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Section: CSE – C
Roll no 29

Q3.1 Request

Filter: **http** Expression... Clear Apply Save

No.	Time	Source	Destination	Protocol	Length	Info
593	32.663022861	172.16.57.64	117.18.237.29	OCSP	433	Request
606	32.774130127	117.18.237.29	172.16.57.64	OCSP	916	Response
6146	348.227398162	172.16.57.64	142.250.67.163	OCSP	439	Request
6247	348.416282460	142.250.67.163	172.16.57.64	OCSP	818	Response

Frame 593: 433 bytes on wire (3464 bits), 433 bytes captured (3464 bits) on interface 0
Ethernet II, Src: Micro-St 27:6e:b1 (8c:89:a5:27:6e:b1), Dst: All-HSRP-routers_39 (00:00:0c:07:ac:39)
Internet Protocol Version 4, Src: 172.16.57.64, Dst: 117.18.237.29
Transmission Control Protocol, Src Port: 52950, Dst Port: 80, Seq: 1, Ack: 1, Len: 379
Hypertext Transfer Protocol
POST / HTTP/1.1
Host: ocsp.digicert.com
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:83.0) Gecko/20100101 Firefox/83.0
Accept: */*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Content-Type: application/ocsp-request
Content-Length: 83
Connection: keep-alive
[Full request URI: http://ocsp.digicert.com/]
[HTTP request 1/1]
[Response in frame: 606]
File Data: 83 bytes
Online Certificate Status Protocol

0000 00 00 0c 07 ac 39 8c 89 a5 27 6e b1 08 00 45 009...'.n...E.
0010 01 a3 eb 95 40 00 40 06 06 3f ac 10 39 40 75 12@.@.?.9@u.
0020 ed 1d ce d6 00 50 ac f2 4a a4 20 bf b0 3a 50 18P..J. ...:P.
0030 00 e5 84 6c 00 00 50 4f 53 54 20 2f 20 48 54 54l..PO ST / HTT

enp3s0: <live capture in progr... Packets: 12785 · Displayed: 4 (0.0%) Profile: Defau

Response

Filter: **http** Expression... Clear Apply Save

No.	Time	Source	Destination	Protocol	Length	Info
593	32.663022861	172.16.57.64	117.18.237.29	OCSP	433	Request
606	32.774130127	117.18.237.29	172.16.57.64	OCSP	916	Response
6146	348.227398162	172.16.57.64	142.250.67.163	OCSP	439	Request
6247	348.416282460	142.250.67.163	172.16.57.64	OCSP	818	Response

Frame 606: 916 bytes on wire (7328 bits), 916 bytes captured (7328 bits) on interface 0
Ethernet II, Src: cc:7f:76:13:39:7f (cc:7f:76:13:39:7f), Dst: Micro-St 27:6e:b1 (8c:89:a5:27:6e:b1)
Internet Protocol Version 4, Src: 117.18.237.29, Dst: 172.16.57.64
Transmission Control Protocol, Src Port: 80, Dst Port: 52950, Seq: 1, Ack: 380, Len: 862
Hypertext Transfer Protocol
HTTP/1.1 200 OK
Accept-Ranges: bytes
Age: 4095
Cache-Control: max-age=137818
Content-Type: application/ocsp-response
Date: Thu, 10 Dec 2020 07:48:17 GMT
Etag: "5fd13alc-1d7"
Expires: Fri, 11 Dec 2020 22:05:15 GMT
Last-Modified: Wed, 09 Dec 2020 20:57:00 GMT
Server: ECS (tir/CDD3)
X-Cache: HIT
Content-Length: 471
Via: HTTP/1.1 forward.http.proxy:3128
Connection: keep-alive
[HTTP response 1/1]
[Time since request: 0.111107266 seconds]

0000 8c 89 a5 27 6e b1 cc 7f 76 13 39 7f 08 00 45 00 ...'.n...v.9...E.
0010 03 86 9e 86 40 00 3f 06 52 6b 75 12 ed 1d ac 10@.?. Rku.....
0020 39 40 00 50 ce d6 20 bf b0 3a ac f2 4c 1f 50 18 9@.P.L.P.
0030 00 ed e6 0f 00 00 48 54 54 50 2f 31 2e 31 20 32HT TP/1.1 2

enp3s0: <live capture in progr... Packets: 12893 · Displayed: 4 (0.0%) Profile: D

Q3.2

request

The image displays a Wireshark packet capture of an FTP session. The packet list on the left shows several FTP-related packets, including a PORT command (425) and a LIST command (426). The packet details pane for frame 425 shows the File Transfer Protocol (FTP) structure, including the PORT command and the current working directory. The packet bytes pane shows the raw data of the packet. On the right, a terminal window shows the user's commands and the FTP server's responses, including the PORT command and the directory listing.

No.	Time	Source	Destination	Protocol	Length	Info
425	17.795755802	172.16.57.64	172.16.57.152	FTP	71	Request: PORT
426	17.795978303	172.16.57.152	172.16.57.64	FTP	100	Response: 257 "/" is the current directory
942	36.259804109	172.16.57.64	172.16.57.152	FTP	91	Request: PORT 172.16.57.64,215,0
944	36.260207693	172.16.57.152	172.16.57.64	FTP	117	Response: 200 PORT command successful
946	36.260282826	172.16.57.64	172.16.57.152	FTP	72	Request: LIST
950	36.261578348	172.16.57.152	172.16.57.64	FTP	105	Response: 150 Here comes the directory listing
954	36.261912287	172.16.57.152	172.16.57.64	FTP	90	Response: 226 Directory send OK.

