Advance Networks Lab: Lab Assignment-2

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Contents

Problem 1

Displaying arp table

Ans)cmd: arp -n

```
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:/$ arp -n
Address                 HWtype  HWaddress           Flags Mask        Iface
10.30.56.1              ether   00:1f:9d:f2:bc:c9   C                 eth0
```

Empty arp table.

cmd: sudo ip -s -s neigh flush all

```
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:~$ sudo ip -s -s neigh flush all
10.30.56.1 dev eth0 lladdr 00:1f:9d:f2:bc:c9 ref 307 used 67/67/47 probes 4 STALE

*** Round 1, deleting 1 entries ***
*** Flush is complete after 1 round ***
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:~$ arp -n
Address                 HWtype  HWaddress           Flags Mask        Iface
10.30.56.1                      (incomplete)                          eth0
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:~$ 
```

Problem 2

Ping with another machine in the intranet.
cmd:ping 10.30.56.123

arp table after pinging to local machine.
cmd: arp -n

```
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:/$ arp -n
Address                  HWtype  HWaddress           Flags Mask            Iface
10.30.56.1               ether   00:1f:9d:f2:bc:c9   C                     eth0
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:/$ sudo ip -s -s neigh flush all
10.30.56.1 dev eth0 lladdr 00:1f:9d:f2:bc:c9 ref 10 used 26/21/21 probes 1 REACH
ABLE

*** Round 1, deleting 1 entries ***
*** Flush is complete after 1 round ***
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:/$ arp -n
Address                  HWtype  HWaddress           Flags Mask            Iface
10.30.56.1                       (incomplete)                              eth0
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:/$ ping 10.30.56.123
PING 10.30.56.123 (10.30.56.123) 56(84) bytes of data.
64 bytes from 10.30.56.123: icmp_req=1 ttl=64 time=1.50 ms
64 bytes from 10.30.56.123: icmp_req=2 ttl=64 time=0.680 ms
64 bytes from 10.30.56.123: icmp_req=3 ttl=64 time=0.714 ms
^C
--- 10.30.56.123 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2000ms
rtt min/avg/max/mdev = 0.680/0.965/1.501/0.379 ms
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:/$ arp -n
Address                  HWtype  HWaddress           Flags Mask            Iface
10.30.56.123             ether   6c:3b:e5:31:2f:a5   C                     eth0
10.30.56.1               ether   00:1f:9d:f2:bc:c9   C                     eth0
```
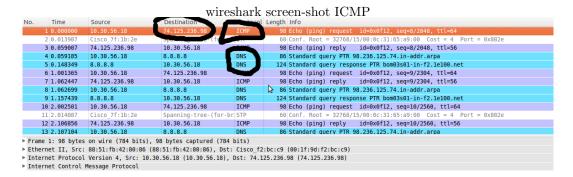
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.30.56.125	224.0.0.1	ICMP	98	Echo (ping) request id=0x1320, seq=15/3840, ttl=1
2	0.805213	10.30.56.113	224.0.0.1	ICMP	98	Echo (ping) request id=0x10a3, seq=589/19714, ttl=1
3	1.008014	10.30.56.125	224.0.0.1	ICMP	98	Echo (ping) request id=0x1320, seq=16/4096, ttl=1
4	1.734477	10.30.56.18	10.30.56.123	ICMP	98	Echo (ping) request id=0x13b5, seq=1/256, ttl=64
5	1.735021	10.30.56.123	10.30.56.18	ICMP	98	Echo (ping) reply id=0x13b5, seq=1/256, ttl=64
6	1.813079	10.30.56.113	224.0.0.1	ICMP	98	Echo (ping) request id=0x10a3, seq=590/19970, ttl=1
7	2.015995	10.30.56.125	224.0.0.1	ICMP	98	Echo (ping) request id=0x1320, seq=17/4352, ttl=1
8	2.733474	10.30.56.18	10.30.56.123	ICMP	98	Echo (ping) request id=0x13b5, seq=2/512, ttl=64
9	2.734024	10.30.56.123	10.30.56.18	ICMP	98	Echo (ping) reply id=0x13b5, seq=2/512, ttl=64
10	2.820968	10.30.56.113	224.0.0.1	ICMP	98	Echo (ping) request id=0x10a3, seq=591/20226, ttl=1
11	3.023985	10.30.56.125	224.0.0.1	ICMP	98	Echo (ping) request id=0x1320, seq=18/4608, ttl=1
12	3.732474	10.30.56.18	10.30.56.123	ICMP	98	Echo (ping) request id=0x13b5, seq=3/768, ttl=64
13	3.733085	10.30.56.123	10.30.56.18	ICMP	98	Echo (ping) reply id=0x13b5, seq=3/768, ttl=64
14	3.828948	10.30.56.113	224.0.0.1	ICMP	98	Echo (ping) request id=0x10a3, seq=592/20482, ttl=1
15	4.031930	10.30.56.125	224.0.0.1	ICMP	98	Echo (ping) request id=0x1320, seq=19/4864, ttl=1
16	4.732336	10.30.56.18	10.30.56.123	ICMP	98	Echo (ping) request id=0x13b5, seq=4/1024, ttl=64
17	4.733005	10.30.56.123	10.30.56.18	ICMP	98	Echo (ping) reply id=0x13b5, seq=4/1024, ttl=64

