LAB 5

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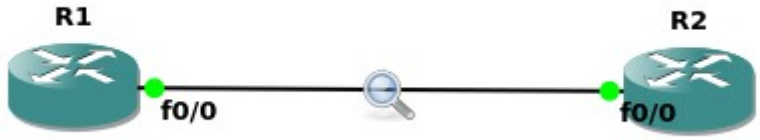
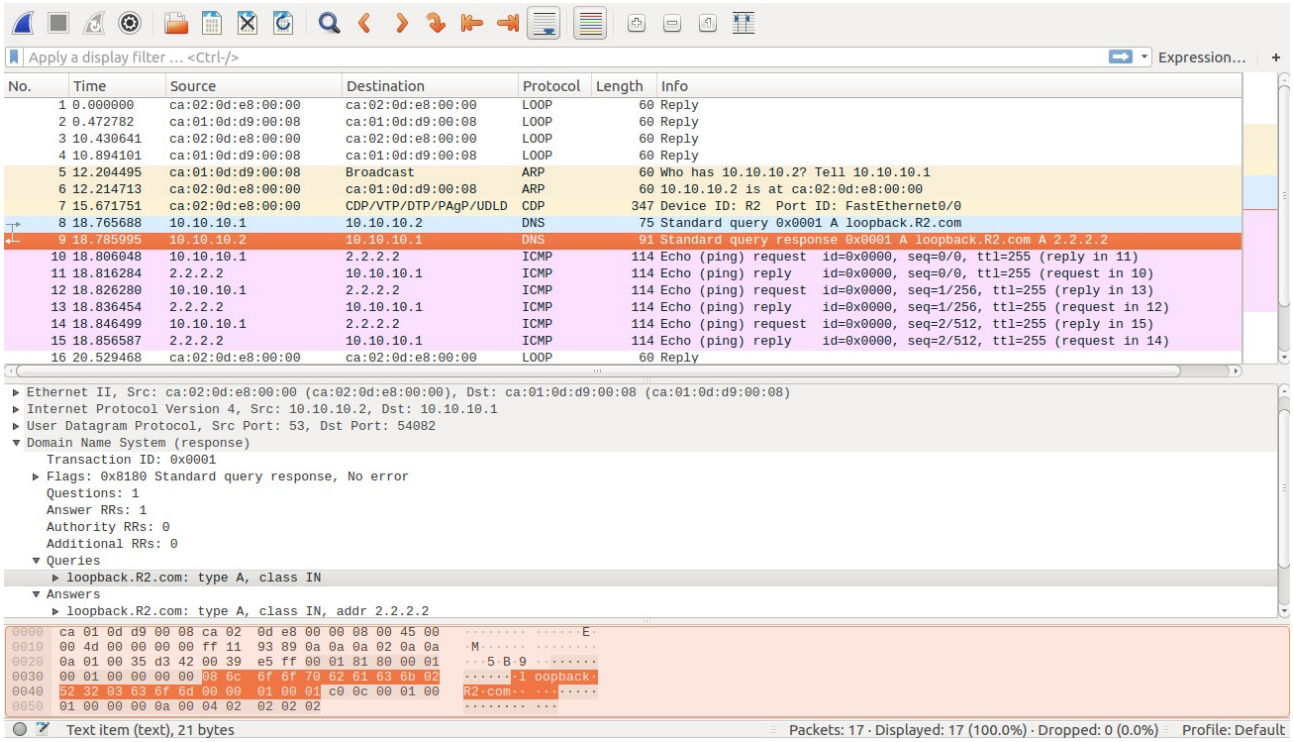
Batch B3

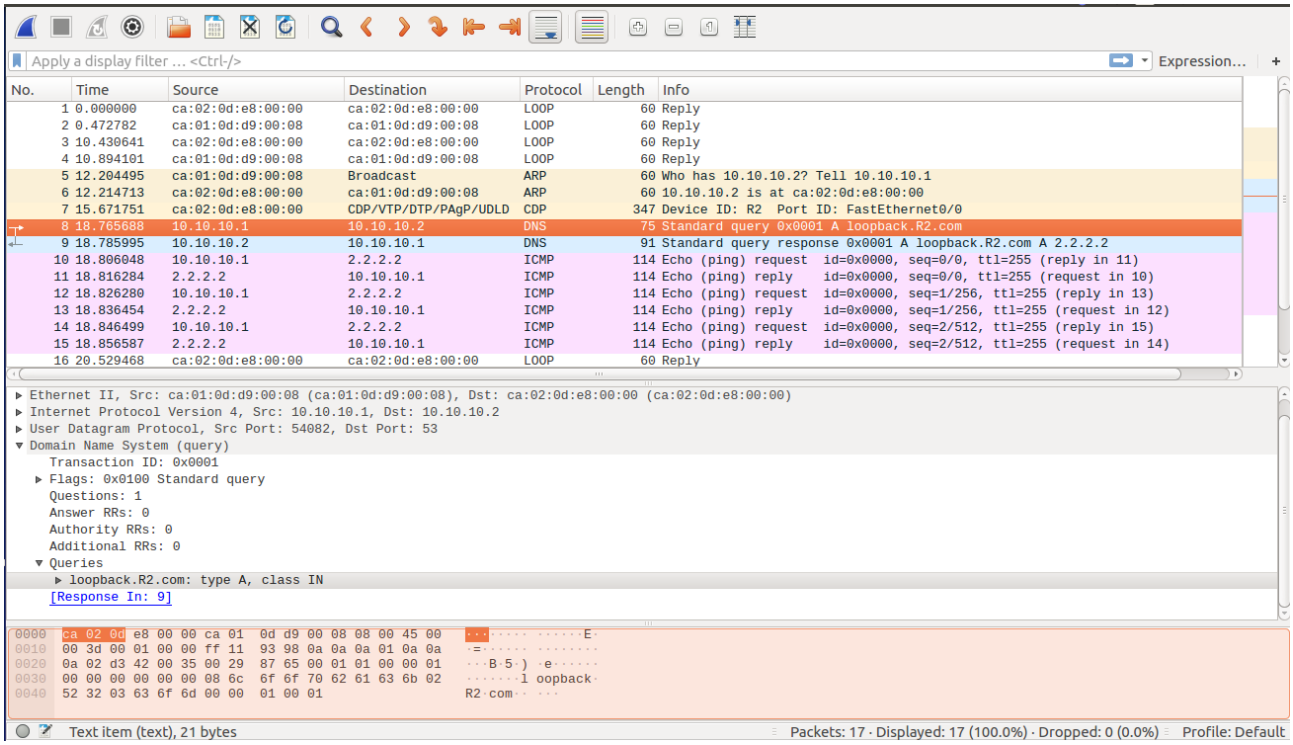
Manual Lab 7 Exercise:
1) Configure the below topology to setup DNS server. R1 will use R2 as DNS server to make DNS resolutions.



