IP System Management Commands

This chapter contains the following sections:

ping

Use the **ping** EXEC mode command to send ICMP echo request packets to another node on the network.

Syntax

ping [ip] {*ipv4-address* | *hostname*} [**size** *packet_size*] [**count** *packet_count*] [**timeout** *time_out*] [**source** *source-address*]

ping ipv6 {*ipv6-address* | *hostname*} [**size** *packet_size*] [**count** *packet_count*] [**timeout** *time_out*] [**source** *source-address*]

Parameters

- **ip**—Use IPv4 to check the network connectivity.
- **ipv6**—Use IPv6 to check the network connectivity.
- ***ipv4-address***—IPv4 address to ping.
- ***ipv6-address***—Unicast or Multicast IPv6 address to ping. When the IPv6 address is a Link Local address (IPv6Z address), the outgoing interface name must be specified.
- ***hostname***—Hostname to ping (Length: 1-158 characters. Maximum label size for each part of the host name: 58.)
- **size** *packet_size*—Number of bytes in the packet not including the VLAN tag. The default is 64 bytes. (IPv4:64–1518, IPv6: 68–1518)
- **count** ***packet_count***—Number of packets to send, from 1 to 65535 packets. The default is 4 packets. If 0 is entered, it pings until stopped (0–65535).
- **time** ***time-out***—Timeout in milliseconds to wait for each reply, from 50 to 65535 milliseconds. The default is 2000 milliseconds (50–65535).
- **source** *source-address*—Source address (Unicast IPv4 address or global Unicast IPv6 address).

Command Mode

Privileged EXEC mode

User Guidelines

Press **Esc** to stop pinging. Following are sample results of the ping command:

- **Destination does not respond**—If the host does not respond, a “no answer from host” appears within 10 seconds.
- **Destination unreachable**—The gateway for this destination indicates that the destination is unreachable.
- **Network or host unreachable**—The switch found no corresponding entry in the route table.

When using the **ping ipv6** command to check network connectivity of a directly attached host using its link local address, the egress interface may be specified in the **IPv6Z** format. If the egress interface is not specified, the default interface is selected.

When using the **ping ipv6** command with a Multicast address, the information displayed is taken from all received echo responses.

When the **source** keyword is configured and the source address is not an address of the switch, the command is halted with an error message and pings are not sent.

Example 1 - Ping an IP address.

```
switchxxxxxx> ping ip 10.1.1.1
Pinging 10.1.1.1 with 64 bytes of data:
64 bytes from 10.1.1.1: icmp_seq=0. time=11 ms
64 bytes from 10.1.1.1: icmp_seq=1. time=8 ms
64 bytes from 10.1.1.1: icmp_seq=2. time=8 ms
64 bytes from 10.1.1.1: icmp_seq=3. time=7 ms
----10.1.1.1 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip (ms) min/avg/max = 7/8/11
```

Example 2 - Ping a site.

```
switchxxxxxx> ping ip yahoo.com
Pinging yahoo.com [66.218.71.198] with 64 bytes of data:
64 bytes from 66.218.71.198: icmp_seq=0. time=11 ms
64 bytes from 66.218.71.198: icmp_seq=1. time=8 ms
64 bytes from 66.218.71.198: icmp_seq=2. time=8 ms
64 bytes from 66.218.71.198: icmp_seq=3. time=7 ms
----10.1.1.1 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip (ms) min/avg/max = 7/8/11
```