Frame 425: 71 bytes on wire (568 bits), 71 bytes captured (568 bits) on interface 0
Ethernet II, Src: Micro-St 27:6e:b1 (8c:89:a5:27:6e:b1), Dst: HewlettP e7:16:ac (78:e7:d1:e7:16:ac)
Internet Protocol Version 4, Src: 172.16.57.64, Dst: 172.16.57.152
Transmission Control Protocol, Src Port: 50216, Dst Port: 21, Seq: 1, Ack: 1, Len: 5
File Transfer Protocol (FTP)
Request command: PORT
[Current working directory: /]
.....'n..E.
98 @..L...90..
0.....9.....
.....CZc
0.Pd..

enp3s0: <live capture in progr... Profile: Default

Response

The image displays a Wireshark packet capture of an FTP session, showing the response to the previous request. The packet list on the left shows the response packet (426). The packet details pane for frame 426 shows the File Transfer Protocol (FTP) structure, including the response code (257) and the current working directory. The packet bytes pane shows the raw data of the packet. On the right, a terminal window shows the user's commands and the FTP server's responses, including the response to the PORT command and the directory listing.

No.	Time	Source	Destination	Protocol	Length	Info
425	17.795755802	172.16.57.64	172.16.57.152	FTP	71	Request: PORT
426	17.795978303	172.16.57.152	172.16.57.64	FTP	100	Response: 257 "/" is the current directory
942	36.259804109	172.16.57.64	172.16.57.152	FTP	91	Request: PORT 172.16.57.64,215,0
944	36.260207693	172.16.57.152	172.16.57.64	FTP	117	Response: 200 PORT command successful
946	36.260282826	172.16.57.64	172.16.57.152	FTP	72	Request: LIST
950	36.261578348	172.16.57.152	172.16.57.64	FTP	105	Response: 150 Here comes the directory listing
954	36.261912287	172.16.57.152	172.16.57.64	FTP	90	Response: 226 Directory send OK.

Frame 426: 100 bytes on wire (800 bits), 100 bytes captured (800 bits) on interface 0
Ethernet II, Src: HewlettP e7:16:ac (78:e7:d1:e7:16:ac), Dst: Micro-St 27:6e:b1 (8c:89:a5:27:6e:b1)
Internet Protocol Version 4, Src: 172.16.57.152, Dst: 172.16.57.64
Transmission Control Protocol, Src Port: 21, Dst Port: 50216, Seq: 1, Ack: 6, Len: 34
File Transfer Protocol (FTP)
Response code: PATHNAME created (257)
Response arg: "/" is the current directory
[Current working directory: /]
.....'n..E.
VI.@..N'.9...
9e...L...
.....Cp..
CZ257 "/" is the current directory
.....
72 79 0d 0a

enp3s0: <live capture in progr... Profile: Default

Q 3.7

DNS

No.	Time	Source	Destination	Protocol	Length	Info
16	1.230834997	172.16.19.202	172.16.57.122	DNS	111	Standard query response 0xbdd A au
670	27.488106744	172.16.19.202	172.16.57.186	DNS	145	Standard query response 0xfaec No s
671	27.488121487	172.16.19.203	172.16.57.186	DNS	145	Standard query response 0xfaec No s

▶ Frame 16: 111 bytes on wire (888 bits), 111 bytes captured (888 bits) on interface 0

▶ Ethernet II, Src: cc:7f:76:13:3a:ff (cc:7f:76:13:3a:ff), Dst: WistronI_88:cd:c8 (98:ee:cb:88:cd:c8)

▶ Internet Protocol Version 4, Src: 172.16.19.202, Dst: 172.16.57.122

▶ User Datagram Protocol, Src Port: 53, Dst Port: 43597

▼ Domain Name System (response)

Transaction ID: 0xbdd

▼ Flags: 0x8180 Standard query response, No error

1... .. = Response: Message is a response

.000 0... .. = Opcode: Standard query (0)

....0... .. = Authoritative: Server is not an authority for domain

....0... .. = Truncated: Message is not truncated

....1... .. = Recursion desired: Do query recursively

....1... .. = Recursion available: Server can do recursive queries

....0... .. = Z: reserved (0)

....0... .. = Answer authenticated: Answer/authority portion was not authenticated by the server

....0... .. = Non-authenticated data: Unacceptable

....0000 = Reply code: No error (0)

Questions: 1

Answer RRs: 1

Authority RRs: 0

Additional RRs: 1

▼ Queries

▶ autopush.prod.mozaws.net: type A, class IN

▼ Answers

- autopush.prod.mozaws.net: type A, class IN, addr 44.235.189.138

Name: autopush.prod.mozaws.net

Type: A (Host Address) (1)

Class: IN (0x0001)

Time to live: 34

Data length: 4

Address: 44.235.189.138

▼ Additional records

▼ <Root>: type OPT

Name: <Root>

Type: OPT (41)

UDP payload size: 4000

Higher bits in extended RCODE: 0x00

EDNS0 version: 0

▼ Z: 0x0000

0... .. = DO bit: Cannot handle DNSSEC security RRs

.000 0000 0000 0000 = Reserved: 0x0000

Data length: 0

[Unsolicited: True]