▸ Frame 4: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
▸ Ethernet II, Src: 88:51:fb:42:80:86 (88:51:fb:42:80:86), Dst: 6c:3b:e5:31:2f:a5 (6c:3b:e5:31:2f:a5)
▸ Internet Protocol Version 4, Src: 10.30.56.18 (10.30.56.18), Dst: 10.30.56.123 (10.30.56.123)
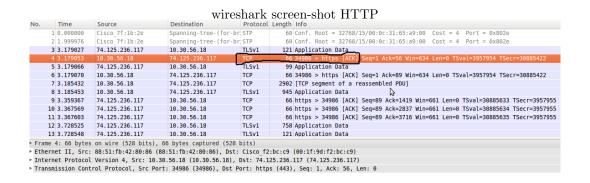▸ Internet Control Message Protocol

ping 4.2.2.1

terminal screen-shot

```
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:/$ arp -n
Address                  HWtype  HWaddress           Flags Mask       Iface
10.30.56.1               ether   00:1f:9d:f2:bc:c9   C                eth0
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:/$ ping 4.2.2.1
PING 4.2.2.1 (4.2.2.1) 56(84) bytes of data.
64 bytes from 4.2.2.1: icmp_req=1 ttl=55 time=194 ms
64 bytes from 4.2.2.1: icmp_req=2 ttl=55 time=200 ms
64 bytes from 4.2.2.1: icmp_req=3 ttl=55 time=200 ms
^C
--- 4.2.2.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 194.902/198.464/200.299/2.545 ms
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:/$ arp -n
Address                  HWtype  HWaddress           Flags Mask       Iface
10.30.56.1               ether   00:1f:9d:f2:bc:c9   C                eth0
```

wireshark screen-shot

6	1.261315	4.2.2.1	10.30.56.18	ICMP	98	Echo (ping) reply id=0x110d, seq=7/1792, ttl=55
7	2.000169	10.30.56.18	4.2.2.1	ICMP	98	Echo (ping) request id=0x110d, seq=8/2048, ttl=64
8	2.248789	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=243/62208, ttl=1
9	2.311812	4.2.2.1	10.30.56.18	ICMP	98	Echo (ping) reply id=0x110d, seq=8/2048, ttl=55
10	3.000624	10.30.56.18	4.2.2.1	ICMP	98	Echo (ping) request id=0x110d, seq=9/2304, ttl=64
11	3.256809	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=244/62464, ttl=1
12	3.297994	4.2.2.1	10.30.56.18	ICMP	98	Echo (ping) reply id=0x110d, seq=9/2304, ttl=55
13	4.000808	10.30.56.18	4.2.2.1	ICMP	98	Echo (ping) request id=0x110d, seq=10/2560, ttl=64
14	4.264796	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=245/62720, ttl=1
15	4.279675	4.2.2.1	10.30.56.18	ICMP	98	Echo (ping) reply id=0x110d, seq=10/2560, ttl=55
16	4.984778	88:51:fb:42:80:89	Broadcast	ARP	60	Who has 10.30.56.1? Tell 10.30.56.125
17	5.001519	10.30.56.18	4.2.2.1	ICMP	98	Echo (ping) request id=0x110d, seq=11/2816, ttl=64
18	5.273127	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=246/62976, ttl=1
19	5.323844	4.2.2.1	10.30.56.18	ICMP	98	Echo (ping) reply id=0x110d, seq=11/2816, ttl=55
20	6.001626	10.30.56.18	4.2.2.1	ICMP	98	Echo (ping) request id=0x110d, seq=12/3072, ttl=64
21	6.266892	4.2.2.1	10.30.56.18	ICMP	98	Echo (ping) reply id=0x110d, seq=12/3072, ttl=55

