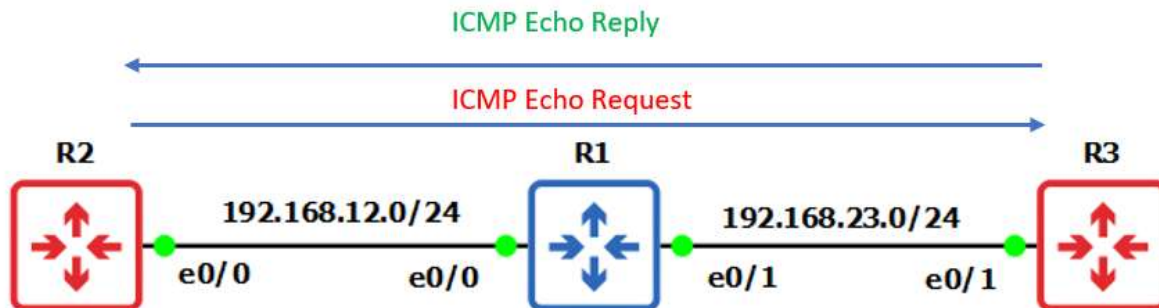


## Ping Command:

The ping ("ping" stands for **Packet Internet Groper**) command is a very common method for troubleshooting the accessibility of devices. It uses two Internet Control Message Protocol (ICMP) query messages, ICMP echo requests and ICMP echo replies, to determine whether a remote host is active. The ping command also measures the amount of time it takes to receive the echo reply. The ping command first sends an echo request packet to an address, and then it waits for a reply. The ping is successful only if the echo request gets to the destination, and the destination is able to get an echo reply back to the source of the ping.



## Extended Ping Command:

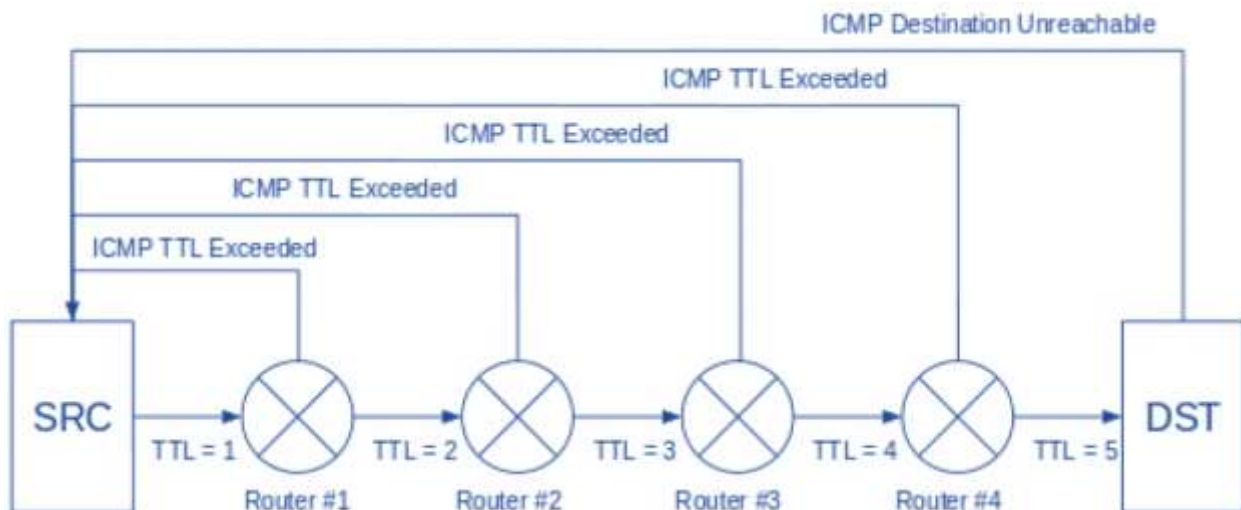
When a normal ping command is sent from a router, the source address of the ping is the IP address of the interface that the packet uses to exit the router. If an extended ping command is used, the source IP address can be changed to any IP address on the router.

Field	Description
Protocol [ip]:	Prompts for a supported protocol
Target IP address:	Prompts for the IP address or host name of the destination node
Repeat count [5]:	Number of ping packets that will be sent to destination address
Datagram size [100]:	Size of the ping packet (in bytes). Default: 100 bytes.
Timeout in seconds [2]:	Timeout interval. Default: 2 (seconds).
Extended commands [n]:	Specifies whether or not a series of additional commands appears.
Source address or interface:	The interface or IP addresses of the router to use as a source address for the probes.
Validate reply data? [no]:	Specify whether or not to validate the reply data.
Sweep range of sizes [n]:	Each exclamation point (!) indicates receipt of a reply. A period (.) indicates the network server timed out while waiting for a reply. Other characters may appear in the ping output display, depending on the protocol type.
Success rate is 100 percent	Percentage of packets successfully echoed back to the router. Anything less than 80 percent is usually considered problematic.
round-trip min/avg/max = 1/2/4 ms	Round-trip travel time intervals for the protocol echo packets, including minimum/average/maximum (in milliseconds).

Output	Description
!	Each bang represents the receipt of a reply.
.	Timeout while waiting for reply.
U	Destination unreachable.
N	Network unreachable.
P	Protocol unreachable.
C	Congestion Occurred.
M	Maximum transmission unit (MTU) problem.
A	Administratively prohibited.
I	User-interrupted ping.
?	Unknown packet type.
&	Packet lifetime exceeded.
Ctrl+Shift+6	Abort Cisco ping.

## Traceroute Command:

The traceroute command can be used to discover the routes packets take to a remote destination, as well as where routing breaks down. The device executing the traceroute command sends out a sequence of User Datagram Protocol (UDP) datagrams, each with incrementing Time-To-Live (TTL) values, to an invalid port address at the remote host. The purpose behind the traceroute command is to record the source of each ICMP "time exceeded" message to provide a trace of the path the packet took to reach the destination.



### Extended Traceroute Command:

The extended traceroute command is a variation of the traceroute command. An extended traceroute command can be used to see what path packets are taking to get to a destination, and the command can be used to check routing at the same time. This is helpful for troubleshooting routing loops, or for determining where packets are getting lost.

Output	Description
<i>nn msec</i>	Round-trip time per probe in milliseconds.
*	The probe timed out.
?	Unknown packet type.
A	Administratively unreachable; check for access list issues.
H	Host unreachable.
N	Network unreachable.
P	Protocol unreachable.
Q	Source quench.
U	Port unreachable.

Field	Description
Protocol [ip]:	Prompts for a supported protocol.
Target IP address	You must enter a host name or an IP address. There is no default.
Source address:	Interface or IP addresses of the router to use as a source address
Numeric display [n]:	The default is to have both a symbolic and numeric display; however, you can suppress the symbolic display.
Timeout in seconds [3]:	The number of seconds to wait for a response to a probe packet.
Probe count [3]:	The number of probes to be sent at each TTL level.
Minimum Time to Live [1]:	The TTL value for the first probes. The default is 1, but it can be set to a higher value to suppress the display of known hops.
Maximum TTL [30]:	The largest TTL value that can be used. The default is 30.
Port Number [33434]:	The destination port used by the UDP probe messages.
Loose, Strict, Record, Timestamp, Verbose[none]:	IP header options. You can specify any combination.