Networks HomeWork-1

Ans1

#testmyspeed.com

London Ping 564ms Download 26.73 Mbps   Uplodad 0.42 Mbps

#speedtest.net

   Ping 2ms Download 23.67 Mbps Upload 15.36 Mbps

Download and upload speeds are different. Though the difference in download speed is not much , but difference in upload speed is significant.

The speed depends upon 2 things.

1) Bandwidth is also defined as the amount of data that can be transmitted in a fixed amount of time.

2) The roundtrip time in milliseconds is the ping rate (or effective latency) between our PC and the server.

It depends on how long it takes to initiate the connections between PC and server, and how quickly the data arrives. It is critical to the Internet connections perceived speed.

"Which is more important depends entirely on what you are attempting to accomplish. If you're downloading huge files, you probably care more about bandwidth than latency. If you are trying to watch high-definition video, both are equally important. If you're playing an online game, latency may be far more important than bandwidth." – source Internet.

 ** For both the tests Bandwidth is same since the amount of data one can carry is same. But for both the tests latency is different and depends on distance/location of server, computational capabilities of their server which creates a slight download difference. While there is a huge upload speed difference maybe because ping in "speedtest.net" is so small that latency is minimized in calculations which might be playing significant role in "testmyspeed.com". Also it depends on the way they tests. Ideally they should test on how much data they are being able to send after the link has been set up in a continuous manner which is followed by "speedtest.net" as given on their website. The mechanism and parameters for "testmyspeed.com" might be different and latency time might be included in that.

Ans2

    (a) PING utility is used to check if a network connection has been established and is intact.

In other words it checks if a host is reachable or not in a IP network. It can also give us information about number of hops our data encounters between 2 computers and roundtrip time it takes for data from server to client.

PING uses ICMP(Internet Control Message Protocol) 's echo facility. It makes an ICMP echo request and gets an ICMP echo reply. ICMP is used along with IP(Internet Protocol) and has two versions depending on version of IP ie ICMPv4 and ICMPv6.

It belongs to broader group of protocols called "Internet Protocol Suite". It performs error reporting and diagnostic functions for eg. "requested service is not available" , "host or router can't be reached" etc.

Each ICMP message contains three fields that define its purpose and provide a checksum.

"They are TYPE, CODE, and CHECKSUM fields. The TYPE field identifies the ICMP message, the CODE field gives information about associated TYPE field, and the CHECKSUM gives a method for confirming the integrity of the message.

The Echo Request ICMP will have a Type field of 8 and a Code field of 0. Echo Replies have a Type field of 0 and a Code field of 0." –source Internet

    (b) Pinged with 32 bytes of data

www.google.com : 216.58.197.68 , AVG RTT 51ms

www.rice.edu : 128.42.206.11 , AVG RTT 364 ms

www.iitd.ac.in : 10.7.174.111 , AVG RTT 43ms

IIT server is nearest in terms of RTT , followed by google and rice. IIT server is very close but might be less efficient or quick in responding than google server in terms of latency. (Though best RTT I got for IIT server was 6ms over multiple trials). The google server might be located within India so it's number comes next. Rice server must be in US so its RTT must be very high.

Ans 3

a) **IPv4 Addresses**
   Lo
   inet addr:127.0.0.1
   Mask:255.0.0.0
   wlp1s0
   inet addr:10.192.19.120
   Bcast:10.192.31.255
   Mask:255.255.224.0

b) **Ethernet Hardware Address**
   Link encap:Ethernet HWaddr 60:57:18:fe:84:e5
   MTU:1500

   MTU stands for Maximum Transmission Unit . It is the largest size that can be sent in a
   packet or frame based network such as Internet. It is usually the size in octets (1 octet = 8
   bytes), though it may be in bytes also. Messages larger than MTU are broken into smaller
   packets before transmission. Too small MTU leads to header overhead and more
   acknowledgement costs.

c) **IPv6**
   lo
   inet6 addr: ::1/128 Scope:Host
   wlp1s0
   inet6 addr: fe80::70c6:6eb9:675a:3b13/64 Scope:Link

   They are 128 bit addresses.

Ans 4

Traceroute www.iitd.ac.in

traceroute to www.iitd.ac.in (10.7.174.111), 30 hops max, 60 byte packets

 1 10.192.1.1 (10.192.1.1) 6.519 ms 6.640 ms 8.164 ms

 2 10.254.234.1 (10.254.234.1) 34.921 ms 34.972 ms 35.207 ms

 3 10.254.236.10 (10.254.236.10) 35.222 ms (10.254.236.18) 109.878ms 10.254.236.10 110.031 ms

 4 www.iitd.ac.in (10.7.174.111) 109.437 ms 109.560 ms 116.176 ms
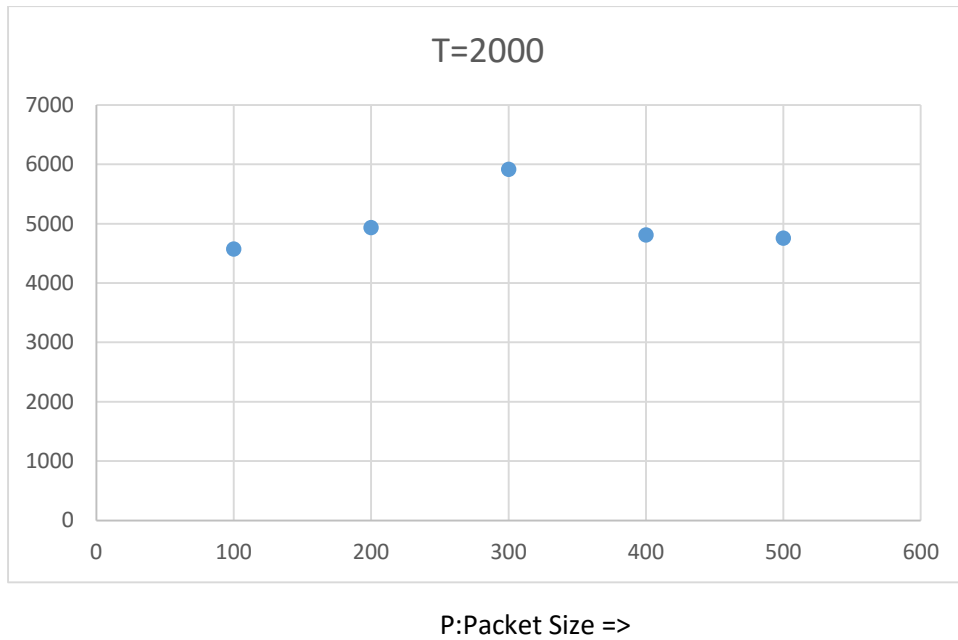

Traceroute www.cse.iitd.ac.in

traceroute to www.cse.iitd.ac.in (10.208.20.4), 30 hops max, 60 byte packets

 1 10.192.1.1 (10.192.1.1) 12.914 ms 12.880 ms 12.867 ms

 2 10.254.234.1 (10.254.234.1) 13.282 ms 18.285 ms 89.685 ms

 3 10.254.208.2 (10.254.208.2) 12.819 ms 12.814 ms 12.809 ms

 4 bahar.cse.iitd.ernet.in (10.208.20.4) 8.395 ms 12.401 ms 12.756 ms

We note that 2 (1st and 2nd) are common and 2 (3rd and 4th)are different on both paths. No it is not always the case. It maybe because of various random factors in the network that affect the latency in the network.

Ans 5

Avg RTT for RC initialized to T = 2000

P:Packet Size =>

b) Avg RTT for T = 10000