▸ Frame 10: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
▾ Ethernet II, Src: 88:51:fb:42:80:86 (88:51:fb:42:80:86), Dst: Cisco_f2:bc:c9 (00:1f:9d:f2:bc:c9)
  ▾ Destination: Cisco_f2:bc:c9 (00:1f:9d:f2:bc:c9)

ping google.com

wireshark screen-shot ICMP

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.30.56.18	74.125.236.98	ICMP	98	Echo (ping) request id=0x0f12, seq=8/2048, ttl=64
2	0.013907	Cisco_7f:1b:2e	Spanning-tree-(for-br)	STP	60	Conf. Root = 32768/15/00:0c:31:65:a9:00 Cost = 4 Port = 0x802e
3	0.059007	74.125.236.98	10.30.56.18	ICMP	98	Echo (ping) reply id=0x0f12, seq=8/2048, ttl=56
4	0.059185	10.30.56.18	8.8.8.8	DNS	86	Standard query PTR 98.236.125.74.in-addr.arpa
5	0.148349	8.8.8.8	10.30.56.18	DNS	124	Standard query response PTR bom03s01-in-f2.1e100.net
6	1.001365	10.30.56.18	74.125.236.98		98	Echo (ping) request id=0x0f12, seq=9/2304, ttl=64
7	1.062447	74.125.236.98	10.30.56.18	ICMP	98	Echo (ping) reply id=0x0f12, seq=9/2304, ttl=56
8	1.062699	10.30.56.18	8.8.8.8	DNS	86	Standard query PTR 98.236.125.74.in-addr.arpa
9	1.157439	8.8.8.8	10.30.56.18	DNS	124	Standard query response PTR bom03s01-in-f2.1e100.net
10	2.002501	10.30.56.18	74.125.236.98	ICMP	98	Echo (ping) request id=0x0f12, seq=10/2560, ttl=64
11	2.014087	Cisco_7f:1b:2e	Spanning-tree-(for-br)	STP	60	Conf. Root = 32768/15/00:0c:31:65:a9:00 Cost = 4 Port = 0x802e
12	2.106856	74.125.236.98	10.30.56.18	ICMP	98	Echo (ping) reply id=0x0f12, seq=10/2560, ttl=56
13	2.107104	10.30.56.18	8.8.8.8	DNS	86	Standard query PTR 98.236.125.74.in-addr.arpa

▸ Frame 1: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
▸ Ethernet II, Src: 88:51:fb:42:80:86 (88:51:fb:42:80:86), Dst: Cisco_f2:bc:c9 (00:1f:9d:f2:bc:c9)
▸ Internet Protocol Version 4, Src: 10.30.56.18 (10.30.56.18), Dst: 74.125.236.98 (74.125.236.98)
▸ Internet Control Message Protocol

Request google.com from web browser.

