Comp9331 Lab6
StudentID: z5184142
StudentName: JiachenLi

Exercise 1: Understanding the Impact of Network Dynamics on Routing

Question 1: Which nodes communicate with which other nodes? Which route do the packets follow? Does it change over time?
Answer:
The Node 0 communicate with Node 5 and Node 2 communication with Node 5. The packets follow two routes, one is 0-1-4-5 and another is 2-3-5. 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 nodes change as a result of that?
Answer:
The link between node 1 and node 4 is down at time 1.0 and 1.2. The route between the communicating nodes does not change as a result of that.

Question 3: Did you observe any additional traffic as compared to Step 3 above? How does the network react to the changes that take place at time 1.0 and time 1.2 now?
Answer:
Yes, there is some additional traffic as compared to Step 3. The packets from node 0 to node 5 changes its route when the link between node 1 and node 4 is down, the previous route is 0-1-4-5 and after the link is down, the route is 0-1-2-3-5.

Question 4: How does this change affect the routing? Explain why.
Answer:
This change makes the route of node 0 to node 5 is always 0-1-2-3-5 instead of route 0-1-4-5. This is because the cost of route 0-1-4-5 is 5 which is higher than the cost of route 0-1-2-3-5, so the router will choose the least cost route for packet transmission.

Question 5: Describe what happens and deduce the effect of the line you just uncommented.
Answer:
The packets transfer from node 2 to node 5 has two routes, one is 2-3-5 and another is 2-1-4-5. The packets from node 2 to node 5 repeat in this process, if one packet is sent through 2-3-5, the next one will be sent through 2-1-4-5. The effect of the line that I have uncommented is that it makes node 2 to 5 has two equal cost routes, the cost of route 2-3-5 is 4 and the cost of route 2-1-4-5 is also 4, and the router could have multiple choice for the packet transmission.

Exercise 3: Understanding IP Fragmentation

Question 1: Which data size has caused fragmentation and why? Which host/router has fragmented the original datagram? How many fragments have been created when data size is specified as 2000?
Answer:
2000 and 3500 data size has cause fragmentation and this is because the default MTU value of the network is 1500, and the 2000 and 3500 data size are bigger than the MTU value, so it will cause fragmentation.
The host Apple_64:20:52 has fragmented the original datagram.
2 fragments have been created when data size is specified as 2000.

Question 2: Did the reply from the destination 8.8.8.8. for 3500-byte data size also get fragmented? Why and why not?

Answer:

Yes, the reply from the destination 8.8.8.8 for 3500-byte data size also get fragmented. This is because of that the response packet size is also 3500-type, which is larger than the MTU value, so it needs to be fragmented.

Question 3: Give the ID, length, flag and offset values for all the fragments of the first packet sent by 192.168.1.103 with data size of 3500 bytes?

Answer:

The ID is 7a7b (31355), length is 1500(1480 Data size),1500(1480 Data size), 568(532 Data size), flag is 0x2000, 0x20b9, 0x0172, and offset value is 0, 185, 370.

Question 4: Has fragmentation of fragments occurred when data of size 3500 bytes has been used? Why and why not?

Answer:

No. Because the fragmentation will be reassembled to one packet.

Question 5: What will happen if for our example one fragment of the original datagram from 192.168.1.103 is lost?

Answer:

If one fragment is lost, then the peer will send the receive packet back and mark them time exceeded.