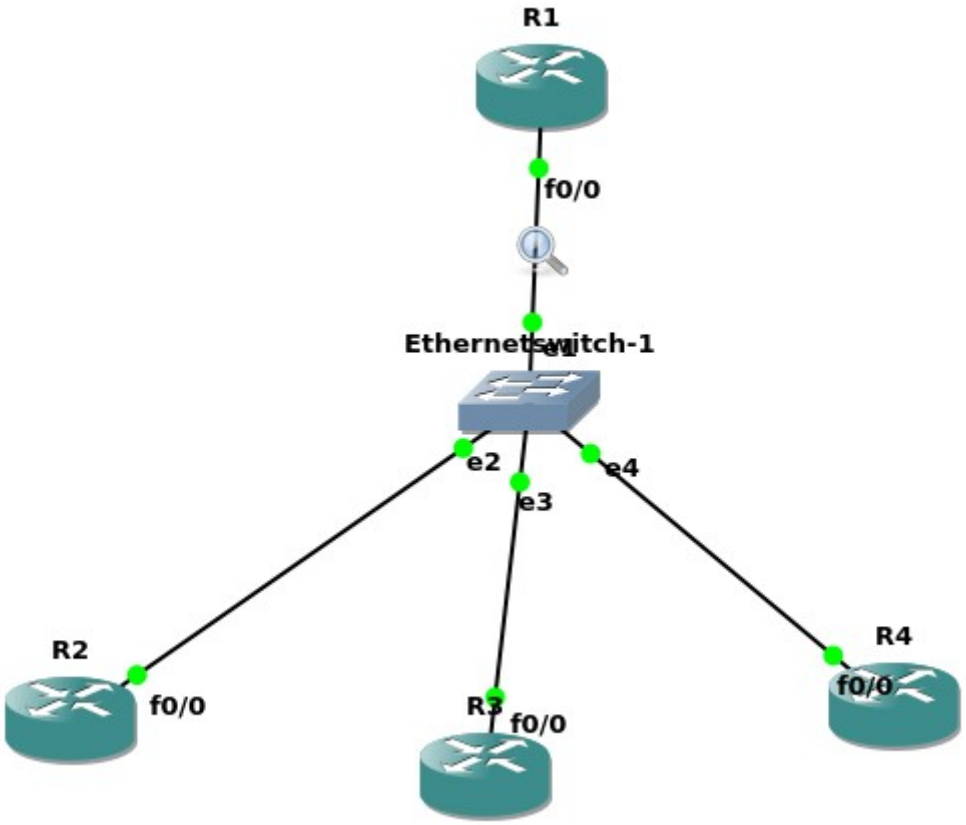
DNS query response:



DNS query:



2) Configure the below DNS Server and DNS Client. Test the setup. Analyze the Interaction.



Configuring R1 ip and hostname:

```
R1#enable
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#hostname R1
R1(config)#int f0/0
R1(config-if)#ip address 10.0.10.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#do wr
*Nov  6 13:54:32.467: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R1(config-if)#do wr

*Nov  6 13:54:32.467: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Administrative State Down
*Nov  6 13:54:33.467: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
Building configuration...
[OK]
R1(config-if)#end
```

Setting up R1 as DNS Server and pinging to check if it is correct:

```
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ip dns server
R1(config)#ip host loopback.R1.com 2.2.2.2
R1(config)#int loopback 1
R1(config-if)#ip a
*Nov  6 13:59:42.483: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up
R1(config-if)#ip address 2.2.2.2 255.255.255.255
R1(config-if)#end
R1#
*Nov  6 13:59:57.139: %SYS-5-CONFIG_I: Configured from console by console
R1#ping loopback.R1.com

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/4 ms
R1#
```

Configuring R2 ip and hostname:

Setup R2 to resolve hostnames using R1 and pinging so we can capture packets:

```
R2#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ip domain lookup
R2(config)#ip name-server 10.0.10.1
R2(config)#ip route 0.0.0.0 0.0.0.0 10.0.10.1
R2(config)#end
R2#
*Nov  6 14:00:57.111: %SYS-5-CONFIG_I: Configured from console by console
R2#ping loopback.R1.com

Translating "loopback.R1.com"...domain server (10.0.10.1) [OK]

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 56/60/64 ms
R2#
R2(config-if)#no shut
R2(config-if)#do wr
*Nov  6 13:55:00.607: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R2(config-if)#do wr
*Nov  6 13:55:00.607: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Administrative State Down
*Nov  6 13:55:01.607: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R2(config-if)#do wr
Building configuration...
[OK]
R2(config-if)#end
R2#
*Nov  6 13:55:07.655: %SYS-5-CONFIG_I: Configured from console by console
```

