EE122–Fall 2013 — Solutions to Homework 2

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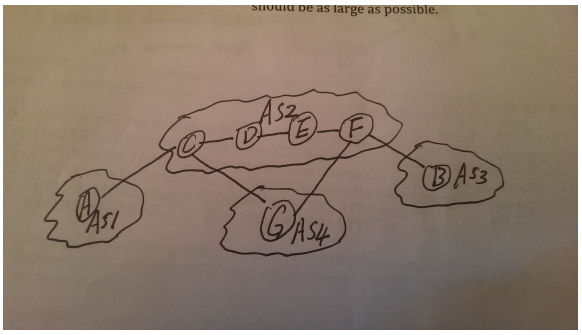
Problem 1

R2→10000000.01100000.00100111.00000000/25
R3→10000000.01100000.00100111.00000000/27
R4→10000000.01100000.00101000.00000000/25
R5→11000000.00000100.10011001.00000000/26
So,
(a) 10000000.01100000.00101000.00001100 →R4
(b) 10000000.01100000.00100111.00001010 →R3
(c) 10000000.01100000.00100111.00110000 →R2
(d) 11000000.00000100.10011001.00010001 →R5
(e) 11000000.00000100.10011001.01011010 →R6

Problem 2

(a)



The shortest path is A→C→G→F→B in terms of routers and 1→2→4→2→3 in terms of ASes.

(b)

Because RIP will always choose the shortes path, RIP will choose A→C→G→F→B in terms of routers as the path from A to B.

(c)

ForBGP, becaues it prefer the path with fewer ASes, BGP will choose A→C→D→E→F→B in terms of routers as the path from A to B

Problem 3

(a)

Assume ACK size is negligible
160kbps*125ms/1kB=2.5 Because the size of window must be an integer, W_S=2

(b)

Because we assume there is no proccessing time, every time receiver receive a packet it will immediately send a ACK back to sender. So $W_R = 1$ is enough.

(c)

For selective acknowledgement, because every time receiver receive a packet that is not in the right order, receiver do not drop it and store it in the buffer, send ACK for the packet back to sender. And send does not receive the ACK for the packet that should be in the right order, sender will resend a new one. Before receiver receives the new packet that is in the right order, it will just store all other packet that are not in order in buffer. So the maximum numer of packets receiver will store is equal to the size of sender. So we want $W_R = W_S$

Problem 4

(c) and (e) are True

Problem 5

(a)

1-6 and 22-25

(b)

6-14 and 15-21

(c)

A triple duplicate ACK.

(d)

32

(e)

40/2=20

(f)

24/2=12

(g)

Assume the duplicate ACKs occures immediately before the end of 26^{th}
CWND=8/2=4
SSTHRESH=12/2=6

Problem 6

Part (a)

Traceroute transmits packets with small Time To Live values; each time a packet pass through a router, Time To Live value decreaase by 1. When TTL value goes to zero the packet expire and traceroute sends back the information using ICMP Time Exceeded message back to sender.

Part (b)

traceroute to 216.81.59.173 (216.81.59.173), 64 hops max, 52 byte packets
1 * * *
2 [AS25] xe-1-2-0-1985.inr-306-sut.berkeley.edu (136.152.20.1) 9.998 ms 4.052 ms 6.365 ms
3 [AS25] t5-4.inr-202-reccev.berkeley.edu (128.32.0.58) 5.928 ms 4.119 ms 5.664 ms
4 [AS25] xe-5-1-0.inr-001-sut.berkeley.edu (128.32.0.66) 10.423 ms 12.599 ms 48.544 ms
5 [AS2152] cenic.net (137.164.50.16) 4.590 ms 4.064 ms 7.608 ms
6 [AS2152] oak-agg2–sfo-agg1-10g.cenic.net (137.164.22.25) 8.006 ms 24.223 ms 28.060 ms
7 [AS2152] dc-paix-px1–oak-core1-ge.cenic.net (137.164.47.18) 6.310 ms 6.945 ms 6.778 ms
8 [AS2152] hurricane–paix-px1-ge.cenic.net (198.32.251.70) 11.935 ms 45.858 ms 16.560 ms
9 [AS6939] 10gigabitethernet3-1.core1.sjc2.he.net (72.52.92.70) 27.641 ms 7.918 ms 52.378 ms
10 [AS6939] 10gigabitethernet14-7.core1.lax2.he.net (184.105.213.5) 15.071 ms 104.214 ms 22.345 ms
11 [AS46841] 10gigabitethernet2-3.core1.phx2.he.net (184.105.222.85) 31.365 ms 26.236 ms 25.737 ms
12 [AS46841] 10gigabitethernet5-3.core1.dal1.he.net (184.105.222.78) 55.314 ms 46.131 ms 46.376 ms
13 [AS6939] 10gigabitethernet5-4.core1.atl1.he.net (184.105.213.114) 87.504 ms 74.713 ms 78.964 ms
14 [AS6939] 216.66.0.26 (216.66.0.26) 67.796 ms 66.816 ms 66.943 ms
15 * * *
16 [AS21513] episode.iv (206.214.251.1) 117.155 ms 106.257 ms 108.214 ms
17 [AS21513] a.new.hope (206.214.251.6) 107.776 ms 108.208 ms 109.204 ms
18 [AS21513] it.is.a.period.of.civil.war (206.214.251.9) 108.309 ms 109.786 ms 109.637 ms
19 [AS21513] rebel.spaceships (206.214.251.14) 107.540 ms 107.145 ms 108.954 ms
20 [AS21513] striking.from.a.hidden.base (206.214.251.17) 109.116 ms 110.270 ms 106.703 ms
21 [AS21513] have.won.their.first.victory (206.214.251.22) 107.468 ms 106.741 ms 106.895 ms
22 [AS21513] against.the.evil.galactic.empire (206.214.251.25) 106.948 ms 108.344 ms 115.134 ms