0000	98 ee cb 88 cd c8 cc 7f 76 13 3a ff 08 00 45 00 v:....E.
0010	00 61 2a 28 00 00 7f 11 6b ff ac 10 13 ca ac 10	.a*(.... k.....
0020	39 7a 00 35 aa 4d 00 4d 26 f2 bb dd 81 80 00 01	9z.5.M.M &.....
0030	00 01 00 00 00 01 08 61 75 74 6f 70 75 73 68 04a utopush.
0040	70 72 6f 64 06 6d 6f 7a 61 77 73 03 6e 65 74 00	prod.moz aws.net.
0050	00 01 00 01 c0 0c 00 01 00 01 00 00 00 22 00 04".
0060	2c eb bd 8a 00 00 29 0f a0 00 00 00 00 00 00)

Text item (text), 16 bytes ... Profile: Default

Q 4.1

4.1a

The image displays a network topology and associated terminal outputs. The topology shows a central 'Ethernetswitch-1' connected to four PCs (PC-1, PC-2, PC-3, PC-4), each labeled as a 'VPCS' node.

Topology Summary

Node	Console
Ethernetswitch-1	telnet 127.0.0.1:5010
PC-1	telnet 127.0.0.1:5001
PC-2	telnet 127.0.0.1:5004
PC-3	telnet 127.0.0.1:5006
PC-4	telnet 127.0.0.1:5008

Servers Summary

- lplab-Lenovo-Product CPU 21.2%, RAM 72.4%

Terminal Outputs:

Terminal 1 (PC-1):

```
Escape character is '^['.  
PC-1>  
PC-1>  
PC-1>  
PC-1> ip 10.0.1.11/24  
Checking for duplicate address...  
10.0.1.11 is being used by MAC 00:50:79:66:68:01  
Address not changed  
PC-1> 
```

Terminal 2 (PC-2):

```
PC-2>  
PC-2> ip 10.0.1.11/24  
Checking for duplicate address...  
10.0.1.11 is being used by MAC 00:50:79:66:68:01  
Address not changed  
PC-2> ip 10.0.1.12/24  
Checking for duplicate address...  
PC1 : 10.0.1.12 255.255.255.0
```

Terminal 3 (PC-3):

```
PC-3>  
PC-3>  
PC-3>  
PC-3>  
PC-3> ip 10.0.1.11/24  
Checking for duplicate address...  
PC1 : 10.0.1.11 255.255.255.0  
PC-3> ip 10.0.1.13/24  
Checking for duplicate address...  
PC1 : 10.0.1.13 255.255.255.0  
PC-3> 
```

Terminal 4 (PC-4):

```
PC-4> ip 10.0.1.11/24  
Checking for duplicate address...  
PC1 : 10.0.1.11 255.255.255.0  
PC-4> ip 10.0.1.14/24  
Checking for duplicate address...  
PC1 : 10.0.1.14 255.255.255.0  
PC-4> 
```


4.1 a

```
PC-1> ping 10.0.1.12
84 bytes from 10.0.1.12 icmp_seq=1 ttl=64 time=0.258 ms
^[[A^C
PC-1> ping 10.0.1.13
```

4.1b

Apply a display filter ... <Ctrl-/> Expression...

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.0.1.11	10.0.1.12	ICMP	98	Echo (ping) request id=0x27f4, seq=1/256, ttl=64 (reply in 2)
2	0.000207	10.0.1.12	10.0.1.11	ICMP	98	Echo (ping) reply id=0x27f4, seq=1/256, ttl=64 (request in 1)
3	2.501999	10.0.1.11	10.0.1.13	ICMP	98	Echo (ping) request id=0x2af4, seq=1/256, ttl=64 (reply in 4)
4	2.592212	10.0.1.13	10.0.1.11	ICMP	98	Echo (ping) reply id=0x2af4, seq=1/256, ttl=64 (request in 3)
5	5.087987	10.0.1.11	10.0.1.14	ICMP	98	Echo (ping) request id=0x2cf4, seq=1/256, ttl=64 (reply in 6)
6	5.088175	10.0.1.14	10.0.1.11	ICMP	98	Echo (ping) reply id=0x2cf4, seq=1/256, ttl=64 (request in 5)
7	6.089139	10.0.1.11	10.0.1.14	ICMP	98	Echo (ping) request id=0x2df4, seq=2/512, ttl=64 (reply in 8)
8	6.089270	10.0.1.14	10.0.1.11	ICMP	98	Echo (ping) reply id=0x2df4, seq=2/512, ttl=64 (request in 7)
9	7.090276	10.0.1.11	10.0.1.14	ICMP	98	Echo (ping) request id=0x2ef4, seq=3/768, ttl=64 (reply in 10)
10	7.090471	10.0.1.14	10.0.1.11	ICMP	98	Echo (ping) reply id=0x2ef4, seq=3/768, ttl=64 (request in 9)
11	8.091468	10.0.1.11	10.0.1.14	ICMP	98	Echo (ping) request id=0x2ff4, seq=4/1024, ttl=64 (reply in 12)
12	8.091730	10.0.1.14	10.0.1.11	ICMP	98	Echo (ping) reply id=0x2ff4, seq=4/1024, ttl=64 (request in 11)
13	9.092557	10.0.1.11	10.0.1.14	ICMP	98	Echo (ping) request id=0x30f4, seq=5/1280, ttl=64 (reply in 14)