Configuring R3 ip and hostname:

```
R3#
R3#enable
R3#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#hostname R3
R3(config)#int f0/0
R3(config-if)#ip address 10.0.10.3 255.255.255.0
R3(config-if)#no shut
R3(config-if)#do wr
*Nov  6 13:55:42.279: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R3(config-if)#do wr
Building configuration...

*Nov  6 13:55:42.279: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Administrative State Down
*Nov  6 13:55:43.311: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up[OK]
R3(config-if)#end
R3#
*Nov  6 13:55:48.467: %SYS-5-CONFIG_I: Configured from console by console
```

Setup R3 to resolve hostnames using R1 and pinging so we can capture packets:

```
R3#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ip domain lookup
R3(config)#ip name-server 10.0.10.1
R3(config)#ip route 0.0.0.0 0.0.0.0 10.0.10.1
R3(config)#end
R3#
*Nov  6 14:02:29.383: %SYS-5-CONFIG_I: Configured from console by console
R3#ping loopback.R1.com

Translating "loopback.R1.com"...domain server (10.0.10.1) [OK]

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 56/59/64 ms
R3#
```

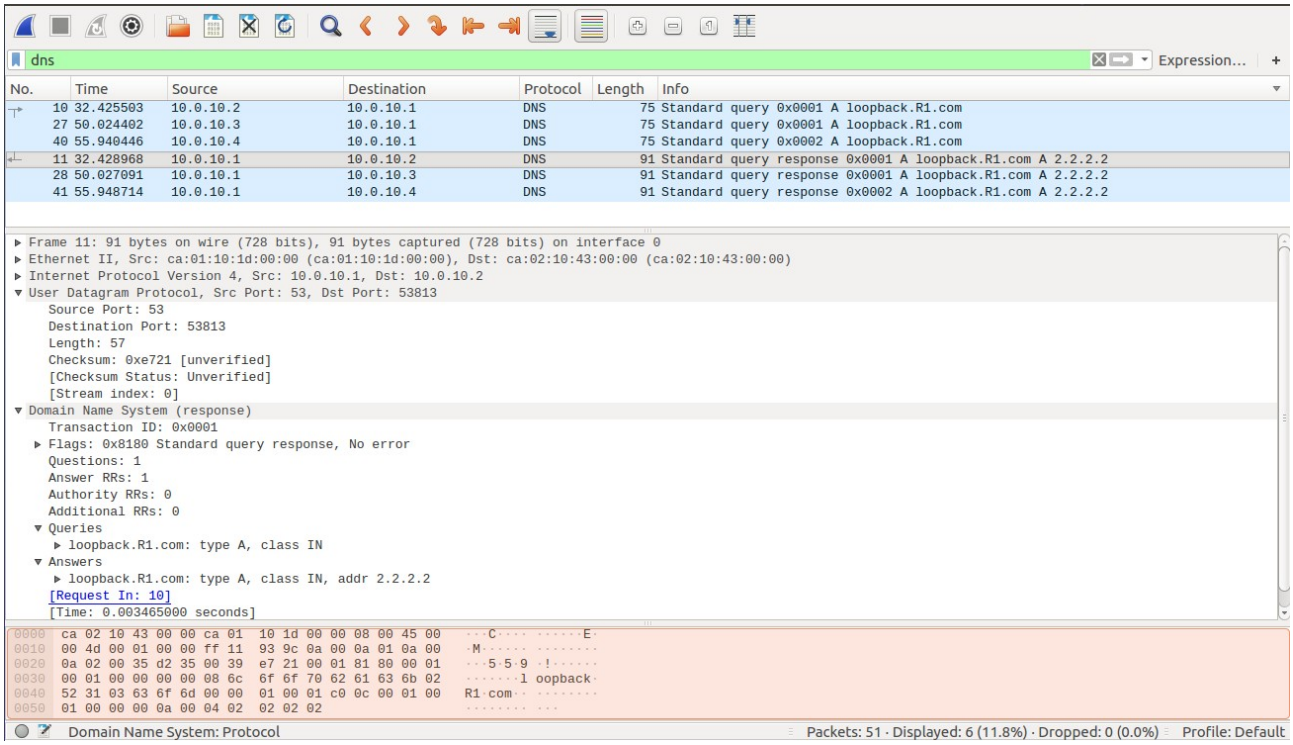
Configuring R4 ip and hostname:

```
R4#enable
R4#cofig t
     ^
% Invalid input detected at '^' marker.

R4#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#hostname R4
R4(config)#int f0/0
R4(config-if)#ip address 10.0.10.4 255.255.255.0
R4(config-if)#no shut
R4(config-if)#do wr
Building configuration...
[OK]
R4(config-if)#
*Nov  6 13:56:02.435: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Nov  6 13:56:02.435: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Administrative State Down
R4(config-if)#en
*Nov  6 13:56:03.435: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R4(config-if)#end
R4#
*Nov  6 13:56:05.303: %SYS-5-CONFIG_I: Configured from console by console
```

