

ASSIGNMENT 2

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

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

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

LAYER	FIELD 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

9a. Assume H1 sent a message to H2, H3, H4, H5 and a machine on the internet (ibm.com). How many entries would be there in H1's ARP table due to the messages?

Solution:

2

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

9b. For the next three parts assume all caches are cleared before H3 sends a single ping request to H1 (the command = ping H1).

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

Solution:

6

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

Solution:

6

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

Solution:

6

9.f Answer the same questions for hosts H6 and H7, again assuming caches are all clear before starting.

Solution:

H6:

- a) 4
- b) 0
- c) 6
- d) 4

H7:

- a) 2
- b) 0
- c) 0
- d) 6

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

1. Determine the network address for the test laboratory and the netmask value.

Solution:

Network address: 129.186.251.0

Netmask: 255.255.255.0

2. Use the test lab and nslookup to find the ip address of each of the following machines.

- a. www.nasa.gov: 63.151.118.105,
- b. www.iac.iastate.edu: 129.186.105.22
- c. www.cnn.com: 157.166.226.25
- d. www.iseage.org: 129.186.105.37
- e. www.iastate.edu: 129.186.140.50
- f. Spock.ee.iastate.edu: 129.186.215.40

3. Use command ping to find the average time delay.

C:\Users\harish>ping www.nasa.gov

Pinging a1718.dscg.akamai.net [63.151.118.105] with 32 bytes of data:

Reply from 63.151.118.105: bytes=32 time=76ms TTL=52

Reply from 63.151.118.105: bytes=32 time=77ms TTL=52

Reply from 63.151.118.105: bytes=32 time=75ms TTL=52

Reply from 63.151.118.105: bytes=32 time=70ms TTL=52

Ping statistics for 63.151.118.105:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 70ms, Maximum = 77ms, Average = 74ms

C:\Users\harish>ping www.iac.iastate.edu

Pinging iac.ece.iastate.edu [129.186.105.22] with 32 bytes of data:

Request timed out.

Request timed out.

Request timed out.

Request timed out.

Ping statistics for 129.186.105.22:

Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\harish>ping www.cnn.com

Pinging ouzo-cnn-671716670.us-west-2.elb.amazonaws.com [50.112.248.126] with 32 bytes of data:

Request timed out.

Request timed out.

Request timed out.

Request timed out.

Ping statistics for 50.112.248.126:

Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\harish>ping www.iseage.org

Pinging www.iseage.org [129.186.105.37] with 32 bytes of data:

Request timed out.

Request timed out.

Request timed out.

Request timed out.

Ping statistics for 129.186.105.37:

Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\harish>ping www.iastate.edu

Pinging www.iastate.edu [129.186.23.166] with 32 bytes of data:

Reply from 129.186.23.166: bytes=32 time=14ms TTL=248

Reply from 129.186.23.166: bytes=32 time=16ms TTL=248

Reply from 129.186.23.166: bytes=32 time=28ms TTL=248

Reply from 129.186.23.166: bytes=32 time=17ms TTL=248

Ping statistics for 129.186.23.166:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 14ms, Maximum = 28ms, Average = 18ms

C:\Users\harish>ping spock.ee.iastate.edu

Pinging spock.ee.iastate.edu [129.186.215.40] with 32 bytes of data:

Reply from 129.186.215.40: bytes=32 time=15ms TTL=56

Reply from 129.186.215.40: bytes=32 time=15ms TTL=56

Reply from 129.186.215.40: bytes=32 time=15ms TTL=56

Reply from 129.186.215.40: bytes=32 time=17ms TTL=56

Ping statistics for 129.186.215.40:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 15ms, Maximum = 17ms, Average = 15ms

4. Dump the route table for machine used in step 3.

```
C:\Windows\system32\cmd.exe
C:\Users\harish>netstat -r -n
=====
Interface List
12...20 10 7a 44 2b 2d .....Realtek RTL8188CE 802.11b/g/n WiFi Adapter
11...e4 11 5b 4d 3e 5f .....Realtek PCIe GBE Family Controller
1.....Software Loopback Interface 1
14...00 00 00 00 00 00 e0 Microsoft ISATAP Adapter
15...00 00 00 00 00 00 e0 Microsoft ISATAP Adapter #2
13...00 00 00 00 00 00 e0 Teredo Tunneling Pseudo-Interface
=====

IPv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway          Interface        Metric
0.0.0.0                    0.0.0.0          10.1.4.1         10.1.4.156       306
10.1.4.0                   255.255.255.0    On-link         10.1.4.156       286
10.1.4.156                 255.255.255.255  On-link         10.1.4.156       286
10.1.4.255                 255.255.255.255  On-link         10.1.4.156       286
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
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         10.1.4.156       286
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         10.1.4.156       286
=====
Persistent Routes:
None

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
13      58 :::/0 On-link
1       306 ::1/128 On-link
13      58 2001:::/32 On-link
13      306 2001:0:9d38:6ab8:347c:3b6d:52e6:3a89/128 On-link
12      286 fe80::/64 On-link
13      306 fe80::/64 On-link
12      286 fe80::25da:95e9:3ffd:2f89/128 On-link
13      306 fe80::347c:3b6d:52e6:3a89/128 On-link
1       306 ff00::/8 On-link
13      306 ff00::/8 On-link
12      286 ff00::/8 On-link
=====
Persistent Routes:
None
C:\Users\harish>
```