▶ Frame 2: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface 0
 ▶ Ethernet II, Src: Private_66:68:03 (00:50:79:66:68:03), Dst: Private_66:68:00 (00:50:79:66:68:00)
 ▼ Internet Protocol Version 4, Src: 10.0.1.12, Dst: 10.0.1.11
 0100 = Version: 4
 0101 = Header Length: 20 bytes (5)
 ▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
 Total Length: 84
 Identification: 0xf427 (62503)
 ▶ Flags: 0x0000
 Time to live: 64
 Protocol: ICMP (1)
 Header checksum: 0x706b [validation disabled]
 [Header checksum status: Unverified]
 Source: 10.0.1.12
 Destination: 10.0.1.11
 ▶ Internet Control Message Protocol

```
0000  00 50 79 66 68 00 00 50 79 66 68 03 08 00 45 00  Pyth...P yfh...E:
0010  00 54 f4 27 00 00 40 01 70 6b 0a 00 01 0c 0a 00  :T...@ pk.....
0020  01 0b 00 00 00 17 27 f4 00 01 08 09 0a 0b 0c 0d  .....
0030  0e 0f 10 11 12 13 14 15 16 17 18 19 1a 1b 1c 1d  .....
0040  1e 1f 20 21 22 23 24 25 26 27 28 29 2a 2b 2c 2d  ...!#$% &'()*+,-
0050  2e 2f 30 31 32 33 34 35 36 37 38 39 3a 3b 3c 3d  ./012345 6789:;<=
0060  3e 3f                                     >?

```

Ready to load or capture Packets: 14 · Displayed: 14 (100.0%) Profile: Default

4.1 c

```
PC-1> ping 10.0.1.12
84 bytes from 10.0.1.12 icmp_seq=1 ttl=64 time=0.298 ms
84 bytes from 10.0.1.12 icmp_seq=2 ttl=64 time=0.412 ms
84 bytes from 10.0.1.12 icmp_seq=3 ttl=64 time=0.447 ms
84 bytes from 10.0.1.12 icmp_seq=4 ttl=64 time=0.352 ms
84 bytes from 10.0.1.12 icmp_seq=5 ttl=64 time=0.402 ms
PC-1> █
```

4.1d

MAC Addresses

```
▼ Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: Private_66:68:00 (00:50:79:66:68:00)
  ▼ Destination: Private_66:68:00 (00:50:79:66:68:00)
    Address: Private_66:68:00 (00:50:79:66:68:00)
    .... ..0. .... = LG bit: Globally unique address (factory default)
    .... ..0 .... = IG bit: Individual address (unicast)
  ▼ Source: Private_66:68:01 (00:50:79:66:68:01)
    Address: Private_66:68:01 (00:50:79:66:68:01)
    .... ..0. .... = LG bit: Globally unique address (factory default)
    .... ..0 .... = IG bit: Individual address (unicast)
  Type: IPv4 (0x0800)
```

Showing ARP Table

```
PC-1> ping 10.0.1.12
84 bytes from 10.0.1.12 icmp_seq=1 ttl=64 time=0.298 ms
84 bytes from 10.0.1.12 icmp_seq=2 ttl=64 time=0.412 ms
84 bytes from 10.0.1.12 icmp_seq=3 ttl=64 time=0.447 ms
84 bytes from 10.0.1.12 icmp_seq=4 ttl=64 time=0.352 ms
84 bytes from 10.0.1.12 icmp_seq=5 ttl=64 time=0.402 ms

PC-1> ping 10.0.1.12
84 bytes from 10.0.1.12 icmp_seq=1 ttl=64 time=0.359 ms
^C
PC-1> ping 10.0.1.13
84 bytes from 10.0.1.13 icmp_seq=1 ttl=64 time=0.294 ms
84 bytes from 10.0.1.13 icmp_seq=2 ttl=64 time=0.373 ms
^C
PC-1> ping 10.0.1.14
84 bytes from 10.0.1.14 icmp_seq=1 ttl=64 time=0.353 ms
84 bytes from 10.0.1.14 icmp_seq=2 ttl=64 time=0.348 ms
^C
PC-1>
PC-1> show arp

00:50:79:66:68:03 10.0.1.12 expires in 85 seconds
00:50:79:66:68:02 10.0.1.13 expires in 113 seconds
00:50:79:66:68:01 10.0.1.14 expires in 116 seconds

PC-1> █
```