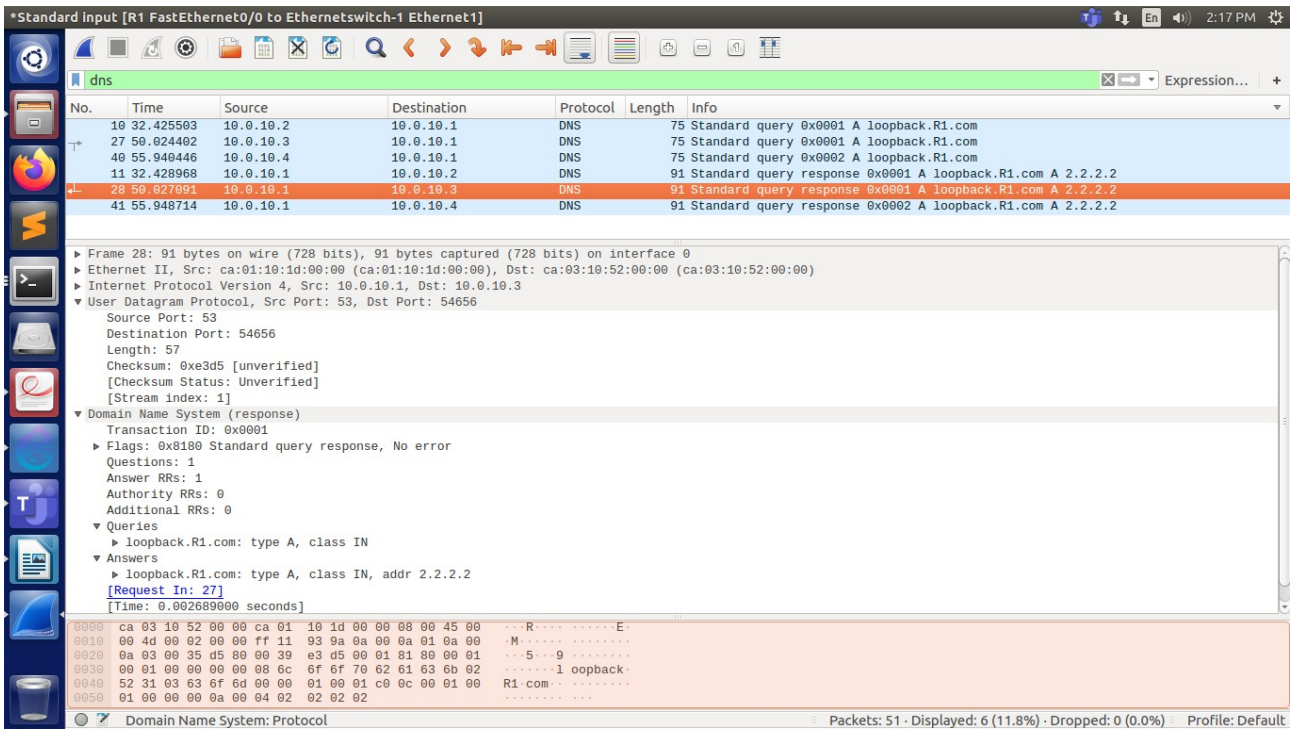
Setup R4 to resolve hostnames using R1 and pinging so we can capture packets:

```
R4#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#ip domain lookup
R4(config)#ip name-server 10.0.10.1
R4(config)#ip route 0.0.0.0 0.0.0.0 10.0.10.1
R4(config)#end
R4#
*Nov  6 14:02:36.071: %SYS-5-CONFIG_I: Configured from console by console
R4#ping loopback.R1.com

Translating "loopback.R1.com"...domain server (10.0.10.1) [OK]

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 60/60/64 ms
R4#ping loopback.R1.com

Translating "loopback.R1.com"...domain server (10.0.10.1) [OK]

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/55/60 ms
R4#
```

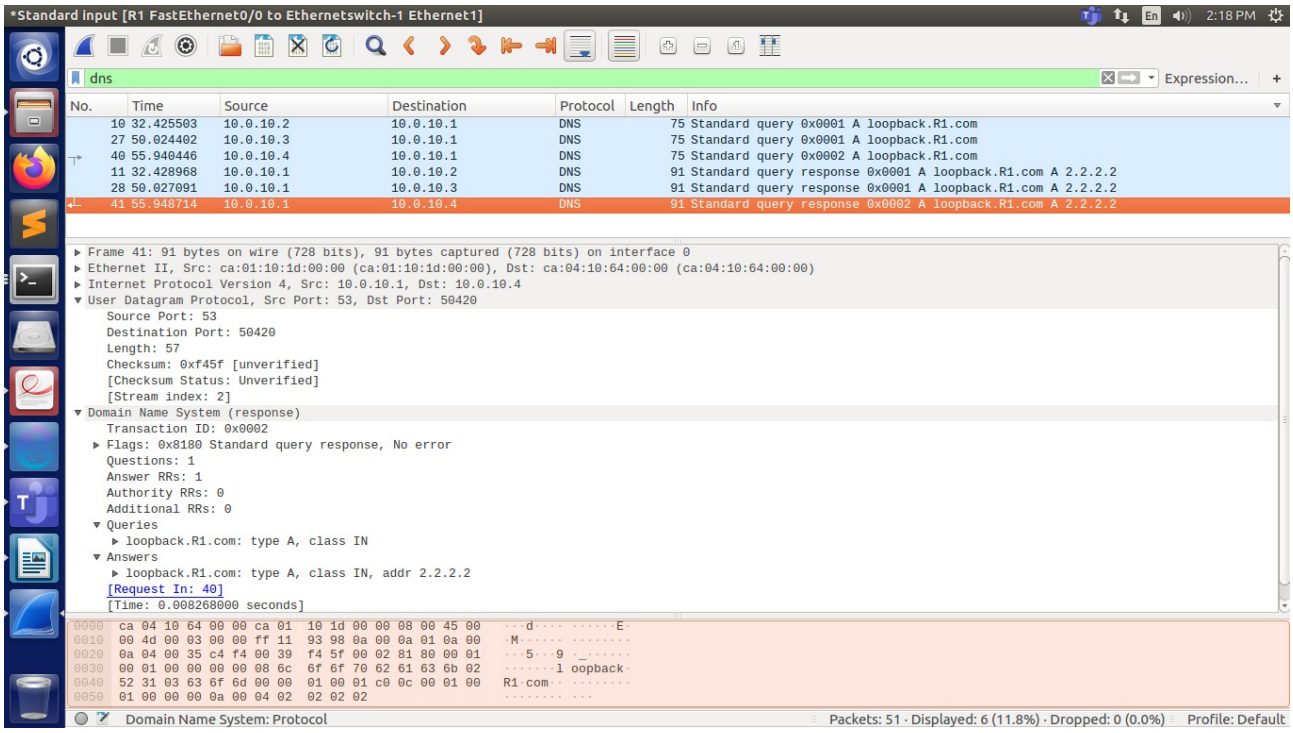
DNS query response when we ping from R2 to R1:



DNS query response when we ping from R3 to R1:

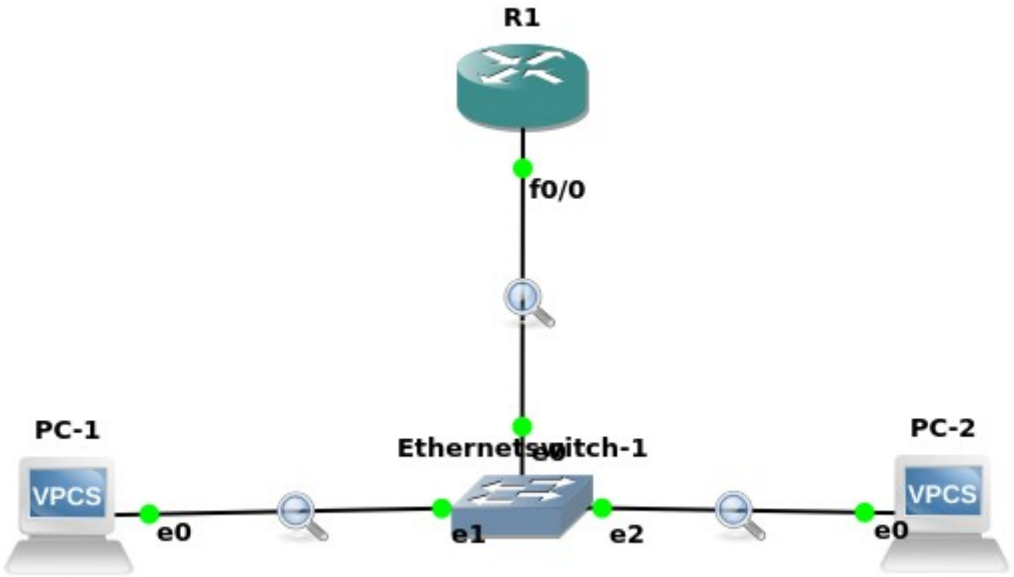


DNS query response when we ping from R4 to R1:



Manual Lab 8 Exercise:

1) Configure two VMs that will be used to test connectivity from end to end and R1 will serve as a DHCP server to distribute IP addresses.



Configure R1 as DHCP server:

```
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#IP dhcp pool R1
R1(dhcp-config)#Network 192.168.3.0 255.255.255.0
R1(dhcp-config)#Default-router 192.168.3.1
R1(dhcp-config)#exit
```

Configure interface f0/0:

```
R1(config)#int f0/0
R1(config-if)#no shut
R1(config-if)#ip
*Nov  6 14:38:30.319: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R1(config-if)#ip addres
*Nov  6 14:38:30.319: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Administrative State Down
*Nov  6 14:38:31.319: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config-if)#ip address 192.168.3.1 255.255.255.0
R1(config-if)#exit
R1(config)#exit
R1#
*Nov  6 14:39:10.123: %SYS-5-CONFIG_I: Configured from console by console
R1#
```