5. Use the command arp -a to determine Ethernet address of the host.

```
C:\Users\harish>arp -a
Interface: 10.1.4.156 --- 0xc
Internet Address    Physical Address    Type
10.1.4.1            00-50-da-08-6f-fd   dynamic
10.1.4.33           00-26-5e-55-4b-1f   dynamic
10.1.4.78           28-cf-da-e0-5d-8c   dynamic
10.1.4.95           74-e5-43-39-5f-15   dynamic
10.1.4.98           e0-06-e6-5e-5a-95   dynamic
10.1.4.120          70-f1-a1-fc-27-42   dynamic
10.1.4.140          30-46-9a-1f-a7-36   dynamic
10.1.4.142          68-a3-c4-11-0f-27   dynamic
10.1.4.162          88-9f-fa-80-3c-65   dynamic
10.1.4.177          1c-65-9d-8e-a6-69   dynamic
10.1.4.207          24-be-05-3e-64-f2   dynamic
10.1.4.210          00-16-ea-55-79-6c   dynamic
```

10.1.4.255	ff-ff-ff-ff-ff	static
224.0.0.22	01-00-5e-00-00-16	static
224.0.0.251	01-00-5e-00-00-fb	static
224.0.0.252	01-00-5e-00-00-fc	static
224.0.0.253	01-00-5e-00-00-fd	static
239.255.255.250	01-00-5e-7f-ff-fa	static
255.255.255.255	ff-ff-ff-ff-ff	static

6. Use nslookup to find ip address of mail servers stated above in experiment 2.

C:\Users\harish>nslookup

Default Server: 420-428swalnut.rentiowatech.com

Address: 10.1.4.1

> set type=MX

> www.nasa.gov

Server: 420-428swalnut.rentiowatech.com

Address: 10.1.4.1

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.dscg.akamai.net

dscg.akamai.net

primary name server = n0dscg.akamai.net

responsible mail addr = hostmaster.akamai.com

serial = 1349332906

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: 420-428swalnut.rentiowatech.com

Address: 10.1.4.1

Non-authoritative answer:

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 = 476340848
refresh = 36000 (10 hours)
retry = 3600 (1 hour)
expire = 604800 (7 days)
default TTL = 360000 (4 days 4 hours)

> **www.cnn.com**

Server: 420-428swalnut.rentiowatech.com

Address: 10.1.4.1

Non-authoritative answer:

www.cnn.com canonical name = www.cnn.com.vgtf.net

www.cnn.com.vgtf.net canonical name = cnn-atl.gslb.vgtf.net

gslb.vgtf.net

primary name server = pdns1.ultradns.net
responsible mail addr = Mark\Reed.turner.com
serial = 2012100322
refresh = 10800 (3 hours)
retry = 3600 (1 hour)
expire = 2592000 (30 days)
default TTL = 86400 (1 day)

> **www.iseage.org**

Server: 420-428swalnut.rentiowatech.com

Address: 10.1.4.1

iseage.org

primary name server = romulan.ee.iastate.edu
responsible mail addr = dougj.romulan.ee.iastate.edu
serial = 10903093
refresh = 43200 (12 hours)
retry = 14400 (4 hours)
expire = 720000 (8 days 8 hours)
default TTL = 36000 (10 hours)

> **www.iastate.edu**

Server: 420-428swalnut.rentiowatech.com

Address: 10.1.4.1

iastate.edu

primary name server = dns-1.iastate.edu

responsible mail addr = hostmaster.iastate.edu
serial = 476130574
refresh = 3600 (1 hour)
retry = 900 (15 mins)
expire = 604800 (7 days)
default TTL = 360000 (4 days 4 hours)

> **spock.ee.iastate.edu**

Server: 420-428swalnut.rentiowatech.com

Address: 10.1.4.1

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)

8. Use traceroute to **www.cnn.com**

C:\Users\harish>tracert www.cnn.com

Tracing route to cnn-atl.gslb.vgtnet.net [157.166.226.25]
over a maximum of 30 hops:

1	4 ms	5 ms	4 ms	420-428swalnut.rentiowatech.com [10.1.4.1]
2	*	*	*	Request timed out.
3	20 ms	21 ms	16 ms	172.30.6.21
4	21 ms	14 ms	14 ms	172.30.1.149
5	12 ms	17 ms	21 ms	12.249.52.13
6	22 ms	22 ms	23 ms	cr81.desia.ip.att.net [12.122.153.50]
7	31 ms	34 ms	31 ms	cr2.cgcil.ip.att.net [12.122.153.41]