

Use this command to display authentication keys.

Command Syntax

```
show ntp authentication-keys
```

Parameters

None

Command Mode

Exec mode and Privileged Exec mode

Example

```
#show ntp authentication-keys
```

show ntp authentication-status

Use this command to display whether authentication is enabled or disabled.

Command Syntax

```
show ntp authentication-status
```

Parameters

None

Command Mode

Exec mode and Privileged Exec mode

Example

```
#show ntp authentication-status
```

show ntp logging-status

Use this command to display the NTP logging status.

Command Syntax

```
show ntp logging-status
```

Parameters

None

Command Mode

Exec mode and Privileged Exec mode

Example

```
#show ntp logging-status
NTP logging enabled
```

show ntp peer-status

Use this command to display the peers for which the server is maintaining state, along with a summary of that state.

Command Syntax

```
show ntp peer-status
```

Parameters

None

Command Mode

Exec mode and Privileged Exec mode

Example

```
#show ntp peer-status
```

show ntp peers

Use this command to display NTP peers.

Command Syntax

```
show ntp peers
```

Parameters

None

Command Mode

Exec mode and Privileged Exec mode

Example

```
#show ntp peers
```

show ntp statistics

Use this command to display NTP statistics.

Command Syntax

```
show ntp statistics (io | local | memory | peer ( ipaddr (A.B.C.D | X:X::X:X ) |
  name (HOSTNAME)) )
```

Parameters

`io`	Counters maintained in the input-output module
`local`	Counters maintained in the local protocol module
`memory`	Counters related to memory allocation
`peer`	Counters associated with the specified peer
`ipaddr`	Peer IP address
`A.B.C.D`	Peer IPv4 address
`X:X::X:X`	Peer IPv6 address
`name`	Peer host name
`HOSTNAME`	Peer host name

Command Mode

Exec mode and Privileged Exec mode

Example

```
#show ntp statistics memory
```

show ntp trusted-keys

Use this command to display keys that are valid for authentication.

Command Syntax

```
show ntp trusted-keys
```

Parameters

None

Command Mode

Exec mode and Privileged Exec mode

Example

```
#show ntp trusted-keys
```

show running-config ntp

Use this command to display the NTP running configuration.

Command Syntax

```
show running-config ntp (|all)
```

Parameters

`all`	Reserved for future use

Command Mode

Exec mode and Privileged Exec mode

Example

```
#show running-config ntp
```

CHAPTER 8 Remote Authentication Dial In User Service

This chapter is a reference for Remote Authentication Dial In User Service (RADIUS) commands, RADIUS provides centralized Authentication, Authorization, and Accounting (AAA) management for users that connect to and use a network service. RADIUS is specified in RFC 2865.

debug radius

Use this command to display RADIUS debugging information.

Use the `no` form of this command stop displaying RADIUS debugging information.

Command Syntax

```
debug radius (aaa-request | aaa-request-lowlevel | all | config | config-lowlevel |
  server-monitor | server-monitor-errors)
no debug radius (aaa-request | aaa-request-lowlevel | all | config | config-
  lowlevel | server-monitor | server-monitor-errors)
```

Parameters

`aaa-request`	RADIUS AAA requests
`aaa-request-lowlevel`	RADIUS AAA low-level requests
`all`	All
`config`	RADIUS configuration
`config-lowlevel`	RADIUS low-level configuration
`server-monitor`	RADIUS server monitor
`server-monitor-errors`	RADIUS server monitor errors

Command Mode

Executive mode and configure mode

Examples

```
#debug radius
```

radius-server host

Use this command to configure a RADIUS server for both accounting and authentication.

Use the `no` form of this command to remove a RADIUS server.

Command Syntax

```
radius-server host (A.B.C.D | X:X::X:X | HOSTNAME)
radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) retransmit <0-5>
radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) timeout <1-60> (retransmit <0-5>
  |)
radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) test (idle-time <0-1440> |
  password WORD | username WORD)
no radius-server host (A.B.C.D | X:X::X:X | HOSTNAME)
no radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) retransmit <0-5>
no radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) timeout <1-60> (retransmit
  <0-5> |)
no radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) test (idle-time <0-1440> |
  password WORD | username WORD)
```

Parameters

`A.B.C.D`	IPv4 address of RADIUS server
`X:X::X:X`	IPv6 address of RADIUS server
`HOSTNAME`	DNS host name of RADIUS server
`retransmit`	Number of times to try to connect to the RADIUS server before reverting to local authentication
`<0-5>`	Range of retransmit count
`timeout`	How long to wait for a response from the RADIUS server before declaring a timeout failure
`<1-60>`	Range of timeout period in seconds
`test`	Parameters for sending test packets to the RADIUS server
`idle-time`	Time interval to monitor the server
`<0-1440>`	Range of time interval in minutes
`password`	User password
`WORD`	User password (maximum 32 characters)
`username`	User name
`WORD`	User name (maximum 32 characters)

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#radius-server host 203.0.113.15
```

radius-server host acct-port

Use this command to configure a RADIUS server and specify a UDP port to use for RADIUS accounting messages.

Use the `no` form of this command to remove a RADIUS server.

Command Syntax

```
radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) acct-port <0-65535> (accounting
  (retransmit <0-5> | timeout <1-60> (retransmit <0-5> |) |) | authentication
  (accounting (retransmit <0-5> | timeout <1-60> (retransmit <0-5> |) |) |) |
  retransmit <0-5> | timeout <1-60> ( retransmit <0-5> |) |)
no radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) acct-port <0-65535>
  (accounting (retransmit <0-5> | timeout <1-60> (retransmit <0-5> |) |) |
  authentication (accounting (retransmit <0-5> | timeout <1-60> (retransmit <0-5>
  |) |) |) | retransmit <0-5> | timeout <1-60> ( retransmit <0-5> |) |)
```

Parameters

`A.B.C.D`	IPv4 address of RADIUS server
`X:X::X:X`	IPv6 address of RADIUS server
`HOSTNAME`	DNS host name of RADIUS server
`acct-port`	UDP port to use for RADIUS accounting messages
`<0-65535>`	Range of UDP port numbers
`accounting`	Use RADIUS server only for accounting purposes
`authentication`	Use RADIUS server only for authentication purposes
`retransmit`	Number of times to try to connect to the RADIUS server before reverting to local authentication
`<0-5>`	Range of retransmit count
`timeout`	How long to wait for a response from the RADIUS server before declaring a timeout failure
`<1-60>`	Range of timeout period in seconds

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#radius-server host 192.168.2.3 acct-port 23255
```

radius-server host auth-port

Use this command to configure a RADIUS server and specify a UDP port to use for RADIUS authentication messages.

Use the `no` form of this command to remove a RADIUS server.

Command Syntax

```
radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) auth-port <0-65535> (accounting
  (retransmit <0-5> | timeout <1-60> (retransmit <0-5> |) |) | acct-port <0-65535>
  (accounting (retransmit <0-5> | timeout <1-60> (retransmit <0-5> |) |) |
  authentication (accounting (retransmit <0-5> | timeout <1-60> (retransmit <0-5>
  |) |) |) | retransmit <0-5> | timeout <1-60> (retransmit <0-5> |) |) |
  authentication (accounting (retransmit <0-5> | timeout <1-60> (retransmit <0-5>
  |) |) |) | retransmit <0-5> | timeout <1-60> (retransmit <0-5> |) |)
no radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) auth-port <0-65535>
  (accounting (retransmit <0-5> | timeout <1-60> (retransmit <0-5> |) |) | acct-
  port <0-65535> (accounting (retransmit <0-5> | timeout <1-60> (retransmit <0-5>
  |) |) | authentication (accounting (retransmit <0-5> | timeout <1-60> (retransmit
  <0-5> |) |) |) | retransmit <0-5> | timeout <1-60> (retransmit <0-5> |) |) |
  authentication (accounting (retransmit <0-5> | timeout <1-60> (retransmit <0-5>
  |) |) |) | retransmit <0-5> | timeout <1-60> (retransmit <0-5> |) |)
```

Parameters

`A.B.C.D`	IPv4 address of RADIUS server
`X:X::X:X`	IPv6 address of RADIUS server
`HOSTNAME`	DNS host name of RADIUS server
`auth-port`	UDP port to use for RADIUS accounting messages
`<0-65535>`	Range of UDP port numbers
`accounting`	Use RADIUS server only for accounting purposes
`acct-port`	UDP port to use for RADIUS accounting messages
`<0-65535>`	Range of UDP port numbers
`authentication`	Use RADIUS server only for authentication purposes
`retransmit`	Number of times to try to connect to the RADIUS server before reverting to local authentication
`<0-5>`	Range of retransmit count
`timeout`	How long to wait for a response from the RADIUS server before declaring a timeout failure
`<1-60>`	Range of timeout period in seconds

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#radius-server host 203.0.113.15 auth-port 23255
```

radius-server host key

Use this command to configure a RADIUS server with a preshared key which is a text string shared between the device and the RADIUS server.

Use the `no` form of this command to remove a RADIUS server.

Command Syntax