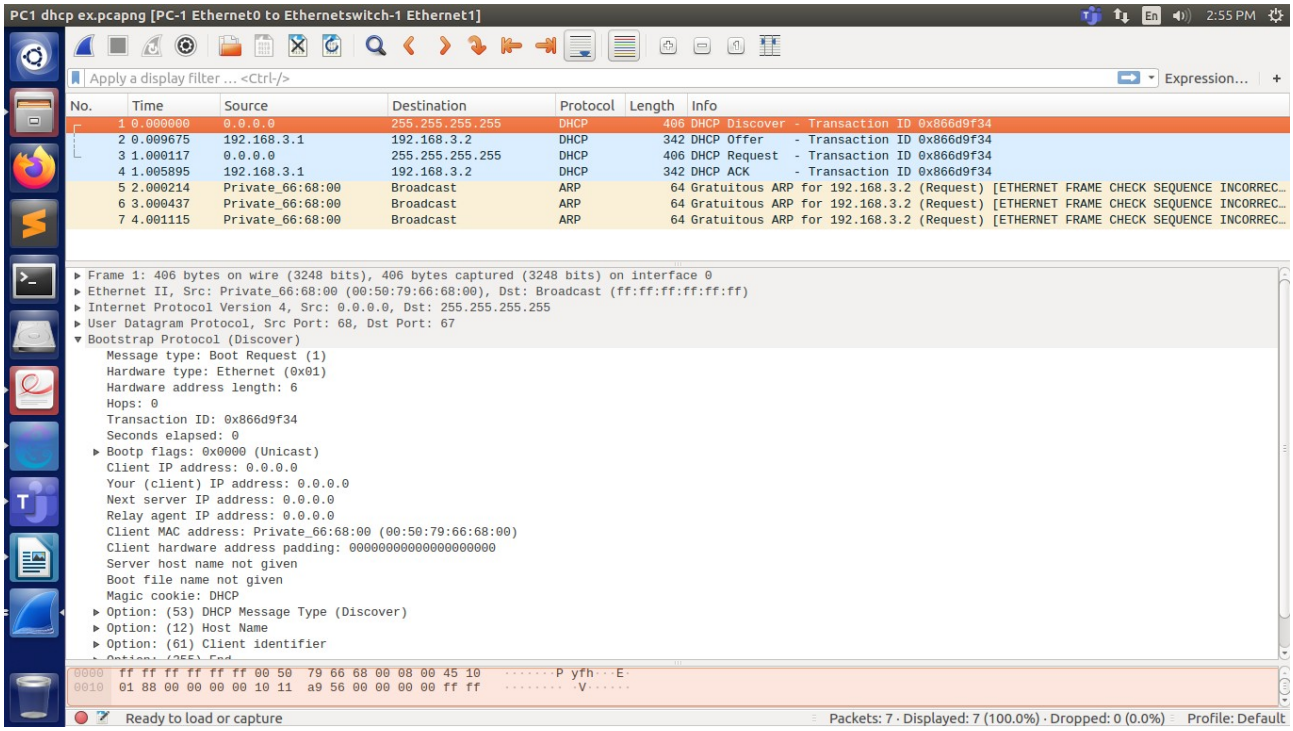
PC1 terminal:

```
PC-1> dhcp
DORA IP 192.168.3.2/24 GW 192.168.3.1

PC-1>
```

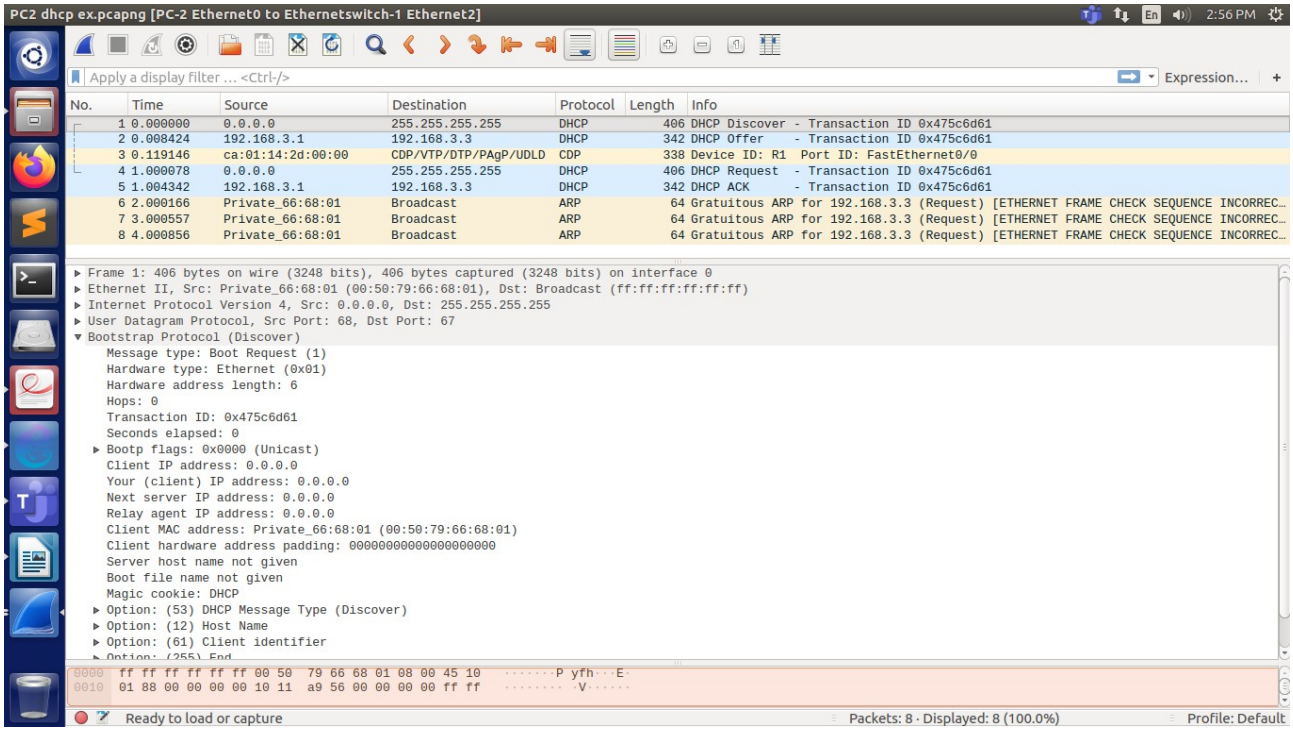
PC2 terminal:

```
PC-2> dhcp
DORA IP 192.168.3.3/24 GW 192.168.3.1

PC-2>
```

