

Cpre 530 - Assignment 2

Fall 2011

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1. Do Homework problems 5,6,9 from Chapter 6 in book.

Problem 5: The route tables for all the devices are as follows

H1

Destination	Next hop	Interface
129.186.5.0/24	129.186.5.30	Eth0
127.0.0.1	127.0.0.1	Loopback
Default	129.186.5.254	En0

H2

Destination	Next hop	Interface
129.186.100.0/24	129.186.100.40	Eth0
127.0.0.1	127.0.0.1	Loopback
Default	129.186.100.252	En0
129.186.5.0/24	129.186.100.254	En1

H3

Destination	Next hop	Interface
129.186.4.0/24	129.186.4.133	Eth0
127.0.0.1	127.0.0.1	Loopback
Default	129.186.4.254	En1

R1

Destination	Next hop	Interface
129.186.5.0/24	129.186.5.254	En0
129.186.100.0/24	129.186.100.254	En1
127.0.0.1	127.0.0.1	Loopback
Default	129.186.100.252	En0

R2

Destination	Next hop	Interface
129.186.100.0/24	129.186.100.252	En0
Default	10.0.0.5	En1
127.0.0.1	127.0.0.1	Loopback

R3

Destination	Next hop	Interface
129.186.5.0/24	129.186.100.254	En1
129.186.100.0	129.186.100.253	En0
Default	129.186.100.252	En0
127.0.0.1	127.0.0.1	Loopback
129.186.4.0	129.186.4.254	En1

Problem 6: The fragment for the network segment between the two routers is as follows:

Layer	Filed name	Original	Fragment 1	Fragment 2
	Destination	N/A	00:88:88:38:12:EC	00:88:88:38:12:EC
Ethernet	Source	N/A	00:86:40:34:45:00	00:86:40:34:45:00
	Type/field	N/A	N/A	N/A
	Ver/HL	4/5	4/5	4/5
	Type	0	0	0
	Len	2740	1536	1244
	Id	3486	3486	3486
IP	Flags	000	001	000
	Offset	0	0	187
	Protocol	17	17	17
	TTL	Computed	Computed	Computed
	Checksum	Computed	Computed	Computed
	Source Ip	129.186.5.4	129.186.5.4	129.186.5.4
	Destination Ip	68.10.7.4	68.10.7.4	68.10.7.4
Data		2700	1496	1204

Problem 9:

9a. How many entries would be there in H1's ARP table due to the messages?

Two

H1 → H5 → Arp for H5

H1 → H2 → Arp for R2

H1 → H3, H4, Int, Ibm.com → Arp for R2.

There are two ARP entries one for H5 and other for R2.

9b. Assume all caches are cleared before H3 sends a single ping request to H1

9c. How many packets are transmitted on the network segment NET 1 (including ping and reply)?

Six

2 ARP (to and from H1)

2 ICMPS (to and from H1)

1 ping + 1 reply (to and from H1)

9d. How many packets are transmitted on the network segment NET 3 (including ping and reply)?

Six (same as above)

9e. How many packets are transmitted on the network segment NET 2 (including ping and reply)?

Six (same as above)

9.f Same questions for hosts H6 and H7

For H6:

- a) Four → ARP for R2, ARP for H2, ARP for R3, ARP for R1.
- c) Zero
- d) Six → 2 ARP, 2 ICMPS, 1 ping and 1 reply
Since Arp cache is lost, H3 does not know about H6
- e) Four → 2 ICMPS, 1 ping and 1 reply on N3
H3 knows about R3)

For H7:

- a) Two → ARP for H3, ARP for R3
- c) Zero
- d) Zero
- e) Six → 2 ARP, 2 ICMPS, 1 ping and 1 reply

2. Do lab experiments 1-8 from Chapter 6 in the book.

Problem 1:

Network address → 129.186.251.0

Netmask → 255.255.255.0

Problem 2: IP address of following machines

2a. www.nasa.gov

Addresses: 209.56.124.24, 209.56.124.25

Aliases: www.nasa.gov, www.nasa.gov.speedera.net

www.nasa.gov.edgesuite.net

2b. www.iac.iastate.edu

Name: iac.ece.iastate.edu

Address: 129.186.105.22

Aliases: www.iac.iastate.edu

2c. www.cnn.com

Name: www.cnn.com

Addresses: 157.166.226.25, 157.166.226.2, 157.166.224.25, 157.166.224.26

2d. www.iseage.org

Name: www.iseage.org

Address: 129.186.105.37

2e. www.iastate.edu

Address: 129.186.140.50

Aliases: www.iastate.edu

2f. Spock.ee.iastate.edu

Name: Spock.ee.iastate.edu

Address: 129.186.215.40

Problem 3: Ping to find average delay for above machines

www.nasa.gov → Time – 1ms ; TTL -59

www.iac.iastate.edu → Time < 1ms ; TTL -62

www.cnn.com → Request Timed out

www.iseage.org → Time < 1ms ; TTL -62

www.iastate.edu → Time < 1ms ; TTL -62

Spock.ee.iastate.edu → Time – 1ms; TTL -61

Problem 4: Dump the route table for the machine used

Netstat – r –n

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C:\Users\suganya>netstat -r -n
=====
Interface List
13...00 18 8b 2a 1a 05 .....Broadcom NetXtreme 57xx Gigabit Controller
1.....Software Loopback Interface 1
14...00 00 00 00 00 00 e0 Microsoft ISA/TAP Adapter
11...00 00 00 00 00 00 e0 Microsoft Teredo Tunneling Adapter
12...00 00 00 00 00 00 e0 Microsoft 6to4 Adapter
=====

IPv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway             Interface           Metric
0.0.0.0                    0.0.0.0          129.186.181.254     129.186.181.62      20
127.0.0.0                  255.0.0.0        On-link             127.0.0.1           306
127.0.0.1                  255.255.255.255  On-link             127.0.0.1           306
127.255.255.255            255.255.255.255  On-link             127.0.0.1           306
129.186.180.0              255.255.254.0    On-link             129.186.181.62      276
129.186.181.62            255.255.255.255  On-link             129.186.181.62      276
129.186.181.255            255.255.255.255  On-link             129.186.181.62      276
224.0.0.0                  240.0.0.0        On-link             127.0.0.1           306
224.0.0.0                  240.0.0.0        On-link             129.186.181.62      276
255.255.255.255            255.255.255.255  On-link             127.0.0.1           306
255.255.255.255            255.255.255.255  On-link             129.186.181.62      276
=====
Persistent Routes:
None

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
13      36  ::/0                fe80::205:dcff:fe1d:b000
1       306 ::1/128             On-link
13      28  2610:130:101:400::/64    On-link
13      276 2610:130:101:400:2d22:99b3:7799:a6b0/128
                                On-link
13      276 2610:130:101:400:dc3e:a2ca:6475:4b05/128
                                On-link
13      276 fe80::/64             On-link
13      276 fe80::2d22:99b3:7799:a6b0/128
                                On-link
1       306 ff00::/8              On-link
13      276 ff00::/8              On-link
=====
Persistent Routes:
None

```

Problem 5: Ethernet address of Gateway

```

C:\Users\suganya>arp -a 129.186.181.254

Interface: 129.186.181.62 --- 0xd
Internet Address      Physical Address      Type
129.186.181.254      00-05-dc-1d-b0-00    dynamic

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Problem 6: nslookup for IP addresses of mail servers in Problem 2

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C:\Users\suganya>nslookup
Default Server: ns-3.iastate.edu
Address: 129.186.142.200