```
radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) key ((0 WORD) | (7 WORD) |
  (WORD))(accounting (retransmit <0-5> |timeout <1-60> (retransmit <0-5> |) |) |
  auth-port <0-65535> (accounting (retransmit <0-5> | timeout <1-60> (retransmit
  <0-5> |) |) | acct-port <0-65535> (accounting (retransmit<0-5> | timeout <1-60>
  (retransmit <0-5>|)|) | authentication (accounting (retransmit<0-5> | timeout <1-
  60> (retransmit <0-5> |) |) |) | retransmit<0-5> | timeout <1-60> (retransmit <0-
  5> |) |) | authentication (accounting (retransmit<0-5> | timeout <1-60>
  (retransmit <0-5> |) |) |) | retransmit <0-5> | timeout <1-60> (retransmit <0-5>
  |) |) | authentication (accounting (retransmit <0-5> | timeout <1-60> (retransmit
  <0-5> |) |) |) | pac (accounting (retransmit<0-5> |timeout <1-60> (retransmit <0-
  5>|) |)| auth-port <0-65535> (accounting (retransmit <0-5> | timeout <1-60>
  (retransmit <0-5>|) |) | acct-port <0-65535> (accounting (retransmit<0-5> |
  timeout<1-60> (retransmit <0-5> |) |) | authentication (accounting (retransmit
  <0-5> | timeout <1-60> (retransmit <0-5>|)|)|) | retransmit <0-5> | timeout <1-
  60> (retransmit <0-5> |) |) | authentication (accounting (retransmit<0-5> |
  timeout <1-60> (retransmit <0-5>|)|)|) | retransmit <0-5> | timeout <1-60>
  (retransmit <0-5> |) |) | authentication (accounting (retransmit <0-5> | timeout
  <1-60> (retransmit <0-5> |) |) |)| retransmit <0-5> | timeout <1-60> (retransmit
  <0-5> |) |) | retransmit <0-5> | timeout <1-60> (retransmit <0-5>|) |)

no radius-server host (A.B.C.D | X:X::X:X | HOSTNAME) key ((0 WORD) | (7 WORD) |
  (WORD))(accounting (retransmit <0-5> |timeout <1-60> (retransmit <0-5> |) |) |
  auth-port <0-65535> (accounting (retransmit <0-5> | timeout <1-60> (retransmit
  <0-5> |) |) | acct-port <0-65535> (accounting (retransmit<0-5> | timeout <1-60>
  (retransmit <0-5>|)|) | authentication (accounting (retransmit<0-5> | timeout <1-
  60> (retransmit <0-5> |) |) |) | retransmit<0-5> | timeout <1-60> (retransmit <0-
  5> |) |) | authentication (accounting (retransmit<0-5> | timeout <1-60>
  (retransmit <0-5> |) |) |) | retransmit <0-5> | timeout <1-60> (retransmit <0-5>
  |) |) | authentication (accounting (retransmit <0-5> | timeout <1-60> (retransmit
  <0-5> |) |) |) | pac (accounting (retransmit<0-5> |timeout <1-60> (retransmit <0-
  5>|) |)| auth-port<0-65535> (accounting (retransmit <0-5> | timeout <1-60>
  (retransmit <0-5>|) |) | acct-port <0-65535> (accounting (retransmit<0-5> |
  timeout<1-60> (retransmit <0-5> |) |) | authentication (accounting (retransmit<0-
  5> | timeout <1-60> (retransmit <0-5>|)|)|) | retransmit <0-5> | timeout <1-60>
  (retransmit <0-5> |) |) | authentication (accounting (retransmit<0-5> | timeout
  <1-60> (retransmit <0-5>|)|)|) | retransmit <0-5> | timeout <1-60> (retransmit
  <0-5> |) |) | authentication (accounting (retransmit <0-5> | timeout <1-60>
  (retransmit <0-5> |) |) |)| retransmit <0-5> | timeout <1-60> (retransmit <0-5> |)
  |) | retransmit <0-5> | timeout <1-60> (retransmit <0-5>|) |)
```

Parameters

`A.B.C.D`	IPv4 address of RADIUS server
`X:X::X:X`	IPv6 address of RADIUS server
`HOSTNAME`	DNS host name of RADIUS server

key	Clear text or encrypted preshared key
0	Clear text preshared key
WORD	Preshared key
7	Encrypted preshared key
WORD	Preshared key
WORD	Clear text preshared key
accounting	Use RADIUS server only for accounting purposes
authentication	Use RADIUS server only for authentication purposes
acct-port	UDP port to use for RADIUS accounting messages
<0-65535>	Range of UDP port numbers
auth-port	UDP port to use for RADIUS accounting messages
<0-65535>	Range of UDP port numbers
retransmit	Number of times to try to connect to the RADIUS server before reverting to local authentication
<0-5>	Range of retransmit count
timeout	How long to wait for a response from the RADIUS server before declaring a timeout failure
<1-60>	Range of timeout period in seconds

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#radius-server host 203.0.113.15 key 7 p2AcxlQA
```

radius-server key

Use this command to set a global preshared key (“shared secret”) which is a text string shared between the device and RADIUS servers.

Use the `no` form of this command to remove a global preshared key.

Command Syntax

```
radius-server key ((0 WORD) | (7 WORD) | (WORD))
no radius-server key
```

Parameters

`0`	Unencrypted (clear text) shared key
`WORD`	Unencrypted key value; maximum length 63 characters
`7`	Hidden shared key
`WORD`	Hidden key value; maximum length 63 characters
`WORD`	Unencrypted (clear text) shared key value; maximum length 63 characters

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#radius-server key 7 p2AcxlQA

#configure terminal
(config)#no radius-server key
```

radius-server timeout

Use this command to set the global timeout which is how long the device waits for a response from a RADIUS server before declaring a timeout failure.

Use the `no` form of this command to set the global timeout to its default (1 second).

Command Syntax

```
radius-server timeout <1-1000>
no radius-server timeout
```

Parameters

`<1-1000>`	Range of timeout period in seconds

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#radius-server timeout 15

#configure terminal
(config)#no radius-server timeout
```

show debug radius

Use this command to display debugging information.

Command Syntax

```
show debug radius
```

Parameters

None

Command Mode

Executive mode

Examples

```
#show debug radius
```

show radius-server

Use this command to display the RADIUS server configuration.

Command Syntax

```
show radius-server ((WORD) |(directed-request) | (groups (GROUP|)|) | (sorted)|
  (statistics WORD))
```

Parameters

WORD	DNS host name or IP address
directed-request	Whether to send authentication requests to the RADIUS server
groups	RADIUS server group
GROUP	Group name; if this parameter is not specified, display all groups
sorted	Sort by RADIUS server name
statistics	Statistics
WORD	DNS host name or IP address

Command Mode

Executive mode

Examples

```
#show radius-server
```

show running-config radius

Use this command to display RADIUS configuration settings in the running configuration.

Command Syntax

```
show running-config radius
```

Parameters

None

Command Mode

Executive mode

Examples

```
#show running-config radius
```

CHAPTER 9 Remote Management

This chapter is a reference for commands that copy these types of files:

- Start-up configuration and running configuration
- Binary files (executables)
- System files such as boot files, core dumps, and debug logs

You can use these commands to copy files locally or to copy between the local device and a remote system.

The commands in this chapter use the techniques in Table 9-1 to remotely transfer files:

Table 9-1: File transfer techniques

Trivial File Transfer Protocol (TFTP)	No authentication or encryption; dangerous to use over the Internet, but might be acceptable in a trusted environment Address format: `tftp:[//server[:port]][/path]`
File Transfer Protocol (FTP)	Authenticates, but does not encrypt Address format: `ftp:[//[username@]server][/path]`
Secure copy (SCP)	Authenticates and encrypts using Secure Shell (SSH1) Address format: `scp:[//[username@]server][/path]`
SSH File Transfer Protocol (SFTP)	Authenticates and encrypts using Secure Shell (SSH2); this is the most secure technique Address format: `sftp:[//[username@]server][/path]`

This chapter contains the command listed below.

Upload files to a remote system:

Download files from a remote system:

Copy files locally:

Manage core file:

- system cores on page 167

copy running-config

Use this command to copy the running configuration to an FTP server, an SCP server, an SFTP server, or a TFTP server.

Command Syntax

```
copy running-config (tftp TFTP-URL|ftp FTP-URL|scp SCP-URL|sftp SFTP-URL)
```

Parameters

`TFTP-URL`	Destination: `tftp:[//server[:port]][/path]`
`FTP-URL`	Destination: `ftp:[//[username@]server][/path]`
`SCP-URL`	Destination: `scp:[//[username@]server][/path]`
`SFTP-URL`	Destination: `sftp:[//[username@]server][/path]`

Command Mode

Privileged Exec mode

Examples

```
#copy running-config sftp sftp://sftp.mysite.com
```

copy running-config (interactive)

Use this command to copy the running configuration to an FTP server, an SCP server, an SFTP server, or a TFTP server.

Command Syntax

```
copy running-config (ftp|tftp|scp|sftp)
```

Parameters

`ftp`	Destination: FTP server
`tftp`	Destination: TFTP server
`scp`	Destination: SCP server
`sftp`	Destination: SFTP server

Command Mode

Privileged Exec mode

Examples

```
#copy running-config sftp
```

copy startup-config

Use this command to copy the running configuration to an FTP server, an SCP server, an SFTP server, or a TFTP server.

Command Syntax

```
copy startup-config (tftp TFTP-URL|ftp FTP-URL|scp SCP-URL|sftp SFTP-URL)
```

Parameters

`TFTP-URL`	Destination: `tftp:[//server[:port]][/path]`
`FTP-URL`	Destination: `ftp:[//[username@]server][/path]`
`SCP-URL`	Destination: `scp:[//[username@]server][/path]`
`SFTP-URL`	Destination: `sftp:[//[username@]server][/path]`

Command Mode

Privileged Exec mode

Examples

```
#copy startup-config sftp sftp://sftp.mysite.com
```

copy startup-config (interactive)

Use this command to copy the running configuration to an FTP server, an SCP server, an SFTP server, or a TFTP server.

Command Syntax

```
copy startup-config (ftp|tftp|scp|sftp)
```

Parameters

`ftp`	Destination: FTP server
`tftp`	Destination: TFTP server
`scp`	Destination: SCP server
`sftp`	Destination: SFTP server

Command Mode

Privileged Exec mode

Examples

```
#copy startup-config sftp
```

copy binary file

Use this command to copy a binary file to an FTP server, an SCP server, an SFTP server, or a TFTP server.

Command Syntax

```
copy file (imi|imish|nsm|ospfd|hostpd|bgpd|isisd|ospf6d|all) (tftp TFTP-URL|ftp
  FTP-URL|scp SCP-URL|sftp SFTP-URL)
```

Parameters

`imi`	Integrated Management Interface executable
`imish`	Integrated Management Interface shell executable
`nsm`	NSM executable
`ospfd`	OSPFv2 executable
`hostpd`	Host protocol executable
`bgpd`	BGP executable
`isisd`	ISIS executable
`ospf6d`	OSPFv3 executable
`all`	All executables
`TFTP-URL`	Destination: `tftp://server[:port]][/path]`
`FTP-URL`	Destination: `ftp://[username@]server][/path]`
`SCP-URL`	Destination: `scp://[username@]server][/path]`
`SFTP-URL`	Destination: `sftp://[username@]server][/path]`

Command Mode

Privileged Exec mode

Examples

```
#copy file imish sftp sftp://sftp.mysite.com
```

copy binary file (interactive)

Use this command to copy a binary file to an FTP server, an SCP server, an SFTP server, or a TFTP server.

Command Syntax

```
copy file (imi|imish|nsm|ospfd|hostpd|bgpd|isisd|ospf6d|all) (tftp|ftp|scp|sftp)
```

Parameters

`imi`	Integrated Management Interface executable
`imish`	Integrated Management Interface shell executable
`nsm`	NSM executable
`ospfd`	OSPFv2 executable
`hostpd`	Host protocol executable
`bgpd`	BGP executable
`isisd`	ISIS executable
`ospf6d`	OSPFv3 executable
`all`	All executables
`ftp`	Destination: FTP server
`tftp`	Destination: TFTP server
`scp`	Destination: SCP server
`sftp`	Destination: SFTP server

Command Mode

Privileged Exec mode

Examples

```
#copy file nsm sftp
```

copy system file

Use this command to copy a system file to an FTP server, an SCP server, an SFTP server, or a TFTP server.