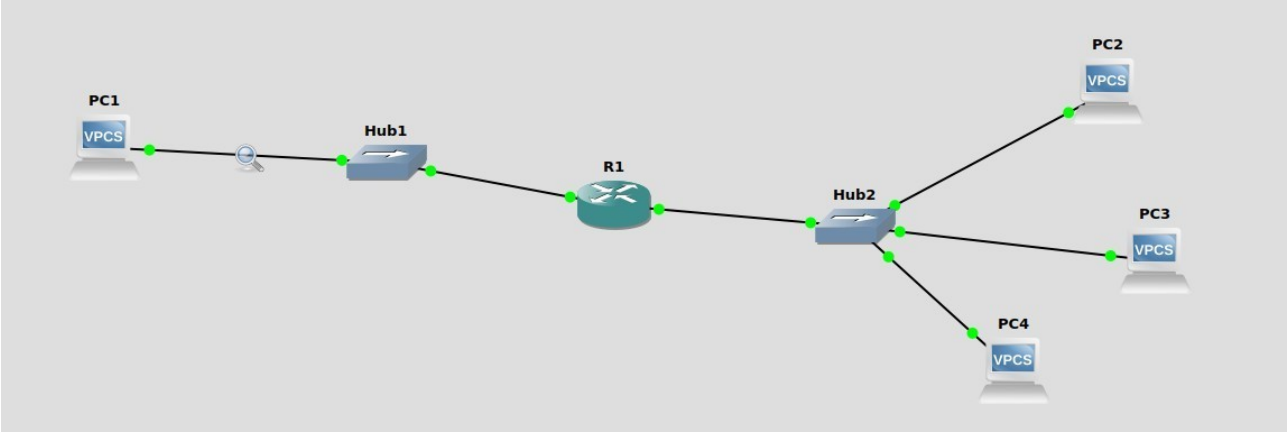
Traffic patterns between PC1 and DHCP router:



Traffic patterns between PC2 and DHCP router:



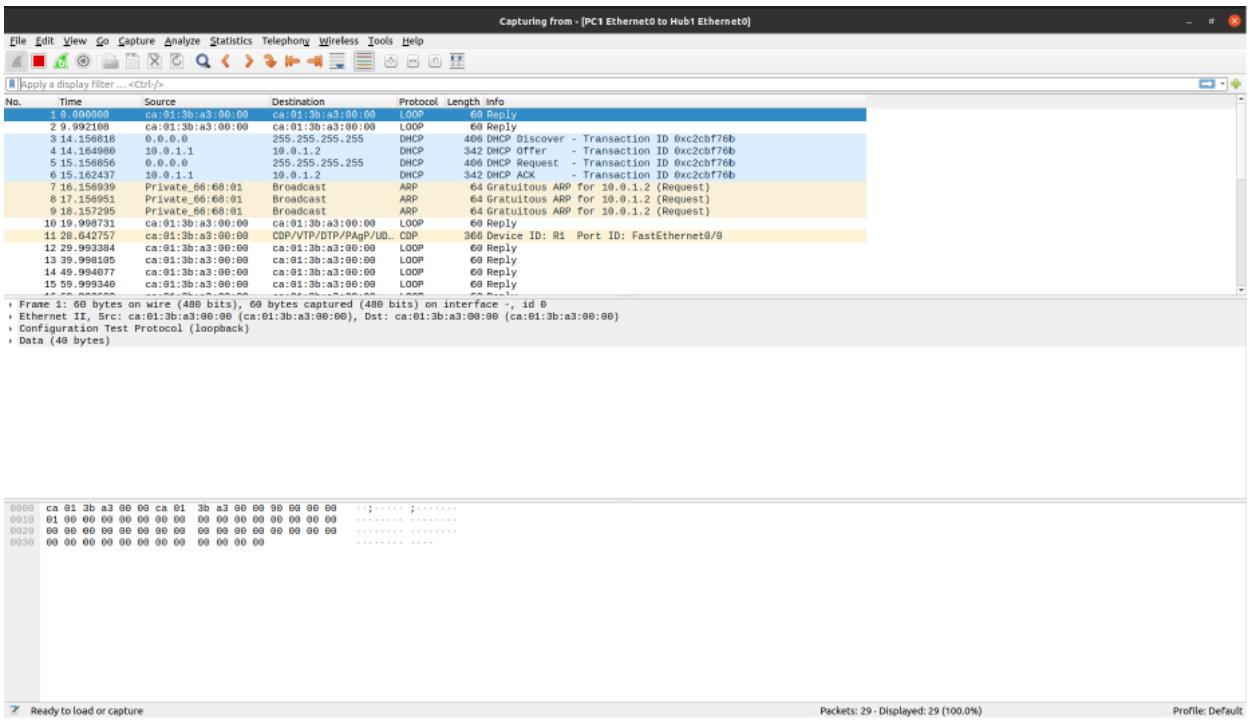
2) Network Prefixes and Routing




```
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#int f0/0
R1(config-if)#exit
R1(config)#IP dhcp pool NAME
R1(dhcp-config)#Network 10.0.1.1 255.255.255.0
R1(dhcp-config)#Default-router 10.0.1.1
R1(dhcp-config)#exit
R1(config)#int f0/0
R1(config-if)#ip address 10.0.1.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#exit
R1(config)#
*Nov 13 16:24:24.155: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Nov 13 16:24:25.155: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to upw
R1(config)#
```

Default gateway is set to f0/0 so we get dhcp command in PC1 not PC2,PC3,PC4

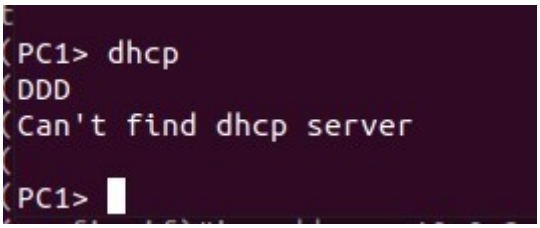
```
PC1> dhcp
DDORA IP 10.0.1.3/24 GW 10.0.1.1
```




```
PC2> dhcp
DDD
Can't find dhcp server
```

