Lab 6 solutions

Exercise 1) Revision of IP Addressing, NAT

Question 1

There are many solutions. Here is one:

Subnet	Number	Netmask
Subnet 1	10.0.1.0	255.255.255.0
Subnet 2	10.0.2.0	255.255.255.0
Subnet 3	10.0.3.0	255.255.255.0

Interface	IP Address
H1	10.0.1.1
H2	10.0.1.2
H3	10.0.2.1
H4	10.0.2.2
R1a	10.0.1.3
R1b	10.0.3.1
R1c	10.0.2.3
NAT-i	10.0.3.2

Note that the broadcast address (10.255.255.255) and the subnet address (10.0.0.0) are not assigned to interfaces.

Question 2

IPv6 would allow Elliot to obtain IP addresses for all network connected devices in his home network from his ISP. This because with IPv6 we have almost infinite # of IP addresses. Thus, there would be need of a private network and the NAT device.

Question 3

A NAT box provides a measure of security by hiding the private network from the public Internet and also not permitting unsolicited inbound connections. This may be a reason to continue to use the NAT box.

Question 4

FTP would not work through this NAT box because it requires that the server open a connection back to the client. (Passive mode FTP would work—it has the client open

the connection instead). Any protocol that embeds IP or TCP-layer information in the application stream is likely to be broken by a basic NAT box.

Exercise 1: Understanding NAT using Wireshark

Question 1

IP address of the client is 192.168.1.100

Question 2.

Source IP: 192.168.1.100, Source Port: 4335, Destination IP: 64.233.169.104, Destination Port: 80

Question 3.

7.158798 seconds.

Source IP: 64.233.169.104, Source Port: 80, Destination IP: 192.168.1.100, Destination Port: 4335

Question 4.

7.075657 seconds.

Source IP: 192.168.1.100, Source Port: 4335, Destination IP: 64.233.169.104, Destination Port: 80

Question 5.

Source IP: 64.233.169.104, Source Port: 80, Destination IP: 192.168.1.100, Destination Port: 4335. The ACK is transmitted at 7.108986.

Question 6.

6.069169 seconds.

Question 7.

Source IP: 71.192.34.104, Source Port: 4335, Destination IP: 64.233.169.104, Destination Port: 80

Only the source IP address has changed.

Question 8.

No, the HTTP Get message is unmodified.

Question 9.

Version: Not Changed. Header Length: Not Changed, Flags: Not Changed. Checksum: Changed. Since the IP source address has changed, and the checksum includes the value of the source IP address, the checksum has to be recomputed by the NAT router.

Question 10.

6.117570 seconds.

Question 11.

Source IP: 64.233.169.104, Source Port: 80, Destination IP: 71.192.34.104, Destination Port: 4335

Only the destination IP address has changed.

Question 12.

6.035475 seconds, and 6.067775 seconds, respectively.

Question 13.

For the SYN: Source IP: 71.192.34.104, Source Port: 4335, Destination IP: 64.233.169.104, Destination Port: 80.

For the ACK: Source IP : 64.233.169.104, Source Port: 80, Destination IP: 71.192.34.104, Destination Port: 4335.

For the SYN, the source IP address has changed, For the ACK, the destination IP address has changed. The port numbers are unchanged.

Question 14.

The NAT translation table would be as follows:

WAN side	**LAN side**
71.192.34.104, 4335	192.168.1.100, 4335