23 [AS21513] during.the.battle (206.214.251.30) 107.989 ms 262.536 ms 108.244 ms
24 [AS21513] rebel.spies.managed (206.214.251.33) 106.811 ms 115.184 ms 106.614 ms
25 [AS21513] to.steal.secret.plans (206.214.251.38) 107.148 ms 108.845 ms 109.227 ms
26 [AS21513] to.the.empires.ultimate.weapon (206.214.251.41) 107.577 ms 110.484 ms 108.883 ms
27 [AS21513] the.death.star (206.214.251.46) 109.148 ms 108.671 ms 106.530 ms
28 [AS21513] an.armored.space.station (206.214.251.49) 106.450 ms 107.384 ms 106.645 ms
29 [AS21513] with.enough.power.to (206.214.251.54) 109.851 ms 108.454 ms 107.584 ms
30 [AS21513] destroy.an.entire.planet (206.214.251.57) 106.931 ms 132.208 ms 122.881 ms
31 [AS21513] pursued.by.the.empires (206.214.251.62) 107.421 ms 111.301 ms 117.747 ms
32 [AS21513] sinister.agents (206.214.251.65) 114.066 ms 107.710 ms 109.741 ms
33 [AS21513] princess.leia.races.home (206.214.251.70) 111.802 ms 381.459 ms 109.925 ms
34 [AS21513] aboard.her.starship (206.214.251.73) 108.241 ms 112.449 ms 111.891 ms
35 [AS21513] custodian.of.the.stolen.plans (206.214.251.78) 110.809 ms 107.928 ms 109.313 ms
36 [AS21513] that.can.save.her (206.214.251.81) 108.153 ms 108.956 ms 109.751 ms
37 [AS21513] people.and.restore (206.214.251.86) 108.020 ms 111.282 ms 107.646 ms
38 [AS21513] freedom.to.the.galaxy (206.214.251.89) 111.601 ms 112.989 ms 148.747 ms
39 [AS21513] 0—i——-i—0 (206.214.251.94) 171.349 ms 111.278 ms 255.688 ms
40 [AS21513] 0————————0 (206.214.251.97) 111.147 ms 109.661 ms 110.565 ms
41 [AS21513] 0————————0 (206.214.251.102) 113.751 ms 109.153 ms 110.352 ms
42 [AS21513] 0————————-0 (206.214.251.105) 107.836 ms 110.324 ms 110.251 ms
43 [AS21513] 0————————0 (206.214.251.110) 111.513 ms 108.142 ms 109.000 ms
44 [AS21513] 0———————0 (206.214.251.113) 111.099 ms 108.126 ms 141.220 ms
45 [AS21513] 0———————-0 (206.214.251.118) 107.918 ms 108.408 ms 108.560 ms
46 [AS21513] 0———————0 (206.214.251.121) 107.929 ms 107.867 ms 111.001 ms
47 [AS21513] 0——————0 (206.214.251.126) 111.123 ms 108.693 ms 110.930 ms
48 [AS21513] 0——————-0 (206.214.251.129) 108.813 ms 132.312 ms 110.502 ms
49 [AS21513] 0——————0 (206.214.251.134) 112.031 ms 109.692 ms 111.276 ms
50 [AS21513] 0—————0 (206.214.251.137) 114.344 ms 281.457 ms 108.667 ms
51 [AS21513] 0————-0 (206.214.251.142) 107.841 ms 110.697 ms 108.941 ms
52 [AS21513] 0————0 (206.214.251.145) 109.620 ms 112.306 ms 115.584 ms
53 [AS21513] 0——0 (206.214.251.150) 109.743 ms 109.469 ms 111.456 ms
54 [AS21513] 0—-0 (206.214.251.153) 108.466 ms 113.609 ms 161.267 ms
55 [AS21513] 0—0 (206.214.251.158) 114.251 ms 223.281 ms 110.124 ms
56 [AS21513] 0–0 (206.214.251.161) 111.517 ms 110.879 ms 118.374 ms
57 [AS21513] 0-0 (206.214.251.166) 145.623 ms 115.682 ms 110.880 ms
58 [AS21513] 00 (206.214.251.169) 114.814 ms 109.668 ms 111.022 ms
59 [AS21513] i (206.214.251.174) 111.328 ms 109.265 ms 111.434 ms
60 [AS21513] by.ryan.werber (206.214.251.177) 114.727 ms 113.186 ms 112.014 ms
61 [AS21513] blizzards.breed.ccie.creativity (206.214.251.182) 108.757 ms 109.779 ms 111.208

ms
62 [AS21513] please.try.again.tracerote.to.obiwan.scrye.net (206.214.251.185) 109.795 ms 118.435 ms 110.403 ms
63 [AS21513] read.more.at.beaglenetworks.net (206.214.251.190) 116.403 ms * 122.843 ms

(c)

<AS25,Berkeley><AS2152,Cenic><AS6939,He><AS46841,He>

(d)

Cenic→He

(e)

It means the packet is not acknowledged within the expected timeout.
It may because of the newwork is busy and the packet was droped from the buffering queue.