wireshark screen-shot HTTP

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	Cisco_7f:1b:2e	Spanning-tree-(for-br)	STP	60	Conf. Root = 32768/15/00:0c:31:65:a9:00 Cost = 4 Port = 0x802e
2	1.999976	Cisco_7f:1b:2e	Spanning-tree-(for-br)	STP	60	Conf. Root = 32768/15/00:0c:31:65:a9:00 Cost = 4 Port = 0x802e
3	3.179027	74.125.236.117	10.30.56.18	TLSv1	121	Application Data
4	3.179053	10.30.56.18	74.125.236.117	TCP	66	34986 > https [ACK] Seq=1 Ack=56 Win=634 Len=0 TSval=3957954 TSecr=30885422
5	3.179066	74.125.236.117	10.30.56.18	TLSv1	99	Application Data
6	3.179070	10.30.56.18	74.125.236.117	TCP	66	34986 > https [ACK] Seq=1 Ack=89 Win=634 Len=0 TSval=3957954 TSecr=30885422
7	3.185432	10.30.56.18	74.125.236.117	TCP	2902	[TCP segment of a reassembled PDU]
8	3.185453	10.30.56.18	74.125.236.117	TLSv1	945	Application Data
9	3.359367	74.125.236.117	10.30.56.18	TCP	66	https > 34986 [ACK] Seq=89 Ack=1419 Win=661 Len=0 TSval=30885633 TSecr=3957955
10	3.367569	74.125.236.117	10.30.56.18	TCP	66	https > 34986 [ACK] Seq=89 Ack=2837 Win=661 Len=0 TSval=30885634 TSecr=3957955
11	3.367603	74.125.236.117	10.30.56.18	TCP	66	https > 34986 [ACK] Seq=89 Ack=3716 Win=661 Len=0 TSval=30885635 TSecr=3957955
12	3.728525	74.125.236.117	10.30.56.18	TLSv1	758	Application Data
13	3.728548	74.125.236.117	10.30.56.18	TLSv1	121	Application Data

▸ Frame 4: 66 bytes on wire (528 bits), 66 bytes captured (528 bits)
▸ Ethernet II, Src: 88:51:fb:42:80:86 (88:51:fb:42:80:86), Dst: Cisco_f2:bc:c9 (00:1f:9d:f2:bc:c9)
▸ Internet Protocol Version 4, Src: 10.30.56.18 (10.30.56.18), Dst: 74.125.236.117 (74.125.236.117)
▸ Transmission Control Protocol, Src Port: 34986 (34986), Dst Port: https (443), Seq: 1, Ack: 56, Len: 0

Problem 3

Ping Broadcast address. cmd:ping 10.30.59.255 -b

```
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:~$ ping 10.30.59.255 -b
WARNING: pinging broadcast address
PING 10.30.59.255 (10.30.59.255) 56(84) bytes of data.
64 bytes from 10.30.56.1: icmp_req=1 ttl=255 time=1.10 ms
64 bytes from 10.30.56.1: icmp_req=2 ttl=255 time=1.24 ms
64 bytes from 10.30.56.1: icmp_req=3 ttl=255 time=0.935 ms
64 bytes from 10.30.56.1: icmp_req=4 ttl=255 time=1.01 ms
^C
--- 10.30.59.255 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3001ms
rtt min/avg/max/mdev = 0.935/1.075/1.247/0.117 ms
ramsandesh@ramsandesh-HP-Compaq-Pro-6300-MT:~$ arp -n
Address                  HWtype  HWaddress          Flags Mask           Iface
10.30.56.1               ether   00:1f:9d:f2:bc:c9  C                    eth0
```