4.1e

No.	Time	Source	Destination	Protocol	Length	Info
18	67.457180	10.0.1.12	10.0.1.11	ICMP	98	Echo (ping) reply id=0x6bf4, seq=1/256, ttl=64 (request in 17)
19	68.458230	10.0.1.11	10.0.1.12	ICMP	98	Echo (ping) request id=0x6cf4, seq=2/512, ttl=64 (reply in 20)
20	68.458431	10.0.1.12	10.0.1.11	ICMP	98	Echo (ping) reply id=0x6cf4, seq=2/512, ttl=64 (request in 19)
21	69.459395	10.0.1.11	10.0.1.12	ICMP	98	Echo (ping) request id=0x6df4, seq=3/768, ttl=64 (reply in 22)
22	69.459573	10.0.1.12	10.0.1.11	ICMP	98	Echo (ping) reply id=0x6df4, seq=3/768, ttl=64 (request in 21)
23	70.460532	10.0.1.11	10.0.1.12	ICMP	98	Echo (ping) request id=0x6ef4, seq=4/1024, ttl=64 (reply in 24)
24	70.460697	10.0.1.12	10.0.1.11	ICMP	98	Echo (ping) reply id=0x6ef4, seq=4/1024, ttl=64 (request in 23)
25	71.461735	10.0.1.11	10.0.1.12	ICMP	98	Echo (ping) request id=0x6ff4, seq=5/1280, ttl=64 (reply in 26)
26	71.461920	10.0.1.12	10.0.1.11	ICMP	98	Echo (ping) reply id=0x6ff4, seq=5/1280, ttl=64 (request in 25)
27	93.339974	10.0.1.11	10.0.1.12	ICMP	98	Echo (ping) request id=0x85f4, seq=1/256, ttl=64 (reply in 28)
28	93.340162	10.0.1.12	10.0.1.11	ICMP	98	Echo (ping) reply id=0x85f4, seq=1/256, ttl=64 (request in 27)
29	95.675993	Private_66:68:...	Broadcast	ARP	64	who has 10.0.1.13? Tell 10.0.1.11 [ETHERNET FRAME CHECK SEQUENCE INCOR...
30	95.676182	Private_66:68:...	Private_66:68:...	ARP	64	10.0.1.13 is at 00:50:79:66:68:02 [ETHERNET FRAME CHECK SEQUENCE INCOR...
31	95.677024	10.0.1.11	10.0.1.13	ICMP	98	Echo (ping) request id=0x87f4, seq=1/256, ttl=64 (reply in 32)
32	95.677168	10.0.1.13	10.0.1.11	ICMP	98	Echo (ping) reply id=0x87f4, seq=1/256, ttl=64 (request in 31)
33	96.678237	10.0.1.11	10.0.1.13	ICMP	98	Echo (ping) request id=0x88f4, seq=2/512, ttl=64 (reply in 34)
34	96.678398	10.0.1.13	10.0.1.11	ICMP	98	Echo (ping) reply id=0x88f4, seq=2/512, ttl=64 (request in 33)
35	98.459997	Private_66:68:...	Broadcast	ARP	64	who has 10.0.1.14? Tell 10.0.1.11 [ETHERNET FRAME CHECK SEQUENCE INCOR...
36	98.460211	Private_66:68:...	Private_66:68:...	ARP	64	10.0.1.14 is at 00:50:79:66:68:01 [ETHERNET FRAME CHECK SEQUENCE INCOR...
37	98.461058	10.0.1.11	10.0.1.14	ICMP	98	Echo (ping) request id=0x8af4, seq=1/256, ttl=64 (reply in 38)
38	98.461214	10.0.1.14	10.0.1.11	ICMP	98	Echo (ping) reply id=0x8af4, seq=1/256, ttl=64 (request in 37)
39	99.462218	10.0.1.11	10.0.1.14	ICMP	98	Echo (ping) request id=0x8bf4, seq=2/512, ttl=64 (reply in 40)
40	99.462388	10.0.1.14	10.0.1.11	ICMP	98	Echo (ping) reply id=0x8bf4, seq=2/512, ttl=64 (request in 39)

▶ Frame 38: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface 0

▼ Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: Private_66:68:00 (00:50:79:66:68:00)

▼ Destination: Private_66:68:00 (00:50:79:66:68:00)

Address: Private_66:68:00 (00:50:79:66:68:00)

.... ..0. = LG bit: Globally unique address (factory default)

.... ...0 = IG bit: Individual address (unicast)

▼ Source: Private_66:68:01 (00:50:79:66:68:01)

Address: Private_66:68:01 (00:50:79:66:68:01)

.... ..0. = LG bit: Globally unique address (factory default)

.... ...0 = IG bit: Individual address (unicast)

Type: IPv4 (0x0800)


```

0000 00 50 79 66 68 00 00 50 79 66 68 01 08 00 45 00  Pyth..P yfh...E-
0010 00 54 f4 8a 00 00 40 01 70 06 0a 00 01 0e 0a 00  T....@. p.....
0020 01 0b 00 00 9d 16 8a f4 00 01 08 00 0a 0b 0c 0d  .....
0030 0e 0f 10 11 12 13 14 15 16 17 18 19 1a 1b 1c 1d  .....
0040 1e 1f 20 21 22 23 24 25 26 27 28 29 2a 2b 2c 2d  ..!#$%&()*+,-
0050 2e 2f 30 31 32 33 34 35 36 37 38 39 3a 3b 3c 3d  ./012345 6789;<=
0060 3e 3f                                     >?

```

Header checksum status (ip.checksum.status) Packets: 40 · Displayed: 40 (100.0%) Profile: Default

Exercises

1. What is the destination MAC address of an ARP Request packet?

Ans: It is the MAC address of the device to which the ARP Request packet is being sent

For example: Destination: Private_66:68:01 (00:50:79:66:68:01) for 10.0.0.4

2. What are the different Type Field values in the Ethernet headers that you observed?

Ans:

Ethernet II, Src: Private_66:68:02 (00:50:79:66:68:02), Dst: Private_66:68:00 (00:50:79:66:68:00)

Destination: Private_66:68:00 (00:50:79:66:68:00)

Address: Private_66:68:00 (00:50:79:66:68:00)

.... ..0. = LG bit: Globally unique address (factory default)

.... ...0 = IG bit: Individual address (unicast)

Source: Private_66:68:02 (00:50:79:66:68:02)

Address: Private_66:68:02 (00:50:79:66:68:02)

.... ..0. = LG bit: Globally unique address (factory default)

.... ..0 = IG bit: Individual address (unicast)

Type: IPv4 (0x0800)

3. Use the captured data to analyse the process in which ARP acquires the MAC address for IP address 10.0.1.12.

Ans: MAC Address: Private_66:68:03 (00:50:79:66:68:03)

