

Exercise 1

Question 1:

What is the IP address of the client ?

The client IP is 192.168.1.100

Question 2:

Consider now the HTTP GET sent from the client to the Google server (whose IP address is IP address 64.233.169.104) at time 7.109267. What are the source and destination IP addresses and TCP source and destination ports on the IP datagram carrying this HTTP GET?

The source and destination IP addresses are: 192.168.1.100 and 64.233.169.104.

The TCP source and destination ports are: 4335 and 80.

Question 3:

At what time is the corresponding 200 OK HTTP message received from the Google server? What are the source and destination IP addresses and TCP source and destination ports on the IP datagram carrying this HTTP 200 OK message?

At time 7.158797 the client receive 200 OK HTTP message from Google server.

The source IP and port: 64.233.169.104 and 80.

The destination IP and port: 192.168.1.100 and 4335.

Question 4:

Recall that before a GET command can be sent to an HTTP server, TCP must first set up a connection using the three-way SYN/ACK handshake. At what time is the client-to-server TCP SYN segment sent that sets up the connection used by the GET sent at time 7.109267? What are the source and destination IP addresses and source and destination ports for the TCP SYN segment?

At time 7.075657 client send sets up connection.

Source IP and port: 192.168.1.100 and 4335.

Destination IP and port: 64.233.169.104 and 80.

Question 5:

What are the source and destination IP addresses and source and destination ports of the ACK sent in response to the SYN. At what time is this ACK received at the client?

The source and destination IP: 64.233.169.104 to 192.168.1.100.

The ACK: 4164040421

The time: 7.108986

Question 6:

At what time does this message appear in the NAT_ISP_side trace file?

The message appear in the NAT_ISP_side at time 6.069168.

Question 7:

What are the source and destination IP addresses and TCP source and destination ports on the IP datagram carrying this HTTP GET message (as recording in the NAT_ISP_side trace file)? Which of these fields are the same, and which are different, than in your answer to Question 2 above?

The source IP and port: 71.192.34.104 and 4335.

The destination IP and port: 64.233.169.104 and 80.

Compare to the Question 2, only the source IP is different. All the ports and destination IP are the same.

Question 8:

Are any fields in the HTTP GET message changed?

Yes, there are some small changes.

Question 9:

Which of the following fields in the IP datagram carrying the HTTP GET are changed: Version, Header Length, Flags, Checksum. If any of these fields have changed, give a reason (in one sentence) stating why this field needed to change.

The Checksum is changed. Since the source IP address is different.

Question 10:

In the NAT_ISP_side trace file, at what time is the first 200 OK HTTP message received from the Google server?

At time 6.117570.

Question 11:

What are the source and destination IP addresses and TCP source and destination ports on the IP datagram carrying this HTTP 200 OK message? Which of these fields are the same, and which are different than your answer to Question 3 above?

The source IP and port: 64.233.169.104 and 80.

The destination IP and port: 71.192.34.104 and 4335.

Only the destination IP is different.

Question 12:

In the NAT_ISP_side trace file, at what time were the client-to-server TCP SYN segment and the server-to-client TCP ACK segment corresponding to the segments in Question 4 and 5 above captured?

At time 6.035475 the client-to-server TCP SYN segment.

At time 6.067775 the server-to-client TCP ACK segment.

Question 13:

What are the source and destination IP addresses and source and destination ports for these two segments? Which of these fields are the same, and which are different than your answer to Question 4 and 5 above?

The source IP and port: 71.192.34.104 and 4335.

The destination IP and port: 64.233.169.104 and 80.

Only the source IP is different. All the ports and destination IP are the same.

Question 14:

The discussion on NAT in the Week 8 lecture slides shows the NAT translation table used by a NAT router. Using your answers to the questions above, fill in the NAT translation table entries for the HTTP connection considered in the questions above.

NAT translation table	
WAN side address	LAN side address
138.76.29.7,5001	10.0.0.1,3345
138.76.29.7,5002	10.0.0.2,3345
138.76.29.7,5003	10.0.0.3,3345

Question 15 (not marked):

The trace files investigated above have additional connections to Google servers

above and beyond the HTTP GET, 200 OK request/response studied above. For example, in the NAT_home_side trace file, consider the client-to-server GET at time 1.572315, and the GET at time 7.573305. Research the use of these two HTTP messages and safe browsing in general. Explain your findings in a concise manner.

In my opinion the server should make sure different clients requests can be replied, so it will close the connection after one client does not have new request for a while.

Exercise 2

Question 1.

Which nodes communicate with which other nodes? Which route do the packets follow? Does it change over time?

0:-1

1: -0,-2,-4

4: -1,-5

5: -4,-3

3: -5,-2

2: -3,-1

The packets follow the path 0-1-4-5. It does not change over time.

Question 2:

What happens at time 1.0 and at time 1.2? Does the route between the communicating node change as a result of that?

At time 1.0 there is an error happened at the link between 1-4, the packets can get through the 1-4 link and just stop at node 1. It is repaired at time 1.2.

The route between the communicating does not change, it still try to send packets through the same route.

Question 3:

How does the network react to the changes that take place at time 1.0 and time 1.2?

At time 1.0, the link 1-4 was broken, the network notice that and try another route to send packets to the destination node. The route be changed to 0-1-2-3-5.

At time 1.2, the link 1-4 was repaired, the network change the route to the original route.

Question 4:

How does this change affect the routing? Explain why.

At former scenario the cost between is all the same as 1. Since the cost between nodes 1 and 4 were changed to 3, the final cost of route 0-1-4-5 was changed to 5 which is bigger than the route 0-1-2-3-5 cost 4. Therefore, the network select the smaller link cost route to send packets.

Question 5:

Describe what happens and deduce the effect of the line you just uncommented.

The network select different route to send packets each time.

The final cost of 0-1-4-5 was changed to same as route 0-1-2-3-5. Since the node be changed able to select multiPath when paths have the same cost.