Computer Networks - CS 214

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1 Warm-up Questions

(a) Using the commands hostname & hostname -I

(b) Using the command arp -a

(c) Using the command cat /etc/resolve.conf

(d) The number represents the official number for this protocol as it will appear within the IP header.

(e) Using the file etc/services.

(f) I have used a light app named Network Info II to abstract the information regarding the same. I have attached the screenshots for the same in the images directory.

2 Ping Utility

(a) We get 100 per cent loss using the IIT Dharwad network. When I pinged my neighbour's IP address, I got 0 per cent loss.

(b) Factors Influencing RTT Number of network hops – Intermediate routers or servers take time to process a signal, increasing RTT. The more hops a signal has to travel through, the higher the RTT. Traffic levels – RTT typically increases when a network is congested with high levels of traffic. It is evident from the values I got in both the cases.
In the 100 per cent loss case, I got a latency of 3067ms for google.com whilst I got a latency of 3054ms pinging my neighbour's IP address.

3 Traceroute

(a) We see that it took 10 hops for the packet to redirect it to https://www.google.com. The network map is as follows:
10.196.3.250 (source) →10.250.209.251 →61.0.239.225 →218.248.235.217 →218.248.235.218 →218.248.253.14 →172.217.163.206 (destination)

(b) Using the flag –max-hops=50 to the traceroute command.

(c) Traceroute sends out three packets per TTL increment. Each column corresponds to the time is took to get one packet back (round-trip-time).

(d) The Time-to-Live (TTL) field of the IP header is defined to be a timer limiting the lifetime of a datagram. When a router forwards a packet, it must reduce the TTL by at least one. If it holds a packet for more than one second, it may decrement the TTL by one for each second. This is the use of TTL field in Internet Control Message Protocol packets.

4 Configuration Files and information

(a) Using the location given and the command cat /etc/hostname

(b) We have to use the command arp -a. This information is not found in any of the configuration files mentioned.

(c) Using the location and the command cat /etc/resolve.conf

(d) The number represents the official number for this protocol as it will appear within the IP header.

(e) Using the location given and the command cat etc/services.

5 Wireshark Application

(a) Images directory has all the screenshots of the working on the Wireshark application as mentioned above.

(b) The black highlighted packet identifies TCP packets with problems - for example, they could have been delivered out-of-order.

(c) Putting http in the filter bar or to filter out more in a better way we use the http.host==”IP Address”

(d) UDP Stream is preferred for DNS because it is fast and has low overhead. A DNS query is a single UDP request from the DNS client followed by a single UDP reply from the server. When a host requests a web page, transmission reliability and completeness must be guaranteed. Therefore, HTTP uses TCP as its transport layer protocol.