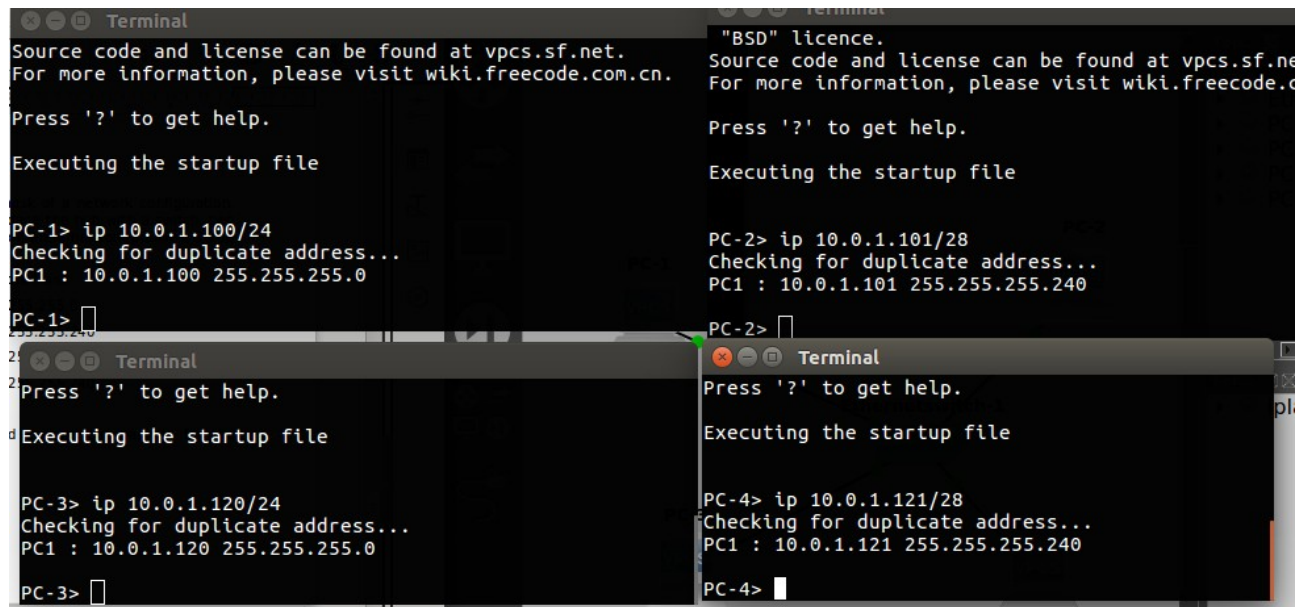
4. Use your output data and ping results to explain what happened in each of the ping commands.

Ans: When the pings were made to other devices, those devices showed up in the ARP table of the source computer

5. Which ping operations were successful, and which were unsuccessful? Why?

Ans: All pings were successful.

Q 4.2



The image shows four terminal windows, each representing a different PC in a network. Each terminal has a title bar with a red, yellow, and green button icon and the word "Terminal".

- PC-1:** The terminal shows the command `ip 10.0.1.100/24` being entered. The output indicates that the address 10.0.1.100 is available on the 255.255.255.0 network.
- PC-2:** The terminal shows the command `ip 10.0.1.101/28` being entered. The output indicates that the address 10.0.1.101 is available on the 255.255.255.240 network.
- PC-3:** The terminal shows the command `ip 10.0.1.120/24` being entered. The output indicates that the address 10.0.1.120 is available on the 255.255.255.0 network.
- PC-4:** The terminal shows the command `ip 10.0.1.121/28` being entered. The output indicates that the address 10.0.1.121 is available on the 255.255.255.240 network.

4.2a

```
PC-1> ping 10.0.1.120
```

4.2b

```
84 bytes from 10.0.1.120 icmp_seq=1 ttl=64 time=0.255 ms
84 bytes from 10.0.1.120 icmp_seq=2 ttl=64 time=0.338 ms
84 bytes from 10.0.1.120 icmp_seq=3 ttl=64 time=0.324 ms
```

4.2 c

```
PC-1> ping 10.0.1.101
84 bytes from 10.0.1.101 icmp_seq=1 ttl=64 time=0.235 ms
84 bytes from 10.0.1.101 icmp_seq=2 ttl=64 time=0.415 ms
84 bytes from 10.0.1.101 icmp_seq=3 ttl=64 time=0.323 ms
84 bytes from 10.0.1.101 icmp_seq=4 ttl=64 time=0.350 ms
84 bytes from PC-1> ping 10.0.1.121
10.0.1.121 icmp_seq=1 timeout
10.0.1.121 icmp_seq=2 timeout
10.0.1.121 icmp_seq=3 timeout
10.0.1.121 icmp_seq=4 timeout
10.0.1.121 icmp_seq=5 timeout
```

