

# Ping

## What is Ping:

Ping is a simple network tool with which we can get to know whether a particular host is active(i.e, whether it is accepting requests) or not. It also shows the information like latency or delay, how many packets are lost, response time for each packet. Ping measures the Round Trip Time(RTT) for echo packets (sent through flooding).

Ping comes by default with most of the operating systems. In windows, we can access ping from the command prompt.

To see all the options, we can just type ping.

```
C:\Users\j...>ping

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
           [-r count] [-s count] [[-j host-list] | [-k host-list]]
           [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
           [-4] [-6] target_name

Options:
  -t           Ping the specified host until stopped.
               To see statistics and continue - type Control-Break;
               To stop - type Control-C.
  -a           Resolve addresses to hostnames.
  -n count     Number of echo requests to send.
  -l size      Send buffer size.
  -f           Set Don't Fragment flag in packet (IPv4-only).
  -i TTL       Time To Live.
  -v TOS       Type Of Service (IPv4-only. This setting has been deprecated
               and has no effect on the type of service field in the IP
               Header).
  -r count     Record route for count hops (IPv4-only).
  -s count     Timestamp for count hops (IPv4-only).
  -j host-list Loose source route along host-list (IPv4-only).
  -k host-list Strict source route along host-list (IPv4-only).
  -w timeout   Timeout in milliseconds to wait for each reply.
  -R           Use routing header to test reverse route also (IPv6-only).
               Per RFC 5095 the use of this routing header has been
               deprecated. Some systems may drop echo requests if
               this header is used.
  -S srcaddr   Source address to use.
  -c compartment Routing compartment identifier.
  -p           Ping a Hyper-V Network Virtualization provider address.
  -4           Force using IPv4.
  -6           Force using IPv6.
```

## Working:

To send a request for a particular domain we can type ping <Domain name>.

By executing the above command we can see that the ping has sent 4 requests to the given domain name( in this case the domain name is `www.google.com` ). We can see the statistics that, a total of 4 packets are sent, four packets are received (echo reply ) and 0 packets are lost. We can also see the statistics of the roundtrip times (time between the packet is sent and the acknowledgment received), the maximum time taken is 467ms, and the minimum is 60ms and the average time taken is 169ms.

Note: All the times mentioned are for this particular case.

```
C:\Users\...>ping www.google.com

Pinging www.google.com [216.58.196.164] with 32 bytes of data:
Reply from 216.58.196.164: bytes=32 time=467ms TTL=115
Reply from 216.58.196.164: bytes=32 time=88ms TTL=115
Reply from 216.58.196.164: bytes=32 time=61ms TTL=115
Reply from 216.58.196.164: bytes=32 time=60ms TTL=115

Ping statistics for 216.58.196.164:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 60ms, Maximum = 467ms, Average = 169ms
```

The options in the ping and their working can be seen in the first image. Let us explore some of the options. By using the flag `-t`, ping keeps on sending the requests until we hit the control + c.

```
C:\Users\...>ping -t www.google.com

Pinging www.google.com [2404:6800:4007:809::2004] with 32 bytes of data:
Reply from 2404:6800:4007:809::2004: time=55ms
Reply from 2404:6800:4007:809::2004: time=56ms
Reply from 2404:6800:4007:809::2004: time=49ms
Reply from 2404:6800:4007:809::2004: time=68ms
Reply from 2404:6800:4007:809::2004: time=64ms
Reply from 2404:6800:4007:809::2004: time=42ms
Reply from 2404:6800:4007:809::2004: time=56ms
Reply from 2404:6800:4007:809::2004: time=53ms

Ping statistics for 2404:6800:4007:809::2004:
    Packets: Sent = 8, Received = 8, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 42ms, Maximum = 68ms, Average = 55ms
Control-C
^C
```

We can specify the number of echo packets to send by using the option `-n`.

```
C:\Users\...>ping -n 2 www.google.com

Pinging www.google.com [2404:6800:4007:812::2004] with 32 bytes of data:
Reply from 2404:6800:4007:812::2004: time=49ms
Reply from 2404:6800:4007:812::2004: time=43ms

Ping statistics for 2404:6800:4007:812::2004:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 43ms, Maximum = 49ms, Average = 46ms
```

If we use an invalid domain name it shows an error.

```
C:\Users\...>ping www.abcd.com
Ping request could not find host www.abcd.com. Please check the name and try again.
```

If the ping doesn't get the echo reply from the server within the time it shows "Request timed out"

Ping is a very useful tool in network troubleshooting. This can be used to narrow down the causes of the problem.