Note: The names of the options for the source in the first parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy (bootflash|core|nvram|usb1|volatile|debug|log|modflash) FILE (tftp TFTP-
  URL|ftp FTP-URL|scp SCP-URL|sftp SFTP-URL)
```

Parameters

`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`core`	Core file storage; on Linux this refers to `/cores/`
`debug`	Debug file storage; on Linux this refers to `/var/log/`
`log`	Log file storage; on Linux this refers to `/var/log/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`FILE`	Source file name
`TFTP-URL`	Destination: `tftp:[//server[:port]][/path]`
`FTP-URL`	Destination: `ftp:[//[username@]server][/path]`
`SCP-URL`	Destination: `scp:[//[username@]server][/path]`
`SFTP-URL`	Destination: `sftp:[//[username@]server][/path]`

Command Mode

Privileged Exec mode

Examples

```
#copy volatile myFile sftp sftp://sftp.mysite.com
```

copy system file (interactive)

Use this command to copy a system file to an FTP server, an SCP server, an SFTP server, or a TFTP server.

Note: The names of the options for the source in the first parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy (bootflash|core|nvram|usb1|volatile|debug|log|modflash) FILE
  (ftp|tftp|scp|sftp)
```

Parameters

`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`core`	Core file storage; on Linux this refers to `/cores/`
`debug`	Debug file storage; on Linux this refers to `/var/log/`
`log`	Log file storage; on Linux this refers to `/var/log/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`FILE`	Source file name
`ftp`	Destination: FTP server
`tftp`	Destination: TFTP server
`scp`	Destination: SCP server
`sftp`	Destination: SFTP server

Command Mode

Privileged Exec mode

Examples

```
#copy nvram myFile sftp
```

copy ftp (startup-config|running-config)

Use this command to copy the start up configuration or running configuration from an FTP server to the local device.

Command Syntax

```
copy ftp FTP-URL (startup-config|running-config)
```

Parameters

`FTP-URL`	Configuration source: `ftp:[//[username@]server][/path]`
`startup-config`	Copy start-up configuration
`running-config`	Copy running configuration

Command Mode

Privileged Exec mode

Examples

```
#copy ftp ftp://ftp.mysite.com running-config
```

copy scp (startup-config|running-config)

Use this command to copy the start up configuration or running configuration from a SCP server to the local device.

Command Syntax

```
copy scp SCP-URL (startup-config|running-config)
```

Parameters

`SCP-URL`	Configuration source: `scp:[//[username@]server][/path]`
`startup-config`	Copy start-up configuration
`running-config`	Copy running configuration

Command Mode

Privileged Exec mode

Examples

```
#copy scp scp://scp.mysite.com running-config
```

copy sftp (startup-config|running-config)

Use this command to copy the start up configuration or running configuration from a SFTP server to the local device.

Command Syntax

```
copy sftp SFTP-URL (startup-config|running-config)
```

Parameters

`SFTP-URL`	Configuration source: `sftp:[//[username@]server][/path]`
`startup-config`	Copy start-up configuration
`running-config`	Copy running configuration

Command Mode

Privileged Exec mode

Examples

```
#copy sftp sftp://sftp.mysite.com unning-config
```

copy tftp (startup-config|running-config)

Use this command to copy the start-up configuration or running configuration from a TFTP server to the local device.

Command Syntax

```
copy tftp TFTP-URL (startup-config|running-config)
```

Parameters

`TFTP-URL`	Configuration source: `tftp:[//server[:port]][/path]`
`startup-config`	Copy start-up configuration
`running-config`	Copy running configuration

Command Mode

Privileged Exec mode

Examples

```
#copy tftp tftp://tftp.mysite.com startup-config
```

copy ftp running-config (interactive)

Use this command to copy the running configuration from an FTP server to the local device.

Command Syntax

```
copy ftp running-config
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#copy ftp running-config
```

copy scp running-config (interactive)

Use this command to copy the running configuration from an SCP server to the local device.

Command Syntax

```
copy scp running-config
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#copy scp running-config
```

copy sftp running-config (interactive)

Use this command to copy the running configuration from an SFTP server to the local device.

Command Syntax

```
copy sftp running-config
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#copy sftp running-config
```

copy tftp running-config (interactive)

Use this command to copy the running configuration from a TFTP server to the local device.

Command Syntax

```
copy tftp running-config
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#copy tftp running-config
```

copy ftp startup-config (interactive)

Use this command to copy the start up confguration from an FTP server to the local device.

Command Syntax

```
copy ftp startup-config
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#copy ftp startup-config
```

copy scp startup-config (interactive)

Use this command to copy the start up confguration from a SCP server to the local device.

Command Syntax

```
copy scp startup-config
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#copy scp startup-config
```

copy sftp startup-config (interactive)

Use this command to copy the start up confguration from an SFTP server to the local device.

Command Syntax

```
copy sftp startup-config
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#copy sftp startup-config
```

copy tftp startup-config (interactive)

Use this command to copy the start-up confguration from a TFTP server to the local device.

Command Syntax

```
copy tftp startup-config
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#copy tftp startup-config
```

copy ftp binary file

Use this command to copy a binary (executable) file from an FTP server to the local device.

Command Syntax

```
copy ftp FTP-URL file (imi|imish|nsm|ospfd|hostpd|bgpd|isisd|ospf6d|all)
```

Parameters

`FTP-URL`	Source: `ftp://[username@]server[/path]`
`imi`	Integrated Management Interface executable
`imish`	Integrated Management Interface shell executable
`nsm`	NSM executable
`ospfd`	OSPFv2 executable
`hostpd`	Host protocol executable
`bgpd`	BGP executable
`isisd`	ISIS executable
`ospf6d`	OSPFv3 executable
`all`	All executables

Command Mode

Privileged Exec mode

Examples

```
#copy ftp ftp://ftp.mysite.com file imi
```

copy scp binary file

Use this command to copy a binary (executable) file from an SCP server to the local device.

Command Syntax

```
copy scp SCP-URL file (imi|imish|nsm|ospfd|hostpd|bgpd|isisd|ospf6d|all)
```

Parameters

`SCP-URL`	Source: `scp://[username@]server[/path]`
`imi`	Integrated Management Interface executable
`imish`	Integrated Management Interface shell executable
`nsm`	NSM executable
`ospfd`	OSPFv2 executable
`hostpd`	Host protocol executable
`bgpd`	BGP executable
`isisd`	ISIS executable
`ospf6d`	OSPFv3 executable
`all`	All executables

Command Mode

Privileged Exec mode

Examples

```
#copy scp scp://scp.mysite.com file nsm
```

copy sftp binary file

Use this command to copy a binary (executable) file from an SFTP server to the local device.

Command Syntax

```
copy sftp SFTP-URL file (imi|imish|nsm|ospfd|hostpd|bgpd|isisd|ospf6d|all)
```

Parameters

`SFTP-URL`	Source: `sftp:[//[username@]server][/path]`
`imi`	Integrated Management Interface executable
`imish`	Integrated Management Interface shell executable
`nsm`	NSM executable
`ospfd`	OSPFv2 executable
`hostpd`	Host protocol executable
`bgpd`	BGP executable
`isisd`	ISIS executable
`ospf6d`	OSPFv3 executable
`all`	All executables

Command Mode

Privileged Exec mode

Examples

```
#copy sftp sftp://sftp.mysite.com file all
```

copy tftp binary file

Use this command to copy a binary (executable) file from a TFTP server to the local device.

Command Syntax

```
copy tftp TFTP-URL file (imi|imish|nsm|ospfd|hostpd|bgpd|isisd|ospf6d|all)
```

Parameters

`TFTP-URL`	Source: `tftp:[//server[:port]][/path]`
`imi`	Integrated Management Interface executable
`imish`	Integrated Management Interface shell executable
`nsm`	NSM executable
`ospfd`	OSPFv2 executable
`hostpd`	Host protocol executable
`bgpd`	BGP executable
`isisd`	ISIS executable
`ospf6d`	OSPFv3 executable
`all`	All executables

Command Mode

Privileged Exec mode

Examples

```
#copy tftp tftp://tftp.mysite.com file ospf6d
```

copy ftp binary file (interactive)

Use this command to copy a binary (executable) file from an FTP server to the local device.

Command Syntax

```
copy ftp file (imi|imish|nsm|ospfd|hostpd|bgpd|isisd|ospf6d|all)
```

Parameters

`imi`	Integrated Management Interface executable
`imish`	Integrated Management Interface shell executable
`nsm`	NSM executable
`ospfd`	OSPFv2 executable
`hostpd`	Host protocol executable
`bgpd`	BGP executable
`isisd`	ISIS executable
`ospf6d`	OSPFv3 executable
`all`	All executables

Command Mode

Privileged Exec mode

Examples

```
#copy ftp imi
```

copy scp binary file (interactive)

Use this command to copy a binary (executable) file from an SCP server to the local device.

Command Syntax

```
copy scp file (imi|imish|nsm|ospfd|hostpd|bgpd|isisd|ospf6d|all)
```

Parameters

`imi`	Integrated Management Interface executable
`imish`	Integrated Management Interface shell executable
`nsm`	NSM executable
`ospfd`	OSPFv2 executable
`hostpd`	Host protocol executable
`bgpd`	BGP executable
`isisd`	ISIS executable
`ospf6d`	OSPFv3 executable
`all`	All executables

Command Mode

Privileged Exec mode

Examples

```
#copy scp nsm
```

copy sftp binary file (interactive)

Use this command to copy a binary (executable) file from an SFTP server to the local device.

Command Syntax

```
copy sftp file (imi|imish|nsm|ospfd|hostpd|bgpd|isisd|ospf6d|all)
```

Parameters

`imi`	Integrated Management Interface executable
`imish`	Integrated Management Interface shell executable
`nsm`	NSM executable
`ospfd`	OSPFv2 executable
`hostpd`	Host protocol executable
`bgpd`	BGP executable
`isisd`	ISIS executable
`ospf6d`	OSPFv3 executable
`all`	All executables

Command Mode

Privileged Exec mode

Examples

```
#copy sftp file all
```

copy tftp binary file (interactive)

Use this command to copy a binary (executable) file from a TFTP server to the local device.