4.2d

```
PC-4> ping 10.0.1.100
No gateway found
```

4.2e

```
PC-2> ping 10.0.1.121
No gateway found
```

4.2f

```
PC-2> ping 10.0.1.120
No gateway found
```

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	Private_66:68:...	Broadcast	ARP	64	Gratuitous ARP for 10.0.1.120 (Request) [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
2	1.000856	Private_66:68:...	Broadcast	ARP	64	Gratuitous ARP for 10.0.1.120 (Request) [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
3	1.715905	Private_66:68:...	Broadcast	ARP	64	Who has 10.0.1.121? Tell 10.0.1.100 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
4	1.716100	Private_66:68:...	Private_66:68:...	ARP	64	10.0.1.121 is at 00:50:79:66:68:02 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
5	1.716944	10.0.1.100	10.0.1.121	ICMP	98	Echo (ping) request id=8x57f8, seq=1/256, ttl=64 (reply in 11)
6	1.717118	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
7	2.001345	Private_66:68:...	Broadcast	ARP	64	Gratuitous ARP for 10.0.1.120 (Request) [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
8	2.717299	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
9	3.717496	10.0.1.100	10.0.1.121	ICMP	98	Echo (ping) request id=8x59f8, seq=2/512, ttl=64 (reply in 17)
10	3.718028	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
11	4.718801	10.0.1.121	10.0.1.100	ICMP	98	Echo (ping) reply id=8x57f8, seq=1/256, ttl=64 (request in 5)
12	4.718899	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
13	5.718638	10.0.1.100	10.0.1.121	ICMP	98	Echo (ping) request id=8x5bf8, seq=3/768, ttl=64 (reply in 22)
14	5.719114	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
15	6.719838	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
16	7.719257	10.0.1.100	10.0.1.121	ICMP	98	Echo (ping) request id=8x5df8, seq=4/1024, ttl=64 (reply in 26)
17	7.720866	10.0.1.121	10.0.1.100	ICMP	98	Echo (ping) reply id=8x59f8, seq=2/512, ttl=64 (request in 9)
18	7.721020	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
19	8.721537	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
20	9.719340	10.0.1.100	10.0.1.121	ICMP	98	Echo (ping) request id=8x5ff8, seq=5/1280, ttl=64 (reply in 30)
21	9.722030	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
22	10.722412	10.0.1.121	10.0.1.100	ICMP	98	Echo (ping) reply id=8x5bf8, seq=3/768, ttl=64 (request in 13)
23	10.722511	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
24	11.723327	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
25	12.724229	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
26	13.724355	10.0.1.121	10.0.1.100	ICMP	98	Echo (ping) reply id=8x5df8, seq=4/1024, ttl=64 (request in 16)
27	13.724474	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
28	14.724658	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
29	15.725514	Private_66:68:...	Broadcast	ARP	64	Who has 0.0.0.0? Tell 10.0.1.121 [ETHERNET FRAME CHECK SEQUENCE INCORRECT]
30	16.725913	10.0.1.121	10.0.1.100	ICMP	98	Echo (ping) reply id=8x5ff8, seq=5/1280, ttl=64 (request in 20)

▶ Frame 12: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface 0

▶ **Ethernet II, Src: Private_66:68:02 (00:50:79:66:68:02), Dst: Broadcast (ff:ff:ff:ff:ff:ff)**

▶ Address Resolution Protocol (request)

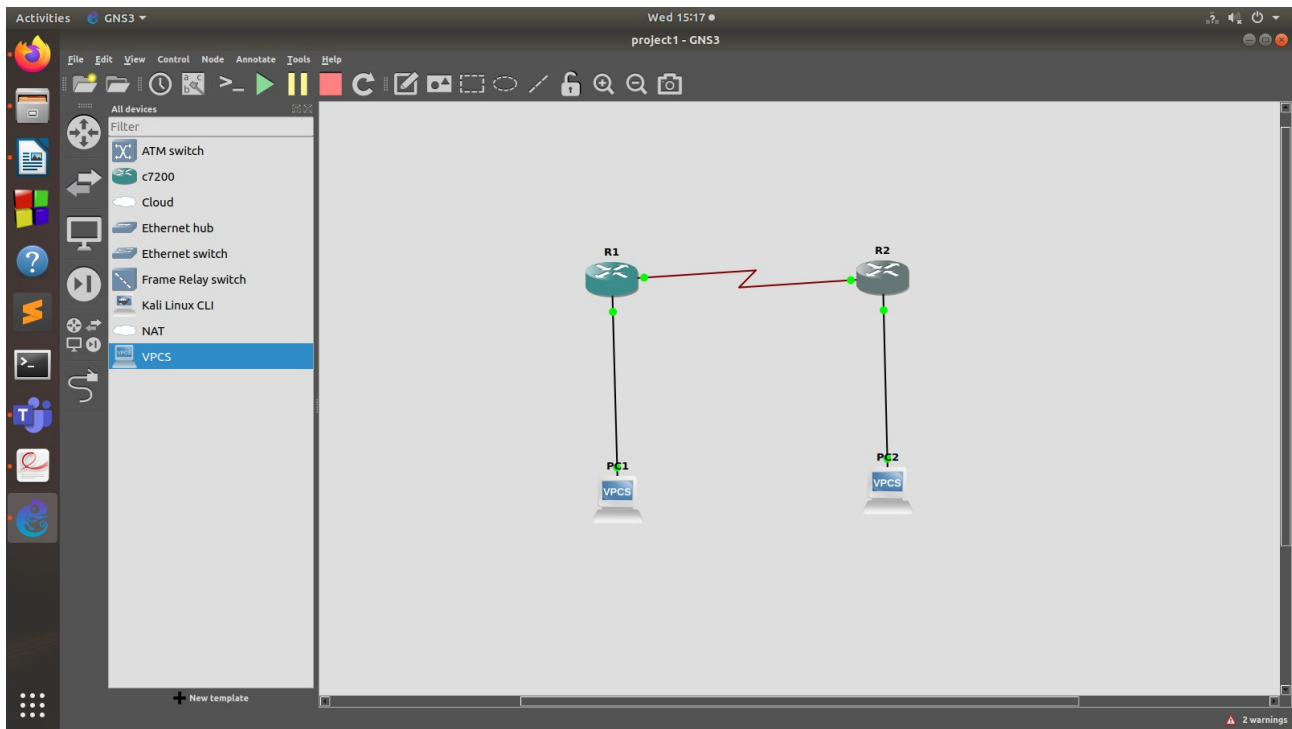
0000 ff ff ff ff ff ff 00 50 79 66 68 02 08 06 00 01P yfh....