> set type=MX
> www.nasa.gov
Server: ns-3.iastate.edu
Address: 129.186.142.200

Non-authoritative answer:
www.nasa.gov canonical name = www.nasa.gov.speedera.net
www.nasa.gov.speedera.net canonical name = www.nasa.gov.edgesuite.net
www.nasa.gov.edgesuite.net canonical name = a1718.x.akamai.net
x.akamai.net
primary name server = n0x.akamai.net
responsible mail addr = hostmaster.akamai.com
serial = 1317684552
refresh = 1000 (16 mins 40 secs)
retry = 1000 (16 mins 40 secs)
expire = 1000 (16 mins 40 secs)
default TTL = 1800 (30 mins)
> www.iac.iastate.edu
Server: ns-3.iastate.edu
Address: 129.186.142.200

www.iac.iastate.edu canonical name = iac.ece.iastate.edu
ece.iastate.edu
primary name server = dns-1.iastate.edu
responsible mail addr = hostmaster.iastate.edu
serial = 476159678
refresh = 36000 (10 hours)
retry = 3600 (1 hour)
expire = 604800 (7 days)
default TTL = 360000 (4 days 4 hours)
> www.cnn.com
Server: ns-3.iastate.edu
Address: 129.186.142.200

*** No mail exchange (MX) records available for www.cnn.com
> www.iseage.org
Server: ns-3.iastate.edu
Address: 129.186.142.200

iseage.org
primary name server = romulan.ee.iastate.edu
responsible mail addr = dougj.romulan.ee.iastate.edu
serial = 10903092
refresh = 43200 (12 hours)
retry = 14400 (4 hours)
expire = 720000 (8 days 8 hours)
default TTL = 36000 (10 hours)
> www.iastate.edu
Server: ns-3.iastate.edu
Address: 129.186.142.200

www.iastate.edu canonical name = webslinger-ur.its.iastate.edu
its.iastate.edu
primary name server = dns-1.iastate.edu
responsible mail addr = hostmaster.iastate.edu
serial = 476177774
refresh = 36000 (10 hours)
retry = 3600 (1 hour)
expire = 604800 (7 days)
default TTL = 360000 (4 days 4 hours)
> spock.ee.iastate.edu
Server: ns-3.iastate.edu
Address: 129.186.142.200

ee.iastate.edu
primary name server = romulan.ee.iastate.edu
responsible mail addr = dougj.romulan.ee.iastate.edu
serial = 11006140
refresh = 43200 (12 hours)
retry = 14400 (4 hours)
expire = 720000 (8 days 8 hours)
default TTL = 36000 (10 hours)
>

```

Problem 7: Use nslookup to find the machine name of several IP addresses.

Address: 129.186.179.254

Name: router-129-186-176-0.iastate.edu

Address: 129.186.177.160

Name: pub402.lib.iastate.edu

Problem 8: Use traceroute to determine addresses of first five routers between test lab and www.cnn.com.

traceroute to www.cnn.com (157.166.226.25), 64 hops max, 52 byte packets

- 1 r62 (129.186.215.62) 0.830 ms 0.851 ms 0.791 ms
- 2 router-129-186-105-0.iastate.edu (129.186.105.254) 1.488 ms 0.541 ms 0.526 ms
- 3 b31gb1-vlan254.tele.iastate.edu (129.186.254.131) 0.612 ms 0.547 ms 0.527 ms
- 4 b31gb2-438.tele.iastate.edu (192.245.179.52) 0.528 ms 0.637 ms 0.615 ms
- 5 te-1-3-212.car2.KansasCity1.Level3.net (4.53.34.13) 4.907 ms 4.894 ms 4.820 ms

Packet Size	Machine Address	Average delay
Size =50 No. of packets=5	129.186.215.62	0.771 ms
	129.186.105.254	0.853 ms
	129.186.254.131	0.774 ms
	192.245.179.52	2.320 ms
	4.53.34.13	5.102 ms
Size = 100 No. of packets = 5	129.186.215.62	0.821 ms
	129.186.105.254	0.906 ms
	129.186.254.131	0.649 ms
	192.245.179.52	0.776 ms
	4.53.34.13	79.234 ms

Reference:

1. Network Security – Dr.Douglas W.Jacobson
2. <http://www.mediacollege.com/internet/troubleshooter/traceroute.html>