Example 3 - Ping an IPv6 address.

```
switchxxxxxx> ping ipv6 3003::11
Pinging 3003::11 with 64 bytes of data:
64 bytes from 3003::11: icmp_seq=1. time=0 ms
64 bytes from 3003::11: icmp_seq=2. time=50 ms
64 bytes from 3003::11: icmp_seq=3. time=0 ms
64 bytes from 3003::11: icmp_seq=4. time=0 ms
----3003::11 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip (ms) min/avg/max = 0/12/50
switchxxxxxx> ping ipv6 FF02::1
Pinging FF02::1 with 64 bytes of data:
64 bytes from FF02::1: icmp_seq=1. time=0 ms
64 bytes from FF02::1: icmp_seq=1. time=70 ms
64 bytes from FF02::1: icmp_seq=2. time=0 ms
64 bytes from FF02::1: icmp_seq=1. time=1050 ms
64 bytes from FF02::1: icmp_seq=2. time=70 ms
64 bytes from FF02::1: icmp_seq=2. time=1050 ms
64 bytes from FF02::1: icmp_seq=3. time=0 ms
64 bytes from FF02::1: icmp_seq=3. time=70 ms
64 bytes from FF02::1: icmp_seq=4. time=0 ms
64 bytes from FF02::1: icmp_seq=3. time=1050 ms
64 bytes from FF02::1: icmp_seq=4. time=70 ms
64 bytes from FF02::1: icmp_sq=4. time=1050 ms
---- FF02::1 PING Statistics----
4 packets transmitted, 12 packets received
```

ssh

To start an encrypted session with a remote networking device, use the **ssh** command in user EXEC or privileged EXEC mode.

Syntax

ssh {*ip-address* | *hostname*} [*port*] [*keyword...*]

Parameters

- ***ip-address***—Specifies the destination host IP address (IPv4 or IPv6).
- ***hostname***—Hostname to ping (Length: 1-158 characters. Maximum label size for each part of the host name: 58.)
- ***port***—Specifies the decimal TCP port number. The default port is the SSH port (22).
- ***keyword***—Specifies the one or more keywords listed in the Keywords table in the User Guidelines.

Keywords Table

Options	Description
/**password** *password*	Specifies the password to use when logging in on the remote networking device running the SSH server. If the keyword is not specified, the password configured by the **ip ssh-client password** command is used. If this keyword is specified the the **/user** keyword must be specified too.
/**source-interface** *interface-id*	Specifies the source interface which minimal IPv4/v6 address will be used as the source IPv4/v6 address. If the keyword is not specified, the source IPv4/IPv6 address configured by the **ip ssh-client source-interface** command is used.
/**user** *user-name*	Specifies the user name to use when logging in on the remote networking device running the SSH server. If the keyword is not specified, the user name configured by the **ip ssh-client username** command is used. If this keyword is specified the **/password** keyword must be specified too.

Default Configuration

The default port is the SSH port (22) on the host.

Command Mode

Privileged EXEC mode

User Guidelines

The **ssh** command enables the switch to make a secure, encrypted connection to another switch running an SSH server. This connection provides functionality that is similar to that of a Telnet connection except that

the connection is encrypted. With authentication and encryption, the SSH client allows for a secure communication over an insecure network.

Only one SSH terminal connection can be active at the same time.

Example 1. The following example sets a secure session between the local device and the edge device HQedge.

```
switchxxxxxx> ssh HQedge
```

Example 2. The following example sets a secure session between the local device and the edge device 1.1.1.1. The user name is HQhost and the password is a password configured by the **ip ssh-client password** command.

```
switchxxxxxx> ssh 1.1.1.1 /user HQhost
```

Example 3. The following example sets a secure session between the local device and the edge device HQedge. The user name is HQhost and the password is ar3245ddd.

```
switchxxxxxx> ssh HQedge /user HQhost /password ar3245ddd
```

Example 4. The following example sets a lookback interface as a source interface:

```
switchxxxxxx> ssh HQedge /source-interface loopback1
```

telnet

The **telnet** EXEC mode command logs on to a host that supports Telnet.

Syntax

telnet {*ip-address* | *hostname*} [*port*] [*keyword*...]

Parameters

- ***ip-address***—Specifies the destination host IP address (IPv4 or IPv6).
- ***hostname***—Hostname to ping (Length: 1-158 characters. Maximum label size for each part of the host name: 58.)
- ***port***—Specifies the decimal TCP port number or one of the keywords listed in the Ports table in the User Guidelines.
- ***keyword***—Specifies the one or more keywords listed in the Keywords table in the User Guidelines.

Default Configuration

The default port is the Telnet port (23) on the host.