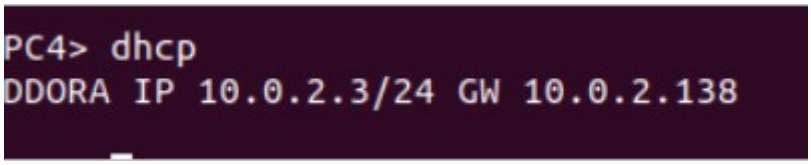
```
*Nov 13 18:04:38.471: %SYS-5-CONFIG_I: Configured from console by console
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#IP dhcp pool NAME
R1(dhcp-config)#Network 10.0.2.138 255.255.255.0
R1(dhcp-config)#default-router 10.0.2.138
R1(dhcp-config)#exit
R1(config)#int f1/0
R1(config-if)#ip address 10.0.2.138 255.255.255.0
R1(config-if)#no shut
R1(config-if)#
*Nov 13 18:05:59.847: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state t
o up
R1(config-if)#
```

f1/0 is set as `default gateway and so we get the dhcp in pc 2/3/4:



27	210.004758	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
28	220.001979	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
29	230.001241	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
30	239.999811	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
31	248.045782	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 0x71a45c73
32	249.045835	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 0x71a45c73
33	249.070938	10.0.2.138	10.0.2.1	DHCP	342	DHCP Offer - Transaction ID 0x71a45c73
34	249.101257	10.0.2.138	10.0.2.1	DHCP	342	DHCP Offer - Transaction ID 0x71a45c73
35	250.008887	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
36	252.045972	0.0.0.0	255.255.255.255	DHCP	406	DHCP Request - Transaction ID 0x71a45c73
37	253.046088	0.0.0.0	255.255.255.255	DHCP	406	DHCP Request - Transaction ID 0x71a45c73
38	253.050329	10.0.2.138	10.0.2.1	DHCP	342	DHCP ACK - Transaction ID 0x71a45c73
39	253.060453	10.0.2.138	10.0.2.1	DHCP	342	DHCP ACK - Transaction ID 0x71a45c73
40	254.046201	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 10.0.2.1 (Request)
41	255.047070	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 10.0.2.1 (Request)
42	255.720732	ca:01:3b:a3:00:38	CDP/VTP/DTP/PAgP/UD…	CDP	375	Device ID: R1 Port ID: FastEthernet2/0
43	256.047342	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 10.0.2.1 (Request)
44	260.002597	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
45	270.004959	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply

11	82.075023	ca:01:3b:a3:00:38	CDP/VTP/DTP/PAgP/UD…	CDP	375	Device ID: R1 Port ID: FastEthernet2/0
12	89.995334	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
13	93.699892	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 0xd8d2a75a
14	94.699930	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 0xd8d2a75a
15	94.701889	10.0.2.138	10.0.2.2	DHCP	342	DHCP Offer - Transaction ID 0xd8d2a75a
16	94.711991	10.0.2.138	10.0.2.2	DHCP	342	DHCP Offer - Transaction ID 0xd8d2a75a
17	97.700052	0.0.0.0	255.255.255.255	DHCP	406	DHCP Request - Transaction ID 0xd8d2a75a
18	98.700165	0.0.0.0	255.255.255.255	DHCP	406	DHCP Request - Transaction ID 0xd8d2a75a
19	98.704400	10.0.2.138	10.0.2.2	DHCP	342	DHCP ACK - Transaction ID 0xd8d2a75a
20	98.714496	10.0.2.138	10.0.2.2	DHCP	342	DHCP ACK - Transaction ID 0xd8d2a75a
21	99.700252	Private_66:68:02	Broadcast	ARP	64	Gratuitous ARP for 10.0.2.2 (Request)
22	99.994806	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
23	100.701207	Private_66:68:02	Broadcast	ARP	64	Gratuitous ARP for 10.0.2.2 (Request)
24	101.701823	Private_66:68:02	Broadcast	ARP	64	Gratuitous ARP for 10.0.2.2 (Request)
25	110.001431	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
26	119.995343	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
27	130.003975	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
28	133.730338	ca:01:3b:a3:00:38	CDP/VTP/DTP/PAgP/UD…	CDP	375	Device ID: R1 Port ID: FastEthernet2/0
29	139.998583	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply



1	0.000000	ca:01:3b:a3:00:38	CDP/VTP/DTP/PAgP/UD…	CDP	375	Device ID: R1 Port ID: FastEthernet2/0
2	7.804505	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
3	13.212807	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 0x838b576c
4	14.212875	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 0x838b576c
5	14.248199	ca:01:3b:a3:00:38	Broadcast	ARP	60	Who has 10.0.2.3? Tell 10.0.2.138
6	16.253294	10.0.2.138	10.0.2.3	DHCP	342	DHCP Offer - Transaction ID 0x838b576c
7	17.212912	0.0.0.0	255.255.255.255	DHCP	406	DHCP Request - Transaction ID 0x838b576c
8	17.854528	10.0.2.138	10.0.2.3	DHCP	342	DHCP ACK - Transaction ID 0x838b576c
9	17.864714	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply
10	18.213090	Private_66:68:03	Broadcast	ARP	64	Gratuitous ARP for 10.0.2.3 (Request)
11	19.213933	Private_66:68:03	Broadcast	ARP	64	Gratuitous ARP for 10.0.2.3 (Request)
12	20.214510	Private_66:68:03	Broadcast	ARP	64	Gratuitous ARP for 10.0.2.3 (Request)
13	27.800505	ca:01:3b:a3:00:38	ca:01:3b:a3:00:38	LOOP	60	Reply

```
PC1> ping 10.0.2.3

84 bytes from 10.0.2.3 icmp_seq=1 ttl=63 time=49.453 ms
```