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Network Systems

Problem Set 3

Problem 1

R1

In	Out Label	Dst	Out Int
-	7	A	0

R2

In	Out Label	Dst	Out Int
-	8	C	0
-	5	A	0

R3

In	Out Label	Dst	Out Int
8	10	C	0
5	10	A	0
7	12	A	1

R4

In	Out Label	Dst	Out Int
10	-	C	0
10	6	A	1

R5

In	Out Label	Dst	Out Int
12	6	A	0

R6

In	Out Label	Dst	Out Int
6	-	A	0

Problem 2

Part a.

Wireless Modem		ISP Modem	
Nat Table	Wireless Router	NAT Table	ISP Modem
192.168.0.5,2222	10.0.1.5,3001	10.0.1.100,3200	96.120.12.18,3500
192.168.0.11,2222	10.0.1.5,3001	10.0.1.100,3200	96.120.12.18,3500
192.168.0.22,2222	10.0.1.5,3001	10.0.1.100,3200	96.120.12.18,3500

Part b.

HTTP Request Before Entering Router	HTTP Request Exiting Router
Src IP: 192.169.0.11	Src IP: 10.0.1.5
Src Port: 2222	Src Port: 3001
Dst IP: 216.58.217.36	Dst IP: 216.58.217.36
DST Port: 80	Dst Port: 80

HTTP Request Exiting Modem

Src IP: 96.120.12.18

Src Port: 3500

Dst IP: 216.58.217.36

DST Port: 80

HTTP Content Before Entering Modem	HTTP Content Exiting Modem
Src IP: 216.58.217.36	Src IP: 10.0.1.100
Src Port: 80	Src Port: 3200
Dst IP: 96.120.12.18	Dst IP: 10.0.1.5
DST Port: 3500	Dst Port: 3001

HTTP Request Exiting Router

Src IP: 192.168.0.1

Src Port: 2222

Dst IP: 192.168.0.11

DST Port: 2222

part c) NAT entries that need to be added is that instead of all 3 hosts sharing the same port of

2222, Host A has a dedicated port 8080. So instead anyone else would connect and send

packets as normal just with the end port of Host A being different.

d) Should not make any difference since they are on the same NAT. Just Host A has its web

service on Port 8080. It does make it hard to run web servers on NAT though however since

NAT doesn't use ports as "port".

Problem 3)

Packet	Size	Flow	Fi
1	200	1	200
2	200	1	400
3	160	2	160
4	120	2	280
5	160	2	440
6	210	3	210
7	150	3	360
8	90	3	450

Order is: 3,1,6,4,7,2,5,8

b)

Packet	Size	Flow	Fi
1	200	1	100
2	200	1	200
3	160	2	40
4	120	2	70
5	160	2	110
6	210	3	70
7	150	3	120
8	90	3	150

Order Time: 3,4,6,1,5,7,8,2

Problem 4

a. Trans Rounds: 1-6, 20-23

b. Trans Rounds: 6-20

c. Triple Dup Ack

d. Trans Round 10

e. 4

Problem 5

Travles as: Host A -> R1 -> tunnel -> R6 -> Host B

Header Information along Path

Src	Dst	
125.0.2.5	125.0.2.200	Host A -> Host B
128.38.81.4	23.30.1.108	R1 -> Tunnel -> R6

Problem 6

a) Throughput derivation: sqrt(1.3)/[sqrt(1.4)*sqrt(10)*RTT] = 9636.24/RTT

b) Flow 1: 1224

   Flow 2: 158.74

   Flow 3: 141.421

   Flow 4: 3.08221

   Flow 5: 136931

In Decreasing Order: Flow 5, Flow 1, Flow 2, Flow 3, Flow 4

Problem 7

a. 1024KB in 1MB

      Since this is slow start (exponential) and cap is 1MB we just go 2^10 and in 10 RTT's
we will reach the window size.

b. Since we don't reset the window it will now transmit 1MB every RTT and to ensure that we hit
the full value after the final transmission we add 9 more MB which is a total added of 10 more
RTTS giving us 20 RTTS to transmit the full 10MB.