Command Mode

Privileged EXEC mode

User Guidelines

Telnet software supports special Telnet commands in the form of Telnet sequences that map generic terminal control functions to operating system-specific functions. To enter a Telnet sequence, press the escape sequence keys (Ctrl-shift-6) followed by a Telnet command character.

Special Telnet Sequences

Telnet Sequence	Purpose
Ctrl-shift-6-b	Break
Ctrl-shift-6-c	Interrupt Process (IP)
Ctrl-shift-6-h	Erase Character (EC)
Ctrl-shift-6-o	Abort Output (AO)
Ctrl-shift-6-t	Are You There? (AYT)
Ctrl-shift-6-u	Erase Line (EL)

At any time during an active Telnet session, available Telnet commands can be listed by pressing the ?/help keys at the system prompt.

A sample of this list follows.

```
switchxxxxxx> ?/help
[Special telnet escape help]
^^ B sends telnet BREAK
^^ C sends telnet IP
^^ H sends telnet EC
^^ O sends telnet AO
^^ T sends telnet AYT
^^ U sends telnet EL
?/help suspends the session (return to system command prompt)
```

Several concurrent Telnet sessions can be opened, enabling switching between the sessions. To open a subsequent session, the current connection has to be suspended by pressing the escape sequence keys (Ctrl-shift-6) and x to return to the system command prompt. Then open a new connection with the telnet EXEC mode command.

This command lists concurrent Telnet connections to remote hosts that were opened by the current Telnet session to the local device. It does not list Telnet connections to remote hosts that were opened by other Telnet sessions.

Keywords Table

Options	Description
/echo	Enables local echo.
/quiet	Prevents onscreen display of all messages from the software.
/source-interface	Specifies the source interface.
/stream	Turns on stream processing, which enables a raw TCP stream with no Telnet control sequences. A stream connection does not process Telnet options and can be appropriate for connections to ports running UNIX-to-UNIX Copy Program (UUCP) and other non-Telnet protocols.
Ctrl-shift-6 x	Returns to the System Command Prompt.

Ports Table

Keyword	Description	Port Number
BGP	Border Gateway Protocol	179
chargen	Character generator	19
cmd	Remote commands	514
daytime	Daytime	13
discard	Discard	9
domain	Domain Name Service	53
echo	Echo	7
exec	Exec	512
finger	Finger	79

Keyword	Description	Port Number
ftp	File Transfer Protocol	21
ftp-data	FTP data connections	20
gopher	Gopher	70
hostname	NIC hostname server	101
ident	Ident Protocol	113
irc	Internet Relay Chat	194
klogin	Kerberos login	543
kshell	Kerberos shell	544
login	Login	513
lpd	Printer service	515
nntp	Network News Transport Protocol	119
pim-auto-rp	PIM Auto-RP	496
pop2	Post Office Protocol v2	109
pop3	Post Office Protocol v3	110
smtp	Simple Mail Transport Protocol	25
sunrpc	Sun Remote Procedure Call	111
syslog	Syslog	514
tacacs	TAC Access Control System	49
talk	Talk	517
telnet	Telnet	23
time	Time	37
uucp	Unix-to-Unix Copy Program	540
whois	Nickname	43
www	World Wide Web	80

Example

The following example displays logging in to IP address 176.213.10.50 via Telnet.

```
switchxxxxxx>  telnet 176.213.10.50
```

traceroute

To display the routes that packets will take when traveling to their destination, use the **traceroute** EXEC mode command.