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.30.56.18	10.30.59.255	ICMP	98	Echo (ping) request id=0x16f6, seq=2/512, ttl=64
2	0.001330	10.30.56.1	10.30.56.18	ICMP	98	Echo (ping) reply id=0x16f6, seq=2/512, ttl=255
3	0.152359	10.30.56.113	224.0.0.1	ICMP	98	Echo (ping) request id=0x1285, seq=782/3587, ttl=1
4	0.284650	10.30.56.103	224.0.0.1	ICMP	98	Echo (ping) request id=0x14a2, seq=121/30976, ttl=1
5	0.392293	10.30.56.109	224.0.0.1	ICMP	98	Echo (ping) request id=0x173f, seq=1813/5383, ttl=1
6	1.001433	10.30.56.18	10.30.59.255	ICMP	98	Echo (ping) request id=0x16f6, seq=3/768, ttl=64
7	1.002344	10.30.56.1	10.30.56.18	ICMP	98	Echo (ping) reply id=0x16f6, seq=3/768, ttl=255
8	1.152330	10.30.56.113	224.0.0.1	ICMP	98	Echo (ping) request id=0x1285, seq=783/3843, ttl=1
9	1.292698	10.30.56.103	224.0.0.1	ICMP	98	Echo (ping) request id=0x14a2, seq=122/31232, ttl=1
10	1.400254	10.30.56.109	224.0.0.1	ICMP	98	Echo (ping) request id=0x173f, seq=1814/5639, ttl=1
11	2.002476	10.30.56.18	10.30.59.255	ICMP	98	Echo (ping) request id=0x16f6, seq=4/1024, ttl=64
12	2.005871	10.30.56.1	10.30.56.18	ICMP	98	Echo (ping) reply id=0x16f6, seq=4/1024, ttl=255
13	2.152302	10.30.56.113	224.0.0.1	ICMP	98	Echo (ping) request id=0x1285, seq=784/4099, ttl=1
14	2.300640	10.30.56.103	224.0.0.1	ICMP	98	Echo (ping) request id=0x14a2, seq=123/31488, ttl=1
15	2.408306	10.30.56.109	224.0.0.1	ICMP	98	Echo (ping) request id=0x173f, seq=1815/5895, ttl=1
16	3.004001	10.30.56.18	10.30.59.255	ICMP	98	Echo (ping) request id=0x16f6, seq=5/1280, ttl=64
17	3.004007	10.30.56.1	10.30.56.18	ICMP	98	Echo (ping) reply id=0x16f6, seq=5/1280, ttl=255

· Frame 1: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
  Ethernet II, Src: 88:51:fb:42:80:86 (88:51:fb:42:80:86), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
· Internet Protocol Version 4, Src: 10.30.56.18 (10.30.56.18), Dst: 10.30.59.255 (10.30.59.255)
· Internet Control Message Protocol

ping Multicast address.
cmd:ping 224.0.0.1

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=74/18944, ttl=1
2	0.233622	10.30.56.147	10.30.56.255	NBNS	92	Name query NB RESTLESZ.SU<00>
3	1.012128	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=75/19200, ttl=1
4	2.016107	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=76/19456, ttl=1
5	3.023958	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=77/19712, ttl=1
6	4.031993	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=78/19968, ttl=1
7	4.237592	10.30.56.18	224.0.0.1	ICMP	98	Echo (ping) request id=0x10c0, seq=1/256, ttl=1
8	5.039912	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=79/20224, ttl=1
9	5.244164	10.30.56.18	224.0.0.1	ICMP	98	Echo (ping) request id=0x10c0, seq=2/512, ttl=1
10	6.048025	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=80/20480, ttl=1
11	6.252207	10.30.56.18	224.0.0.1	ICMP	98	Echo (ping) request id=0x10c0, seq=3/768, ttl=1
12	7.056578	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=81/20736, ttl=1
13	7.260150	10.30.56.18	224.0.0.1	ICMP	98	Echo (ping) request id=0x10c0, seq=4/1024, ttl=1
14	8.063917	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=82/20992, ttl=1
15	8.268169	10.30.56.18	224.0.0.1	ICMP	98	Echo (ping) request id=0x10c0, seq=5/1280, ttl=1
16	9.071839	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=83/21248, ttl=1
17	10.070000	10.30.56.117	224.0.0.1	ICMP	98	Echo (ping) request id=0x11af, seq=84/21504, ttl=1

▶ Frame 7: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
▼ Ethernet II, Src: 88:51:fb:42:80:86 (88:51:fb:42:80:86), Dst: IPv4mcast_00:00:01 (01:00:5e:00:00:01)
  ▼ Destination: IPv4mcast_00:00:01 (01:00:5e:00:00:01)
    Address: IPv4mcast_00:00:01 (01:00:5e:00:00:01)