Command Syntax

```
copy tftp file (imi|imish|nsm|ospfd|hostpd|bgpd|isisd|ospf6d|all)
```

Parameters

`imi`	Integrated Management Interface executable
`imish`	Integrated Management Interface shell executable
`nsm`	NSM executable
`ospfd`	OSPFv2 executable
`hostpd`	Host protocol executable
`bgpd`	BGP executable
`isisd`	ISIS executable
`ospf6d`	OSPFv3 executable
`all`	All executables

Command Mode

Privileged Exec mode

Examples

```
#copy tftp ospf6d
```

copy ftp system file

Use this command to copy a system file from an FTP server to the local device.

Note: The names of the options for the destination in the second parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy ftp FTP-URL (bootflash|nvram|usb1|volatile|debug|log|modflash) FILE
```

Parameters

`FTP-URL`	Source: `ftp:[//[username@]server][/path]`
`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`debug`	Debug file storage; on Linux this refers to `/var/log/`
`log`	Log file storage; on Linux this refers to `/var/log/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy ftp ftp://ftp.mysite.com modflash myFile
```

copy scp system file

Use this command to copy a system file from an SCP server to the local device.

Note: The names of the options for the destination in the second parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy scp SCP-URL (bootflash|nvram|usb1|volatile|debug|log|modflash) FILE
```

Parameters

`SCP-URL`	Source: `scp://[username@]server[/path]`
`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy scp scp://scp.mysite.com bootflash myFile
```

copy sftp system file

Use this command to copy a system file from an SFTP server to the local device.

Note: The names of the options for the destination in the second parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy sftp SFTP-URL (bootflash|nvram|usb1|volatile|debug|log|modflash) FILE
```

Parameters

`SFTP-URL`	Source: `sftp://[username@]server[/path]`
`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy sftp sftp://sftp.mysite.com volatile myFile
```

copy tftp system file

Use this command to copy a system file from a TFTP server to the local device.

Note: The names of the options for the destination in the second parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy tftp TFTP-URL (bootflash|nvram|usb1|volatile|modflash) FILE
```

Parameters

`TFTP-URL`	Source: `tftp:[//server[:port]][/path]`
`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy tftp tftp://tftp.mysite.com nvram myFile
```

copy startup-config running-config

Use this command to copy the start-up configuration to the running configuration.

Command Syntax

```
copy startup-config running-config
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#copy startup-config running-config
```

copy file running-config

Use this command to copy a file to the running configuration.

Command Syntax

```
copy file FILE running-config
```

Parameters

FILE	File name

Command Mode

Privileged Exec mode

Examples

```
#copy myFile running-config
```

copy running-config bootflash

Use this command to copy the running configuration to internal flash memory.

Note: The name `bootflash` is a symbolic location. On Linux, this location refers to `/boot/`. The location on a specific device can vary depending on the platform.

Command Syntax

```
copy running-config bootflash
```

Parameters

`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy running-config bootflash myFile
```

copy running-config nvram

Use this command to copy the running configuration to non-volatile random-access memory.

Note: The name `nvram` is a symbolic location. On Linux, this location refers to `/tmp/`. The location on a specific device can vary depending on the platform.

Command Syntax

```
copy running-config nvram FILE
```

Parameters

`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy running-config nvram myFile
```

copy running-config usb1

Use this command to copy the running configuration to Universal Serial Bus flash memory.

Note: The name `usb1` is a symbolic location. On Linux, this location refers to `/tmp/`. The location on a specific device can vary depending on the platform.

Command Syntax

```
copy running-config usb1 FILE
```

Parameters

`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy running-config usb1 myFile
```

copy running-config volatile

Use this command to copy the running configuration to volatile memory.

Note: The name `volatile` is a symbolic location. On Linux, this location refers to `/tmp/`. The location on a specific device can vary depending on the platform.

Command Syntax

```
copy running-config volatile FILE
```

Parameters

`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy running-config volatile myFile
```

copy startup-config bootflash

Use this command to copy the start-up configuration to internal flash memory.

Note: The name `bootflash` is a symbolic location. On Linux, this location refers to `/boot/`. The location on a specific device can vary depending on the platform.

Command Syntax

```
copy startup-config bootflash FILE
```

Parameters

`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy startup-config bootflash myFile
```

copy startup-config nvram

Use this command to copy the start-up configuration to non-volatile random-access memory.

Note: The name `nvram` is a symbolic location. On Linux, this location refers to `/tmp/`. The location on a specific device can vary depending on the platform.

Command Syntax

```
copy startup-config nvram FILE
```

Parameters

`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy startup-config nvram myFile
```

copy startup-config usb1

Use this command to copy the start-up configuration to Universal Serial Bus flash memory.

Note: The name `usb1` is a symbolic location. On Linux, this location refers to `/tmp/`. The location on a specific device can vary depending on the platform.

Command Syntax

```
copy startup-config usb1 FILE
```

Parameters

`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy running-config usb1 myFile
```

copy startup-config volatile

Use this command to copy the start-up configuration to volatile memory.

Note: The name `volatile` is a symbolic location. On Linux, this location refers to `/tmp/`. The location on a specific device can vary depending on the platform.

Command Syntax

```
copy startup-config volatile FILE
```

Parameters

`FILE`	File name

Command Mode

Privileged Exec mode

Examples

```
#copy startup-config volatile myFile
```

copy system file bootflash

Use this command to copy a system file to internal flash memory.

Note: The names of the options for the source in the first parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy (bootflash|core|debug|log|modflash|nvram|usb1|volatile) FILE bootflash FILE
```

Parameters

`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`core`	Core file storage; on Linux this refers to `/cores/`
`debug`	Debug file storage; on Linux this refers to `/var/log/`
`log`	Log file storage; on Linux this refers to `/var/log/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`FILE`	Source file name
`FILE`	Destination file name

Command Mode

Privileged Exec mode

Examples

```
#copy nvram myFile bootflash myFile
```

copy system file modflash

Use this command to copy a system file to external flash memory.

Note: The names of the options for the source in the first parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy (bootflash|debug|log|modflash|nvram|usb1|volatile) FILE modflash FILE
```

Parameters

`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`debug`	Debug file storage; on Linux this refers to `/var/log/`
`log`	Log file storage; on Linux this refers to `/var/log/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`FILE`	Source file name
`FILE`	Destination file name

Command Mode

Privileged Exec mode

Examples

```
#copy core myFile modflash myFile
```

copy system file nvram

Use this command to copy a system file to non-volatile random-access memory.

Note: The names of the options for the source in the first parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy (bootflash|debug|log|modflash|nvram|usb1|volatile) FILE nvram FILE
```

Parameters

`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`debug`	Debug file storage; on Linux this refers to `/var/log/`
`log`	Log file storage; on Linux this refers to `/var/log/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`FILE`	Source file name
`FILE`	Destination file name

Command Mode

Privileged Exec mode

Examples

```
#copy usb1 myFile nvram myFile
```

copy system file usb1

Use this command to copy a system file to Universal Serial Bus flash memory.

Note: The names of the options for the source in the first parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy (bootflash|core|debug|log|modflash|nvram|usb1|volatile) FILE usb1 FILE
```

Parameters

`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`core`	Core file storage; on Linux this refers to `/cores/`
`debug`	Debug file storage; on Linux this refers to `/var/log/`
`log`	Log file storage; on Linux this refers to `/var/log/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`FILE`	Source file name
`FILE`	Destination file name

Command Mode

Privileged Exec mode

Examples

```
#copy nvram myFile usb1 myFile
```

copy system file volatile

Use this command to copy a system file to volatile memory.

Note: The names of the options for the source in the first parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy (bootflash|debug|log|modflash|nvram|usb1|volatile) FILE volatile FILE
```

Parameters

`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`debug`	Debug file storage; on Linux this refers to `/var/log/`
`log`	Log file storage; on Linux this refers to `/var/log/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`FILE`	Source file name
`FILE`	Destination file name

Command Mode

Privileged Exec mode

Examples

```
#copy bootflash myFile volatile myFile
```

copy system file running-config

Use this command to copy a system file to the running configuration.

Note: The names of the options for the source in the first parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy (bootflash|debug|log|modflash|nvram|usb1|volatile) FILE running-config
```

Parameters

`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`debug`	Debug file storage; on Linux this refers to `/var/log/`
`log`	Log file storage; on Linux this refers to `/var/log/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`FILE`	Source file name

Command Mode

Privileged Exec mode

Examples

```
#copy nvram myFile running-config
```

copy system file startup-config

Use this command to copy a system file to the start-up configuration.

Note: The names of the options for the source in the first parameter refer to symbolic locations. The specific locations for Linux are noted below. The locations on a specific device can vary depending on the platform.

Command Syntax

```
copy (bootflash|debug|log|modflash|nvram|usb1|volatile) FILE startup-config
```

Parameters

`bootflash`	Internal flash memory; on Linux this refers to `/boot/`
`debug`	Debug file storage; on Linux this refers to `/var/log/`
`log`	Log file storage; on Linux this refers to `/var/log/`
`modflash`	External flash memory; on Linux this refers to `/tmp/`
`nvram`	Non-volatile random-access memory; on Linux this refers to `/tmp/`
`usb1`	Universal Serial Bus flash memory; on Linux this refers to `/tmp/`
`volatile`	Volatile memory; on Linux this refers to `/tmp/`
`FILE`	Source file name

Command Mode

Privileged Exec mode

Examples

```
#copy nvram myFile startup-config
```

clear cores

Use this command to clear the TFTP server to which you have previously uploaded core files.

Command Syntax

```
clear cores
```

Parameters

None

Command Mode

Configure mode

Examples

```
#config term
(config)#clear cores
```

show system cores

Use this command to display the TFTP server to which you have previously uploaded core files.

Command Syntax

```
show system cores
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#show system cores
```

system cores

Use this command to upload a core dump to a TFTP server

Use the `no` form of this command to delete a core dump which you have previously uploaded.

Command Syntax

```
system cores TFTP-URL
no system cores
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#system cores tftp tftp://tftp.mysite.com
```

CHAPTER 10 Secure Shell

This chapter describes Secure Shell (SSH) commands.

SSH is a cryptographic protocol for secure data communication, remote login, remote command execution, and other secure network services between two networked computers.

This chapter contains these commands:

clear ssh hosts

Use this command to clear the `known_hosts` file.

This command clears all trusted relationships established with SSH servers during previous connections. When a client downloads a file from an external server the first time, the client stores the server keys in the `known_hosts` file. After that, other connections to the same server will use the server keys stored in the `known_hosts` file. In other words, a trusted relationship is created when a client accepts the server keys the first time.

An example of when you need to clear a trusted relationship is when SSH server keys are changed.

Command Syntax