Syntax

traceroute ip {*ipv4-address* | *hostname*} [**size** *packet_size*] [**ttl** *max-ttl*] [**count** *packet_count*] [**timeout** *time_out*] [**source** *ip-address*]

traceroute ipv6 {*ipv6-address* | *hostname*} [**size** *packet_size*] [**ttl** *max-ttl*] [**count** *packet_count*] [**timeout** *time_out*] [**source** *ip-address*]

Parameters

- **ip**—Use IPv4 to discover the route.
- **ipv6**—Use IPv6 to discover the route.
- ***ipv4-address***—IPv4 address of the destination host.
- ***ipv6-address***—IPv6 address of the destination host.
- ***hostname***—Hostname to ping (Length: 1-158 characters. Maximum label size for each part of the host name: 58.)
- **size** *packet_size*—Number of bytes in the packet not including the VLAN tag. The default is 64 bytes. (IPv4:64-1518, IPv6: 68-1518)
- **ttl** *max-ttl*—The largest TTL value that can be used. The default is 30. The **traceroute** command terminates when the destination is reached or when this value is reached. (Range: 1–255)
- **count** *packet_count*—The number of probes to be sent at each TTL level. The default count is 3. (Range: 1–10)
- **timeout** *time_out*—The number of seconds to wait for a response to a probe packet. The default is 3 seconds. (Range: 1–60)
- **source** *ip-address*—One of the interface addresses of the device to use as a source address for the probes. The device selects the optimal source address by default. (Range: Valid IP address)

Command Mode

Privileged EXEC mode

User Guidelines

The **traceroute** command works by taking advantage of the error messages generated by routers when a datagram exceeds its time-to-live (TTL) value.

The **traceroute** command starts by sending probe datagrams with a TTL value of one. This causes the first router to discard the probe datagram and send back an error message. The traceroute command sends several probes at each TTL level and displays the round-trip time for each.

The **traceroute** command sends out one probe at a time. Each outgoing packet can result in one or two error messages. A "time exceeded" error message indicates that an intermediate router has seen and discarded the probe. A "destination unreachable" error message indicates that the destination node has received the probe and discarded it because it could not deliver the packet. If the timer goes off before a response comes in, the traceroute command prints an asterisk (*****).

The **traceroute** command terminates when the destination responds, when the maximum TTL is exceeded, or when the user interrupts the trace with Esc.

The **traceroute ipv6** command is not relevant to IPv6 link local addresses.

Example

```
switchxxxxxx> traceroute ip umaxp1.physics.lsa.umich.edu
Type Esc to abort.
Tracing the route to umaxp1.physics.lsa.umich.edu (141.211.101.64)
1 i2-gateway.stanford.edu (192.68.191.83)  0 msec 0 msec 0 msec
2 STAN.POS.calren2.NET (171.64.1.213) 0 msec 0 msec 0 msec
3 SUNV--STAN.POS.calren2.net (198.32.249.73) 1 msec 1 msec 1 msec
4 Abilene--QSV.POS.calren2.net (198.32.249.162)  1 msec 1 msec 1 msec
5 kscyng-snvang.abilene.ucaid.edu (198.32.8.103)  33 msec 35 msec 35 msec
6 iplsng-kscyng.abilene.ucaid.edu (198.32.8.80)   47 msec 45 msec 45 msec
7 so-0-2-0x1.aa1.mich.net (192.122.183.9)  56 msec  53 msec 54 msec
8 atm1-0x24.michnet8.mich.net (198.108.23.82)  56 msec 56 msec 57 msec
9 * * *
10 A-ARB3-LSA-NG.c-SEB.umnet.umich.edu(141.211.5.22)58 msec 58msec 58 msec
11 umaxp1.physics.lsa.umich.edu (141.211.101.64)  62 msec 63 msec 63 msec
Trace completed
```

The following table describes the significant fields shown in the display:

Field	Description
1	Indicates the sequence number of the router in the path to the host.
i2-gateway.stanford.edu	Host name of this router.
192.68.191.83	IP address of this router.
1 msec 1 msec 1 msec	Round-trip time for each of the probes that are sent.

The following are characters that can appear in the traceroute command output:

Field	Description
*	The probe timed out.
?	Unknown packet type.
A	Administratively unreachable. Usually, this output indicates that an access list is blocking traffic.
F	Fragmentation required and DF is set.
H	Host unreachable.
N	Network unreachable.

Field	Description
P	Protocol unreachable.
Q	Source quench.
R	Fragment reassembly time exceeded
S	Source route failed.
U	Port unreachable.