02/20/2023 Shreyas Belkune sb2660

Project 2 : Ping and traceroute

# ping program

This program sends an ICMP echo request to the destination address and expects a response from the destination in general.

## Running the code

### To simply run the code and to ping a particular destination continuously-

#### “**sudo python3 sb2660\_ping.py ping 8.8.8.8**”.

#### The above line pings google DNS infinitely until stopped.

#### Use control + c to stop the code if running on terminal.

#### Output –

#### A picture containing calendar Description automatically generated

### To run the ping a destination for a certain number of times-

#### “**sudo python3 sb2660\_ping.py ping 8.8.8.8 c 5**”.

#### The above line pings google DNS 5 times.

#### Output –

#### Text Description automatically generated

### To have a delay between every ping packet sent –

#### **“sudo python3 sb2660\_ping.py ping 8.8.8.8 wait 3”**.

#### The above line pings google DNS infinitely but will wait 3 seconds before sending the next packet.

#### Output –

#### Text Description automatically generated

### To send a packet with a specific size –

#### **“sudo python3 sb2660\_ping.py ping 8.8.8.8 pktsize 8**”.

#### Note that the default packet size sent by the program is 98 bytes (Ethernet Header = 14 Bytes, IP Header = 20 Bytes, ICMP Header = 8 Bytes, Data = 56 Bytes) Note that data is also calculated in the protocol header.

#### The above input would just send 8 bytes of data making the packet size 50 in this case.

#### Output

#### A picture containing table Description automatically generated

### To timeout the code after certain time-

#### **“sudo python3 sb2660\_ping.py ping 8.8.8.8 timeout 5”**.

#### The above input would terminate the code after 5 seconds, if an echo request is sent just before the timeout, and if the response comes after timeout that packet won’t be displayed.

#### Output

#### Text Description automatically generated

#### A screen shot of a computer Description automatically generated with low confidence

# Traceroute Program

This program finds the route a packet takes to reach the destination address, in this code you’re essentially finding out the route a normal ping packet takes to reach its destination.

At every hop it sends 3 ICMP packet and expects a response from the first hop router/device to tell us the sender that the packet we’re sending won’t reach the desired destination as the TTL( Time to live) has decremented to 0. With every hop a packet takes the TTL decrements by 1.

## Running the code

### To generally find the route –

#### “**sudo python3 sb2660\_traceroute.py traceroute 8.8.8.8”.**

#### We’re trying to find the route a packet takes to reach Google DNS Server.

#### Output

#### Text Description automatically generated

#### 

### To alter the number of queries sent per hop –

#### “**sudo python3 sb2660\_traceroute.py traceroute 8.8.8.8 queries 1”.**

#### In general, traceroute send 3 probes per hop, in the above given input we change that to 1.

#### Output

#### Text Description automatically generated

### To print the summary of how many probes weren’t answered-

#### “**sudo python3 sb2660\_traceroute.py traceroute 8.8.8.8 summary”.**

#### The above code will still print the route the packet took to reach the destination, but in the end, it’ll tell you on which hop the probe wasn’t answered.

#### An unanswered probe is denoted by a “\*”, if a packet is sent and a response is not received in 5 seconds, that probe has timed out.

#### If 3 probes at a certain hop, it’ll increase the TTL by 1 and moves on to the next hop.

#### Output-

#### Text Description automatically generated

# Resources used and restrictions

## Libraries Used

### Scapy – packet creation (<https://scapy.readthedocs.io/en/latest/usage.html>)

### Socket – to send and receive packet, also for altering TTL (<https://docs.python.org/3/library/socket.html>)

### Time – For calculating round trip time .

### Struct – To unpack the receiving packet

### Sys – To take in command line arguments

### Signal – To terminate the entire code after a certain time. (<https://docs.python.org/3/library/signal.html>)

## Restrictions

### The programs don’t take in multiple filters

### The program will will display a host name whenever it found for a particular ip, else it’ll print just the ip.