```
clear ssh hosts
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)clear ssh hosts
```

debug ssh server

Use this command to display SSH server debugging information.

Use the `no` form of this command to stop displaying SSH server debugging information.

Command Syntax

```
debug ssh server
debug ssh server (emergencies|alerts|critical|errors|warnings
  |notifications|informational|debugging))
no debug ssh server
```

Parameters

`emergencies`	Emergencies
`alerts`	Alerts
`critical`	Critical
`errors`	Errors
`warnings`	Warnings
`notifications`	Notifications
`informational`	Informational
`debugging`	Debugging

Command Mode

Executive mode and configure mode

Examples

```
#debug ssh server
```

feature ssh

Use this command to enable the SSH server.

Use the `no` form of this command to disable the SSH server.

Command Syntax

```
feature ssh
no feature ssh
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)feature ssh
```

show debug ssh server

Use this command to display whether SSH debugging is enabled.

Command Syntax

```
show debug ssh server
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show debug ssh server
```

show running-config ssh server

Use this command to display SSH settings in the running configuration.

Command Syntax

```
show running-config ssh server
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show running-config ssh server
```

show ssh key

Use this command to display the SSH server key.

Command Syntax

```
show ssh key
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show ssh key
```

show ssh server

Use this command to display the SSH server status.

Command Syntax

```
show ssh server
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show ssh server
```

show username-remote

Use this command to display the RSA or DSA key pair for a user.

Command Syntax

```
show username-remote USERNAME keypair
```

Parameters

USERNAME	User identifier

Command Mode

Exec mode

Examples

```
#show username-remote Fred keypair
```

ssh key

Use this command to create a SSH server key.

Use the `no` form of this command remove a SSH server key. The `no ssh key` form (with no other parameters) deletes both RSA and DSA keys.

You can only give this command when the SSH server is disabled. See the feature ssh command.

Command Syntax

```
ssh key (rsa)
ssh key (rsa) length <768-2048>
ssh key (rsa) length <768-2048> (force)
ssh key (rsa) (force)
ssh key (dsa)
ssh key (dsa) (force)
no ssh key
no ssh key (dsa)
no ssh key (rsa)
```

Parameters

`dsa`	Digital System Algorithm (DSA) SSH key
`rsa`	Rivest, Shamir, and Adelman (RSA) public-key cryptography SSH server key
`force`	Forces the replacement of an SSH key
`length`	Number of bits to use when creating the SSH server key; this parameter is only valid for RSA keys (DSA keys have a default length of 1024)
`<768-2048>`	Range of number of bits

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ssh key dsa
```

ssh login-attempts

Use this command to set the number of times that a user can try to log in to a SSH session.

Use the `no` form of this command to set the number of login attempts to its default (3).

You can only give this command when the SSH server is disabled. See the feature ssh command.

Command Syntax

```
ssh login-attempts <1-10>
no ssh login-attempts <1-10>
```

Parameters

`<1-10>`	Number of login attempts

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ssh login-attempts 5
```

ssh server port

Use this command to set the port number on which the SSH server listens for connections. The default port on which the SSH server listens is 22.

You can only give this command when the SSH server is disabled. See the feature ssh command.

Use the `no` form of this command to set the default port number (22).

Command Syntax

```
ssh server port <1-65535>
no ssh server port
```

Parameters

`<1-65535>`	Port number

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ssh server port 720
```

username-remote sshkey

Use this command to create a user account.

Command Syntax

```
username-remote USERNAME sshkey LINE
```

Parameters

USERNAME	User identifier
LINE	Digital System Algorithm (DSA) key or Rivest, Shamir, and Adelman (RSA) key in OpenSSH format; this key is written to the `authorized_keys` file

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#username-remote fred sshkey
AAAAB3NzaC1kc3MAAAEBAIirweZzCdyITqbMWB8Wly9ivGxY1JBVnWTVtcWKi6uc
CPZyw3I6J6/+69LEkPUSAyO+SK8zj0NF2f25FFc2YDMh1KKHi5gK7iXF3/ran54j
nP2byyLeo8rnuVqfEDLaBI1qQaWBcDQvsZc14t5SEJfsOQSfR03PDqPYAisrZRvM
5pWfzo486Rh33J3+17OuARQtZFDP4wA5zZoFxhl4U3RK42JzKNUiYBDrH3lSgfkv
XLWLXz9WcxY6zuKvXFwUpOA9PRXwUsKQqWuyywZQLNavENqFyoQ8oZnNKLCYE0h8
QnUe62NGxb3jQXKLflOL04JFNiii9sACG1Y/ut4ANysAAAAVAJbM7Z4chRgiVahN
iwXFJNkBmWGZAAABAAuF1FlI6xy0L/pBaIlFw34uUL/mh4SR2Di2X52eK70VNj+m
y5eQdRC6cxpaVqpS3Q4xTN+W/kaBbIlX40xJP5lcjMvfn/nqiuIeEodmVIJMWxOD
fh3egeGuSW614Vzd1RGrxpYInIOygMULRcxhmbX+rPliuUIvhg36iH0UR7XBln6h
uyKFvEmaL7bGlRvELjqaj0y6iiCfP1yGBc5vavH5X+jOWqdsJHsCgcIzPF5D1Ybp
w0nZmGsqO+P55mjMuj0O2uI7Ns1sxyirbnGhd+ZZ1u03QDy6MBcUspai8U5CIe6X
WqvXY+yJjpuvlW9GTHowCcGd6Z/e9IC6VE/kNEAAAAEAFIe6kLGTALR0F3AfapYY
/M+bvkmkkhOJUZVdLiwMjcvtJb9fQpPxqXElS3ZvUNIEElUPS/V7KgSsj8eg3FKN
iUGICkTwHIK7RTLC8k4IE6U3V3866JtxW+Znv1DB7uwnbZgoIZuVt3r1+h8O0ah8
UKwDUMJT0fwu9cuuS3G8Ss/gKi1HgByrcxXoK51/r4Bc4QmR2VQ8sXOREv/SHJeY
JGbEX3OxjRgXC7GlpbrdPiL8zs0dPiZ0ovAswsBOYlKYhd7JvfCcvWRjgP5h55aw
GNSmNs3STKufbIqYGeDAISYNYY4F2JzR593KIBnWgyhokyYybyEBh8NwTTO4J5rT
ZA==
```

username-remote keypair

Use this command to create a user account.

Command Syntax

```
username-remote USERNAME keypair (rsa)
username-remote USERNAME keypair (dsa)
username-remote USERNAME keypair rsa length <768-2048>
username-remote USERNAME keypair rsa length <768-2048> (force)
username-remote USERNAME keypair rsa (force)
username-remote USERNAME keypair dsa (force)
```

Parameters

`USERNAME`	User identifier
`keypair`	Key pairs
`rsa`	Rivest, Shamir, and Adelman (RSA) public-key cryptography SSH server key
`dsa`	Digital System Algorithm (DSA) SSH key
`length`	Number of bits to use when creating the SSH server key; this parameter is only valid for RSA keys (DSA keys have a default length of 1024)
`<768-2048>`	Range of number of bits
`force`	Forces the replacement of an SSH key

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#username-remote fred keypair rsa
```

CHAPTER 11 Simple Network Management Protocol

This chapter is a reference for Simple Network Management Protocol (SNMP) commands.

SNMP provides a standardized framework and a common language for monitoring and managing devices in a network. The SNMP framework consists of three parts:

- An SNMP manager: The system used to control and monitor the activities of network devices. This is sometimes called a Network Management System (NMS).
- An SNMP agent: The component within a managed device that maintains the data for the device and reports these data SNMP managers.
- Management Information Base (MIB): SNMP exposes management data in the form of variables which describe the system configuration. These variables can be queried (and sometimes set) by SNMP managers.

In SNMP, administration groups are known as *communities*. SNMP communities consist of one agent and one or more SNMP managers. You can assign groups of hosts to SNMP communities for limited security checking of agents and management systems or for administrative purposes. Defining communities provides security by allowing only management systems and agents within the same community to communicate.

A host can belong to multiple communities at the same time, but an agent does not accept a request from a management system outside its list of acceptable community names.

SNMP access rights are organized by groups. Each group is defined with three accesses: read access, write access, and notification access. Each access can be enabled or disabled within each group.

The SNMP v3 security level determines if an SNMP message needs to be protected from disclosure and if the message needs to be authenticated. The security levels are:

- noAuthNoPriv: Ne authentication or encryption
- authNoPriv: Authentication but no encryption
- authPriv: Both authentication and encryption

SNMP is defined in RFCs 3411-3418.

This chapter contains these commands:

clear snmp counters

Use this command to clear SNMP statistics.

Command Syntax

```
clear snmp counters
```

Parameters

None

Command Mode

Exec mode

Examples

```
#clear snmp counters
```

clear snmp hostconfig

Use this command to remove all SNMP trap hosts.

Command Syntax

```
clear snmp hostconfig
```

Parameters

None

Command Mode

Exec mode

Examples

```
#clear snmp hostconfig
```

debug snmp-server

Use this command to display SNMP debugging information.

Use the `no` form of this command to stop displaying SNMP debugging information.

Command Syntax

```
debug snmp-server
no debug snmp-server
```

Parameters

None

Command Mode

Exec and configure mode

Example

```
#debug snmp-server
```

show running-config snmp

Use this command to display the SNMP running configuration.

Command Syntax

```
show running-config snmp
```

Parameters

None

Command Mode

Privileged Exec mode

Example

```
#show running-config snmp
```

show snmp

Use this command to display the SNMP configuration, including session status, system contact, system location, statistics, communities, and users.

Command Syntax

```
show snmp
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show snmp
```

show snmp community

Use this command to display SNMP communities.

Command Syntax

```
show snmp community
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show snmp community
```

show snmp engine-id

Use this command to display the SNMP engine identifier.

The SNMP engine identifier is a unique string used to identify the device for administration purposes. You do not specify an engine identifier for a device; ZebOS-XP generates a default string. For more about the SNMP engine identifier, see RFC 2571.

Command Syntax

```
show snmp engine-id
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show snmp engine-id
```

show snmp group

Use this command to display SNMP server groups and associated views.

Command Syntax

```
show snmp group
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show snmp group
```

show snmp host

Use this command to display the SNMP trap hosts.

Command Syntax

```
show snmp host
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show snmp host
```

show snmp user

Use this command to display SNMP users and associated authentication, encryption, and group.

Command Syntax

```
show snmp user
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show snmp user
```

show snmp view

Use this command to display SNMP views.