0010 08 00 00 04 00 01 00 50 79 66 68 02 0a 00 01 79P yfh....y

0020 ff ff ff ff ff ff 00 00 00 00 00 00 00 00 00 00

0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

4.6) a)



The console output for PC1 shows the following commands and results:

```
File Edit View Search Terminal Help
*10.0.0.1 icmp_seq=5 ttl=255 time=6.214 ms (ICMP type:3, code:1, Destination host unreachable)

PC1> show arp
arp table is empty

PC1> ping 30.0.0.10
*10.0.0.1 icmp_seq=1 ttl=255 time=9.272 ms (ICMP type:3, code:1, Destination host unreachable)
*10.0.0.1 icmp_seq=2 ttl=255 time=6.377 ms (ICMP type:3, code:1, Destination host unreachable)
*10.0.0.1 icmp_seq=3 ttl=255 time=6.169 ms (ICMP type:3, code:1, Destination host unreachable)
*10.0.0.1 icmp_seq=4 ttl=255 time=6.101 ms (ICMP type:3, code:1, Destination host unreachable)
*10.0.0.1 icmp_seq=5 ttl=255 time=7.382 ms (ICMP type:3, code:1, Destination host unreachable)

PC1> show arp
ca:01:77:10:00:00 10.0.0.1 expires in 113 seconds
PC1>
```

The right sidebar shows the 'Topology Summary' with the following nodes:

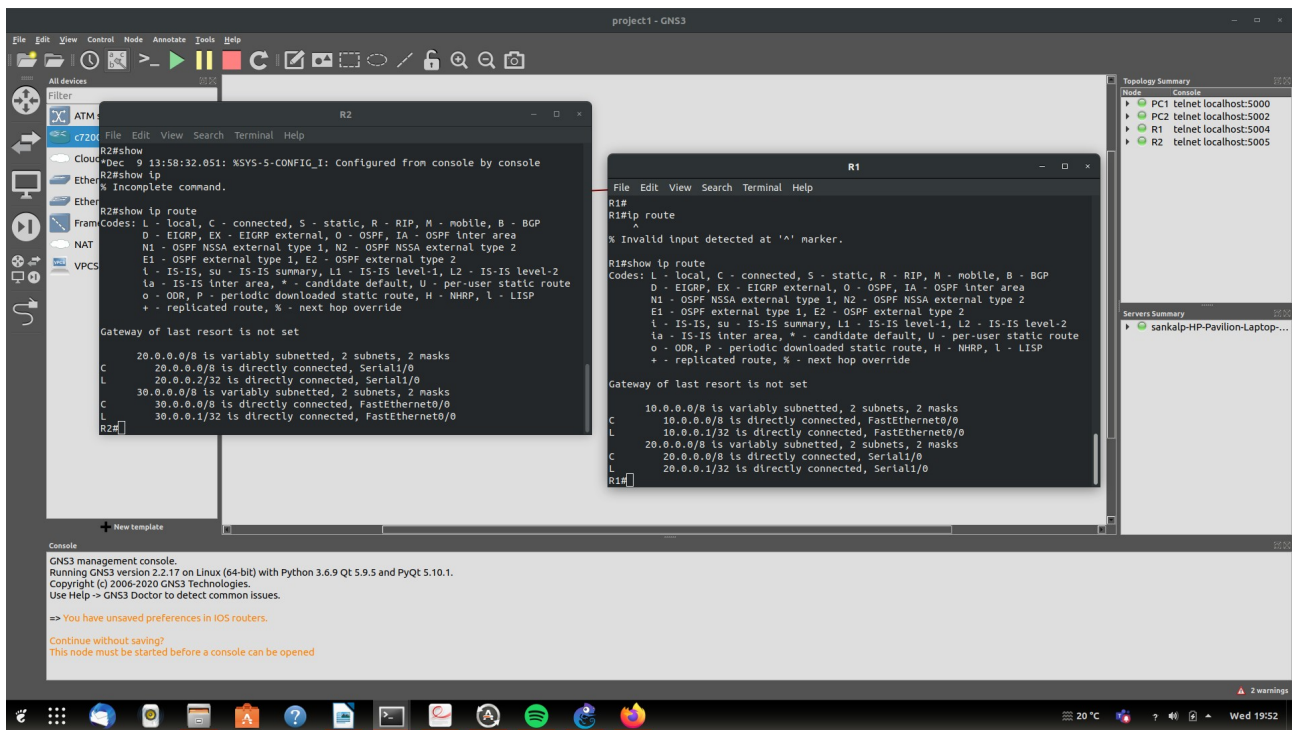
- PC1 telnet localhost:5000
- PC2 telnet localhost:5002
- R1 telnet localhost:5004
- R2 telnet localhost:5005

The bottom console shows the GNS3 management console output:

```
GNS3 management console.
Running GNS3 version 2.2.17 on Linux (64-bit) with Python 3.6.9 Qt 5.9.5 and PyQt 5.10.1.
Copyright (c) 2006-2020 GNS3 Technologies.
Use Help -> GNS3 Doctor to detect common issues.

=> You have unsaved preferences in IOS routers.

Continue without saving?
This node must be started before a console can be opened
```



b)