Command Syntax

```
show snmp view
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show snmp view
```

snmp-server community

Use this command to create an SNMP community string and access privileges.

Use the `no` form of this command to remove an SNMP community string.

Command Syntax

```
snmp-server community WORD (| (view VIEW-NAME version (v1 | v2c ) ( ro | rw)) |
  (group WORD) |( ro | rw) | (use-acl WORD) )
no snmp-server community COMMUNITY-NAME
```

Parameters

`WORD`	SNMP community string; maximum length 32 characters
`view`	Defined view that defines the objects available to the SNMP community
`VIEW-NAME`	View name
`version`	Version
`v1`	SNMP v1
`v2c`	SNMP v2c
`ro`	Read-only access
`rw`	Read-write access
`group`	Community group
`WORD`	Community group name; maximum length 32 characters
`ro`	Read-only access
`rw`	Read-write access
`use-acl`	Access control list (ACL) to filter SNMP requests
`WORD`	ACL name; maximum length 32 characters

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#snmp-server community MyComm view MyView1 version v2c rw
```

snmp-server contact

Use this command to set the system contact information for the device (`sysContact` object).

Use the `no` form of this command to remove the system contact information.

Command Syntax

```
snmp-server contact (|TEXT)
no snmp-server contact (|TEXT)
```

Parameters

`TEXT`	System contact information; maximum length 32 characters without spaces

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#snmp-server contact Irving@555-0150
```

snmp-server enable snmp

Use this command to start the SNMP agent daemon over UDP.

Use the `no` form of this command to stop the SNMP agent daemon over UDP.

Command Syntax

```
snmp-server enable snmp
```

```
no snmp-server enable snmp
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#snmp-server enable snmp
```

snmp-server enable traps

Use this command to enable or disable SNMP traps and inform requests.

Command Syntax

```
snmp-server enable traps (|snmp (|authentication))
no snmp-server enable traps (|snmp (|authentication))
```

Parameters

`snmp`	Enable RFC 1157 notifications
`authentication`	Send SNMP authentication failure notifications

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#snmp-server enable traps
```

snmp-server host

Use this command to configure an SNMP trap host. An SNMP trap host is usually a network management station (NMS) or an SNMP manager.

Use the `no` form of this command to remove an SNMP trap host.

Command Syntax

IPv4/SNMP v2:

```
snmp-server host (A.B.C.D|HOSTNAME) (traps | informs)
  version ((1 | v2c) WORD)  (|udp-port <1-1024>)
```

IPv4/SNMP v3:

```
snmp-server host (A.B.C.D|HOSTNAME) (traps | informs)
  version(( (1 | 2c) WORD | (3 (noauth | auth | priv) WORD)) (|udp-port <1-1024>)
```

IPv6/SNMP v2:

```
snmp-server host (A.B.C.D|X:X::X:X|HOSTNAME) (traps | informs)
  version ((1 | v2c) WORD) (|udp-port <1-1024>)
```

IPv6/SNMP v3:

```
snmp-server host (A.B.C.D|X:X::X:X|HOSTNAME) (traps | informs)
  version(( (1 | 2c) WORD ) | (3 (noauth | auth | priv) WORD)) (|udp-port <1-1024>)
```

“No” forms:

```
no snmp-server host (A.B.C.D | HOSTNAME)
no snmp-server host (A.B.C.D | X:X::X:X | HOSTNAME)
```

Parameters

`A.B.C.D`		IPv4 address
`X:X::X:X`		IPv6 address
`HOSTNAME`		DNS host name
`traps`		Send notifications as traps
`informs`		Send notifications as informs
`version`		Version
	`v1`	SNMP v1
	`v2c`	SNMP v2c
	`2c`	SNMP v2c
	`3`	SNMP v3 security level
		`noauth` — No authentication and no privacy (noAuthNoPriv) security model: messages transmitted as clear text providing backwards compatibility with earlier versions of SNMP
		`auth` — Authentication and no privacy (authNoPriv) security model: use message digest algorithm 5 (MD5) or Secure Hash Algorithm (SHA) for packet authentication; messages transmitted in clear text

priv	Authentication and privacy (authPriv) security model: use authNoPriv packet authentication with Data Encryption Standard (DES) Advanced Encryption Standard (AES) for packet encryption
WORD	SNMP community string or SNMPv3 user name
udp-port	Host UDP port
<1-1024>	Port number; the default is 162

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#snmp-server host abcd::34 traps version 3 auth MyUser udp-port 512
```

snmp-server location

Use this command to set the physical location information of the device (`sysLocation` object).

Use the `no` form of this command to remove the system location information.

Command Syntax

```
snmp-server location (|LINE)
no snmp-server location (|LINE)
```

Parameters

`LINE`	Physical location information

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#snmp-server location Bldg. 5, 3rd floor, northeast
```

snmp-server tcp-session

Use this command to start the SNMP agent daemon over TCP.

Use the `no` form of this command to close the SNMP agent daemon over TCP.

Command Syntax

```
snmp-server tcp-session
no snmp-server tcp-session
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#snmp-server tcp-session
```

snmp-server user

Use this command to create an SNMP server user.

Use the `no` form of this command to remove an SNMP server user.

Command Syntax

```
snmp-server user WORD (|WORD) ((auth (md5 | sha ) AUTH-PASSWORD) ((priv (des | aes)
  PRIV-PASSWORD) |) |)
no snmp-server user USER-NAME
```

Parameters

`WORD`	User name; length 5-32 characters
`WORD`	Name of the group to which the user belongs; maximum length 35 characters
`auth`	Packet authentication type
`md5`	Message Digest Algorithm 5 (MD5)
`sha`	Secure Hash Algorithm (SHA)
`AUTH-PASSWORD`	Authentication password; length 8-33 characters
`priv`	Packet encryption type (“privacy”)
`des`	Data Encryption Standard (DES)
`aes`	Advanced Encryption Standard (AES)
`PRIV-PASSWORD`	Encryption password; length 8-33 characters

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#snmp-server user Fred auth md5 J@u-b;l2e`n,9p_ priv des t41VVb99i8He{Jt
```

snmp-server view

Use this command to create or update a view entry

Use the `no` from of this command to remove a view entry.

Command Syntax

```
snmp-server view VIEW-NAME OID-TREE (included | excluded)
no snmp-server view VIEW-NAME
```

Parameters

`VIEW-NAME`	View name; maximum length 32 characters
`OID-TREE`	Object identifier of a subtree to include or exclude from the view; specify a text string consisting of numbers and periods, such as 1.3.6.2.4
`included`	Include `OID-TREE` in the SNMP view
`excluded`	Exclude `OID-TREE` from the SNMP view

Command Mode

Configure mode

Examples

The following example creates a view named `myView3` that excludes the `snmpCommunityMIB` object (1.3.6.1.6.3.18).

```
#configure terminal
(config)#snmp-server view myView3 1.3.6.1.6.3.18 excluded
```

CHAPTER 12 Syslog

This chapter is a reference for the `syslog` commands.

Linux applications use the `syslog` utility to collect, identify, time-stamp, filter, store, alert, and forward logging data. The `syslog` utility can track and log all manner of system messages from informational to extremely critical. Each system message sent to a `syslog` server has two descriptive labels associated with it:

- The function (facility) of the application that generated it. For example, applications such as `mail` and `cron` generate messages with facilities named “mail” and “cron”.
- Eight degrees of severity (numbered 0-7) of the message which are listed in Table 12-1:.

Table 12-1: Syslog severities

Severity Level	Keyword	Description
0	emergency	System unusable
1	alert	Immediate action required
2	critical	Critical condition
3	error	Error conditions
4	warning	Warning conditions
5	notification	Normal but significant conditions
6	informational	Informational messages
7	debugging	Debugging messages

This chapter contains these commands:

debug logging

Use this command to display logging debugging information.

Use the `no` form of this command stop displaying logging debugging information.

Command Syntax

```
debug logging host
debug logging host (emergencies|alerts|critical|errors|warnings
  |notifications|informational|debugging|)
no debug logging host
```

Parameters

`emergencies`	Emergencies
`alerts`	Alerts
`critical`	Critical
`errors`	Errors
`warnings`	Warnings
`notifications`	Notifications
`informational`	Informational
`debugging`	Debugging

Command Mode

Exec and configure mode

Examples

```
#configure terminal
(config)#debug logging host
```

logging server

Use this command to set a `syslog` server.

Use the `no` form of this command to remove a `syslog` server.

Command Syntax

```
logging server (A.B.C.D|X:X::X:X|HOSTNAME) (|((<0-7>) (|facility (local0| local1 |
  local2 | local3| local4 |local5 | local6 | local7 |user))))
no logging server (A.B.C.D | X:X::X:X | HOSTNAME )
```

Parameters

`A.B.C.D`	IPv4 address
`X:X::X:X`	IPv6 address
`HOSTNAME`	Host name; specify `localhost` to log locally
`<0-7>`	Severity at which messages are logged. The severity levels are shown in Table 12-1. If not specified, the default is 3.
`facility`	Entity logging the message (user defined); if not specified, the default is local7
`local0`	Local0 entity
`local1`	Local1 entity
`local2`	Local2 entity
`local3`	Local3 entity
`local4`	Local4 entity
`local5`	Local5 entity
`local6`	Local6 entity
`local7`	Local7 entity (default)
`user`	User entity

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#logging server MyLogHost
```

logging timestamp

Use this command to set the logging timestamp granularity.

Use the `no` form of this command to reset the logging timestamp granularity to its default (seconds).

Command Syntax

```
logging timestamp (microseconds|milliseconds|seconds)
no logging timestamp (microseconds|milliseconds|seconds)
```

Parameters

`microseconds`	Microseconds granularity
`milliseconds`	Milliseconds granularity
`seconds`	Seconds granularity (default)

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#logging timestamp milliseconds
```

show logging

Use this command to display the logging configuration.

Command Syntax

```
show logging (server|console|timestamp|monitor)
```

Parameters

`server`	Syslog server configuration
`console`	Console configuration
`timestamp`	Timestamp configuration
`monitor`	Monitor configuration

Command Mode

Exec mode

Examples

```
#show logging server
```

show logging last

Use this command to display lines from the end of the log file.

Command Syntax

```
show logging last (<1-9999>)
```

Parameters

<1-9999>	Number of lines to display from end of the log file

Command Mode

Exec mode

Examples

```
#show logging last 100
```

show logging logfile

Use this command to display whether logging is enabled, the log file name, and the logging severity.

Command Syntax

```
show logging logfile
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show logging logfile
```

show logging logfile last-index

Use this command to display the number of line in the log file.

Command Syntax

```
show logging logfile last-index
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show logging logfile last-index
```

show logging logfile start-seqn end-seqn

Use this command to display a range of lines in the log file.

Command Syntax

```
show logging logfile start-seqn (<0-2147483647>) (|(end-seqn <0-2147483647>))
```

Parameters

`start-seqn`	Starting line number
`end-seqn`	Ending line number

Command Mode

Exec mode

Examples

```
#show logging logfile start-seqn 500 end-seqn 750
```

show logging logfile start-time end-time

Use this command to display lines from the log file within a given date-time range.

Command Syntax

```
show logging logfile start-time (<2000-2030> WORD <1-31> WORD) (|(end-time <2006-
  2030> WORD <1-31> WORD))
```

Parameters

`start-time`	Starting date and time:
`<2000-2030>`	Year in YYYY format
`WORD`	Month as `jan`, `feb`, `mar`, ..., `oct`, `nov`, or `dec` (maximum length 3 characters)
`<1-31>`	Day of month in DD format
`WORD`	Hour, minutes, seconds in HH:MM:SS format (maximum length 8 characters); range <0-23>:<0-59>:<0-59>
`end-time`	Ending date and time:
`<2000-2030>`	Year in YYYY format
`WORD`	Month as `jan`, `feb`, `mar`, ..., `oct`, `nov`, or `dec` (maximum length 3 characters)
`<1-31>`	Day of month in DD format
`WORD`	Hour, minutes, seconds in HH:MM:SS format (maximum length 8 characters); range <0-23>:<0-59>:<0-59>

Command Mode

Exec mode

Examples

```
#show logging logfile start-time 2015 mar 15 12:10:00 end-time 2015 apr 15
12:10:00
```

show running-config syslog

Use this command to display the syslog running configuration.

Command Syntax

```
show running-config syslog
```

Parameters

None

Command Mode

Exec mode and Configure mode

Examples

```
#show running-config syslog
```

CHAPTER 13 TACACS+

Terminal Access Controller Access-Control System Plus (TACACS+, usually pronounced like tack-axe) is an access control network protocol for network devices. There is no RFC protocol specification for TACACS.

Unlike RADIUS, TACACS+ provides separate authentication, authorization and accounting services. Like RADIUS, TACACS+ is an open, publicly documented protocol. TACACS+ uses the TCP protocol and encrypts the entire packet (except the header).

The differences between RADIUS and TACACS+ can be summarized as follows:

- RADIUS combines authentication and authorization in a user profile, while TACACS+ separates the two activities.
- RADIUS encrypts only the password in the access-request packet sent from the client to the server. The remainder of the packet is unencrypted. TACACS+ encrypts the entire body of the packet but leaves a standard TACACS+ header.
- RADIUS uses UDP, while TACACS+ uses TCP.
- RADIUS is based on an open standard (RFC 2865), while TACACS+ is proprietary to Cisco.

This chapter contains these commands:

debug tacacs+

Use this command to display TACACS+ debugging information.

Use the `no` form of this command stop displaying TACACS+ debugging information.

Command Syntax

```
debug tacacs+ (aaa-request | aaa-request-lowlevel | all | config | config-lowlevel
  | server-monitor | server-monitor-errors)
no debug tacacs+ (aaa-request | aaa-request-lowlevel | all | config | config-
  lowlevel | server-monitor | server-monitor-errors)
```

Parameters

`aaa-request`	TACACS+ AAA requests
`aaa-request-lowlevel`	TACACS+ AAA low-level requests
`all`	All
`config`	TACACS+ configuration
`config-lowlevel`	TACACS+ low-level configuration
`server-monitor`	TACACS+ server monitor
`server-monitor-errors`	TACACS+ server monitor errors

Command Mode

Executive mode and configure mode

Examples

```
#debug tacacs+
```

feature tacacs+

Use this command to enable the TACACS+ feature.

Use the `no` form of this command to disable the TACACS+ feature.

Command Syntax

```
feature tacacs+
no feature tacacs+
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#feature tacacs+
```

show debug tacacs+

Use this command to display whether TACACS+ debugging is enabled.

Command Syntax

```
show debug tacacs+
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show debug tacacs+
```

show running-config tacacs+

Use this command to display TACACS+ settings in the running configuration.

Command Syntax

```
show running-config tacacs+
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show running-config tacacs+
```

show tacacs-server

Use this command to display the TACACS+ server configuration.

Command Syntax

```
show tacacs-server ((WORD) |(directed-request) | (groups (GROUP|)|) | (sorted)|
  (statistics WORD))
```

Parameters

`WORD`	DNS host name or IP address
`directed-request`	Whether to send authentication requests to the TACACS+ server
`groups`	TACACS+ server group
`GROUP`	Group name; if this parameter is not specified, display all groups
`sorted`	Sort by TACACS+ server name
`statistics`	Statistics
`WORD`	DNS host name or IP address

Command Mode

Executive mode

Examples

```
#show tacacs-server
```

tacacs-server host

Use this command to set the TACACS+ server host name or IP address.

Use the `no` form of this command to remove an TACACS+ server (if only a host name or IP address is specified as a parameter) or to remove all a TACACS+ server's configuration settings (if any other parameters are also specified).

Command Syntax

```
tacacs-server host (HOSTNAME | X:X::X:X | A.B.C.D)  (key ((0 WORD) | (7 WORD) |
  (WORD))|) (port <1-65535> |) (timeout <1-60> |)
tacacs-server host (HOSTNAME | X:X::X:X | A.B.C.D) test (username WORD|) (password
  WORD |) (idle-time <1-1440> |)
no tacacs-server host (HOSTNAME | A.B.C.D | X:X::X:X)
no tacacs-server host (HOSTNAME | X:X::X:X | A.B.C.D) (key ((0 WORD) | (7 WORD) |
  (WORD))|) (port <1-65535> |) (timeout <1-60> |)
no tacacs-server host (HOSTNAME | X:X::X:X | A.B.C.D) test (username WORD|)
  (password WORD |) (idle-time <1-1440> |)
```

Parameters

`HOSTNAME`	Host name
`A.B.C.D`	IPv4 address
`X:X::X:X`	IPv6 address
`key`	Authentication and encryption key ("shared secret")
`0`	Unencrypted (clear text) shared key
`WORD`	Unencrypted key value; maximum length 63 characters
`7`	Hidden shared key
`WORD`	Hidden key value; maximum length 63 characters
`WORD`	Unencrypted (clear text) shared key value; maximum length 63 characters
`port`	TACACS+ server port
`<1-65535>`	TACACS+ server port number; the default is 49
`timeout`	Period to wait for a response from the server before the client declares a timeout failure
`<1-60>`	Timeout value in seconds; the default is 5 seconds
`test`	Verify the TACACS+ server state
`username`	User name used in test packets
`WORD`	User name value; maximum length 32 characters
`password`	Password used in test packets
`WORD`	Password value; maximum length 32 characters
`idle-time`	If a response is not received after this time, the server is assumed dead
`<1-1440>`	Idle-time value; the default is 60

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#tacacs-server host 203.0.113.31 timeout 25
```

tacacs-server key

Use this command to set a global preshared key (“shared secret”) which is a text string shared between the device and TACACS+ servers.

Use the `no` form of this command to remove a global preshared key.

Command Syntax

```
tacacs-server key ((0 WORD) | (7 WORD) | (WORD))
no tacacs-server key ((0 WORD) | (7 WORD) | (WORD))
```

Parameters

`0`	Unencrypted (clear text) shared key
`WORD`	Unencrypted key value; maximum length 63 characters
`7`	Hidden shared key
`WORD`	Hidden key value; maximum length 63 characters
`WORD`	Unencrypted (clear text) shared key value; maximum length 63 characters

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#tacacs-server key 7 jvn05mlQH1
```

tacacs-server timeout

Use this command to set the period to wait for a response from the server before the client declares a timeout failure. The default timeout value is 5 seconds.

You can only give this command when the TACACS+ feature is enabled. See the feature tacacs+ command.

Use the `no` form of this command to set the timeout value to its default value (5 seconds).

Command Syntax

```
tacacs-server timeout <1-60>
no tacacs-server timeout <1-60>
```

Parameters

`<1-60>`	Timeout value in seconds

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#tacacs-server timeout 20
```

CHAPTER 14 Telnet

This chapter describes telnet commands.

Telnet is a client/server protocol that establishes a session between a user terminal and a remote host:

- The telnet client software takes input from the user and sends it to the server's operating system
- The telnet server takes output from the host and sends it to the client to display to the user

While telnet is most often used to implement remote login capability, the protocol is general enough to allow it to be used for a variety of functions.

This chapter contains these commands:

debug telnet server

Use this command to display telnet debugging information.

Use the `no` form of this command to stop displaying telnet debugging information.

Command Syntax

```
debug telnet server
debug telnet server (emergencies|alerts|critical|errors|warnings
  |notifications|informational|debugging)
no debug debug telnet server
```

Parameters

`server`	Server
`client`	Client
`emergencies`	Emergencies
`alerts`	Alerts
`critical`	Critical
`errors`	Errors
`warnings`	Warnings
`notifications`	Notifications
`informational`	Informational
`debugging`	Debugging

Command Mode

Executive mode and configure mode

Examples

```
#debug telnet server
```

feature telnet

Use this command to enable the telnet server.

Use the `no` form of this command to disable the telnet server.

Command Syntax

```
feature telnet
no feature telnet
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#feature telnet
```

show debug telnet server

Use this command to display whether telnet debugging is enabled.

Command Syntax

```
show debug telnet-server
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show debug telnet-server
```

show running-config telnet server

Use this command to display telnet settings in the running configuration.

Command Syntax

```
show running-config telnet server
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show running-config telnet server
```

show telnet server

Use this command to display the telnet server status.

Command Syntax

```
show telnet server
```

Parameters

None

Command Mode

Exec mode

Examples

```
#show telnet server
```

telnet server port

Use this command to set the port number on which the telnet server listens for connections. The default port on which the telnet server listens is 23.

You can only give this command when the telnet server is disabled. See the feature telnet command.

Use the `no` form of this command to set the default port number (23).

Command Syntax

```
telnet server port <1-65535>
no telnet server port
```

Parameters

`<1-65535>`	Port number

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#telnet server port 57
```

CHAPTER 15 User Management

This chapter is a reference for user management commands.

The user management features let you create roles that contain rules that define the operations allowed for any user who is assigned the role. A rule is the basic element of a role. A rule defines what operations the role allows the user to perform. You can apply rules for the following:

- Command: A command or group of commands
- Feature: Commands that apply to a function provided by the device
- Feature group: A user-defined feature group.

These item have a hierarchical relationship:

- The most basic level is the command
- The next level is the feature which represents all commands associated with the feature
- The last level is the feature group which combines related features and allows you to easily manage the rules

This chapter includes these commands:

debug user-mgmt

Use this command to display user management debugging information.

Use the `no` form of this command stop displaying user management debugging information.

Command Syntax

```
debug user-mgmt
no debug user-mgmt
```

Parameters

None

Command Mode

Privileged Exec and configure mode

Example

```
#debug user-mgmt
```

feature

Use this command to add a feature to a feature group.

Command Syntax

```
feature WORD
```

Parameters

WORD	One of protocols/features below: BGP, HOSTP, IGMP, IGMP_IF, ISIS, L2MRIB, LDP, MLD, MLD_IF, MRIB, MRIB4, MRIB4_IF, MRIB6, MRIB6_IF, MSTP, OSPF, OSPF6, PIM, RIB, RIP, RIPNG, RSTP, RVSP, STP, TRILL, VPORTMGR, VRRP

Command Mode

Role feature mode

Example

```
#configure terminal
(config)#role feature-group group-name Ann-Arbor
(config-role-featuregrp)#feature IGMP_IF
(config-role-featuregrp)#feature OSPF6
(config-role-featuregrp)#feature VPORTMGR
```

interface policy deny

Use this command to deny all access to an interface unless explicitly permitted. This command enters role interface mode.

Use the `no` form of this command to permit all access to an interface.

Command Syntax

```
interface policy deny
```

```
no interface policy deny
```

Parameters

None

Command Mode

Role mode

Example

```
#configure terminal
(config)#role name Dearborn
(config-role)#interface policy deny
(config-role-interface)#
```

permit interface ethernet

Use this command to permit selective access to interfaces when general access is denied.

Use the `no` form of this command to remove this permission.

Command Syntax

```
permit interface ethernet <1-255>
no permit interface ethernet <1-255>
```

Parameters

`<1-255>`	Slot/chassis number

Command Mode

Role interface mode

Example

```
#configure terminal
(config)#role name Dearborn
(config-role)#interface policy deny
(config-role-interface)#permit interface ethernet 127
```

permit interface loopback

Use this command to permit selective access to loopback interfaces when general access is denied.

Use the `no` form of this command to remove this permission.

Command Syntax

```
permit interface loopback <0-1023>
no permit interface loopback <0-1023>
```

Parameters

`<0-1023>`	Virtual interface number

Command Mode

Role interface mode

Example

```
#configure terminal
(config)#role name Dearborn
(config-role)#interface policy deny
(config-role-interface)#permit interface loopback 532
```

permit interface mgmt

Use this command to permit selective access to management interfaces when general access is denied.

Use the `no` form of this command to remove this permission.

Command Syntax

```
permit interface mgmt <0-0>
no permit interface mgmt <0-0>
```

Parameters

`<0-0>`	Management interface number

Command Mode

Role interface mode

Example

```
#configure terminal
(config)#role name Dearborn
(config-role)#interface policy deny
(config-role-interface)#permit interface mgmt 0
```

permit interface port-channel

Use this command to permit selective access to port channel interfaces when general access is denied.

Use the `no` form of this command to remove this permission.

Command Syntax

```
permit interface port-channel <1-4096>
no permit interface port-channel <1-4096>
```

Parameters

`<1-4096>`	Port channel number

Command Mode

Role interface mode

Example

```
#configure terminal
(config)#role name Dearborn
(config-role)#interface policy deny
(config-role-interface)#permit interface port-channel 503
```

permit interface vlan

Use this command to permit selective access to VLAN interfaces when general access is denied.

Use the `no` form of this command to remove this permission.

Command Syntax

```
permit interface vlan <1-4094>
no permit interface vlan <1-4094>
```

Parameters

`<1-4094>`	VLAN interface number

Command Mode

Role interface mode

Example

```
#configure terminal
(config)#role name Dearborn
(config-role)#interface policy deny
(config-role-interface)#permit interface vlan 2047
```

permit vlan

Use this command to permit selective access to a VLAN when general access is denied.

Use the `no` form of this command to remove this permission.

Command Syntax

```
permit vlan <1-4093>
no permit vlan <1-4093>
```

Parameters

`<1-4093>`	VLAN number

Command Mode

Role VLAN mode

Example

```
#configure terminal
(config)#role name Dearborn
(config-role)#vlan policy deny
(config-role-vlan)#permit vlan 302
```

permit vrf

Use this command to permit selective access to a VRF when general access is denied.

Use the `no` form of this command to remove this permission.

Command Syntax

```
permit vrf WORD
no permit vrf WORD
```

Parameters

`WORD`	VRF name

Command Mode

Role VRF mode

Example

```
#configure terminal
(config)#role name Dearborn
(config-role)#vrf policy deny
(config-role-vrf)#permit vrf sleeping-bear
```

role feature-group group-name

Use this command to create a feature group and enter role feature mode.

All features supported by a device belong to the `default` feature group. You can create you own custom feature groups with this command.

Use the `no` form of this command to remove a feature group.

Command Syntax

```
role feature-group group-name WORD
no role feature-group name WORD
```

Parameters

`WORD`	Feature group name; maximum length 32 characters

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#role feature-group group-name Ann-Arbor
(config-role-featuregrp)#feature IGMP_IF
(config-role-featuregrp)#feature OSPF6
(config-role-featuregrp)#feature VPORTMGR
```

role name

Use this command to create a role and enter role mode.

For each user role, you give the rule command to define the operations allowed for a user who is assigned the role. Each user role can contain multiple rules and each user can have multiple roles.

Use the `no` form of this command to remove a role.

Command Syntax

```
role name WORD
no role name WORD
```

Parameters

`WORD`	Role name; maximum length 16 characters

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#role name Dearborn
(config-role)#
```

rule

Use this command to create a rule.

A rule is the basic element of a role. A rule defines what operations the role allows the user to perform. You can apply rules for the following:

- Command: A command or group of commands
- Feature: Commands that apply to a function provided by the device. Enter the show role feature command to display the feature names available.
- Feature group: The `default` feature group or a user-defined feature group. All features belong to the `default` feature group. You can create user-defined feature groups with the role feature-group group-name command. Enter the show role feature-group command to display the default feature groups available.

These parameters create a hierarchical relationship:

- The most basic level is the command.
- The next level is the feature which represents all commands associated with the feature.
- The last level is the feature group. The feature group combines related features and allows you to easily manage of the rules.

Use the `no` form of this command to remove a rule.

Command Syntax

```
rule (<1-256>) (permit|deny) command LINE
rule (<1-256>) (permit|deny) (read|read-write) (feature|feature-group) LINE
no rule (<1-256>)
```

Parameters

`<1-256>`	Rule number
`permit`	Permit operation
`deny`	Deny operation
`command`	Command
`LINE`	Command line text; maximum length 128 characters. Use spaces and a semicolon " ;' for command separators; for example: `config t ; int eth1`
`read`	Read access
`read-write`	Read and write access
`feature`	Feature name
`LINE`	One of protocols/features below: BGP, HOSTP, IGMP, IGMP_IF, ISIS, L2MRIB, LDP, MLD, MLD_IF, MRIB, MRIB4, MRIB4_IF, MRIB6, MRIB6_IF, MSTP, OSPF, OSPF6, PIM, RIB, RIP, RIPNG, RSTP, RVSP, STP, TRILL, VPORTMGR, VRRP
`feature-group`	Feature group
`LINE`	Feature group name

Command Mode

Role mode

Examples

```
#configure terminal
(config)#role name Dearborn
(config-role)#rule 57 deny command show running-config
(config-role)#rule 3 permit read-write feature MRIB6
(config-role)#rule 10 permit read feature-group Ann-Arbor
```

show feature-list

Use this command to display a list of protocols/features.

Command Syntax

```
show feature-list
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#show feature-list
```

show role feature

Use this command to display the role configuration.

Command Syntax

```
show role feature ( detail | (name WORD) )
```

Parameters

`detail`	Details
`WORD`	Feature name

Command Mode

Privileged Exec mode

Example

```
#show role feature detail
```

show role feature-group

Use this command to display the role feature group configuration.

Command Syntax

```
show role feature-group (detail | (name WORD))
```

Parameters

`detail`	Details
`WORD`	Feature group name

Command Mode

Privileged Exec mode

Example

```
#show role feature-group detail
```

show role name

Use this command to display details about the rules in a given role.

Command Syntax

```
show role name WORD
```

Parameters

WORD	Role name

Command Mode

Configure mode

Examples

Privileged Exec mode

Examples

```
#show role name Dearborn
```

show roles

Use this command to display a list of roles.

Command Syntax

```
show roles
```

Parameters

None

Command Mode

Privileged Exec mode

Examples

```
#show roles
```

show user-account

Use this command to display information about all users or a given user.

Command Syntax

```
show user-account (|WORD)
```

Parameters

WORD	User name

Command Mode

Privileged Exec mode

Example

```
#show user-account
```

vlan policy deny

Use this command to deny all access to VLANs unless explicitly permitted. This command enters role VLAN mode.

Use the `no` form of this command to permit all access to VLANs.

Command Syntax

```
vlan policy deny
```

```
no vlan policy deny
```

Parameters

None

Command Mode

Role mode

Example

```
#configure terminal
(config)#role name Dearborn
(config-role)#vlan policy deny
(config-role-vlan)#
```

vrf policy deny

Use this command to deny all access to VRFs (virtual routing and forwarding instances) unless explicitly permitted. This command enters role VRF mode.

Use the `no` form of this command to permit all access to VRFs.

Command Syntax

```
vrf policy deny
```

```
no vlan policy deny
```

Parameters

None

Command Mode

Role VRF mode

Example

```
#configure terminal
(config)#role name Dearborn
(config-role)#vrf policy deny
(config-role-vrf)#
```

username-remote

Use this command to add a user or to change a user password.

Use the `no` form of this command to remove a user.

Command Syntax

```
username-remote USERNAME password (|encrypted) PASSWORD
username-remote USERNAME role WORD password (|encrypted) PASSWORD
no username-remote USERNAME
```

Parameters

`USERNAME`	User name; length 2-15 characters
`encrypted`	Password is encrypted
`PASSWORD`	Password; length 8-32 characters
`WORD`	Role name; if not specified, the role is `default`

Command Mode

Configure mode

Example

```
#configure terminal
(config)#username-remote fred smith password encrypted
W3g7y&6yV}JH6&5EYIah?779IT9iV2
```

Index

D

E

F

I

L

M

N

P

R

S

T

U

V

W