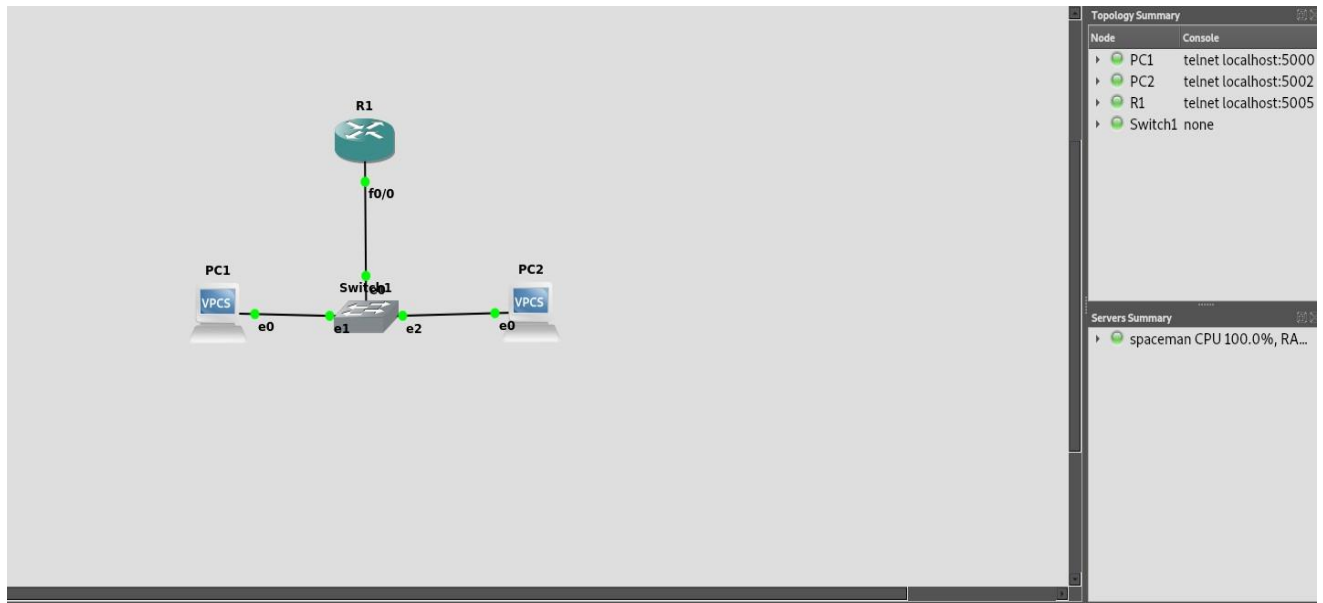


Q1. Configure two VMs that will be used to test connectivity from end to end and R1 will serve as a DHCP server to distribute IP addresses. The diagram below details the current setup:



Router Configuration

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#IP dhcp pool NAME
R1(dhcp-config)#Network 192.168.3.0 255.255.255.0
R1(dhcp-config)#Default-router 192.168.3.1
R1(dhcp-config)#write
^
% Invalid input detected at '^' marker.

R1(dhcp-config)#exit
R1(config)#write
^
% Invalid input detected at '^' marker.

R1(config)#exit
R1#wer
*Mar 1 00:06:23.487: %SYS-5-CONFIG_I: Configured from console by console
R1#write
Building configuration...
[OK]
R1#interface f0/0
^
% Invalid input detected at '^' marker.

R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface f0/0
R1(config-if)#no shutdown
R1(config-if)#ip add
*Mar 1 00:07:04.891: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:07:05.891: %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#write
*Mar 1 00:07:33.795: %SYS-5-CONFIG_I: Configured from console by console
R1#write
Building configuration...
[OK]
R1#
```

```
PC1> dhcp
DDORRA IP 192.168.3.2/24 GW 192.168.3.1

PC1> 
```

```
PC2> dhcp
DDORA IP 192.168.3.3/24 GW 192.168.3.1

PC2>
```

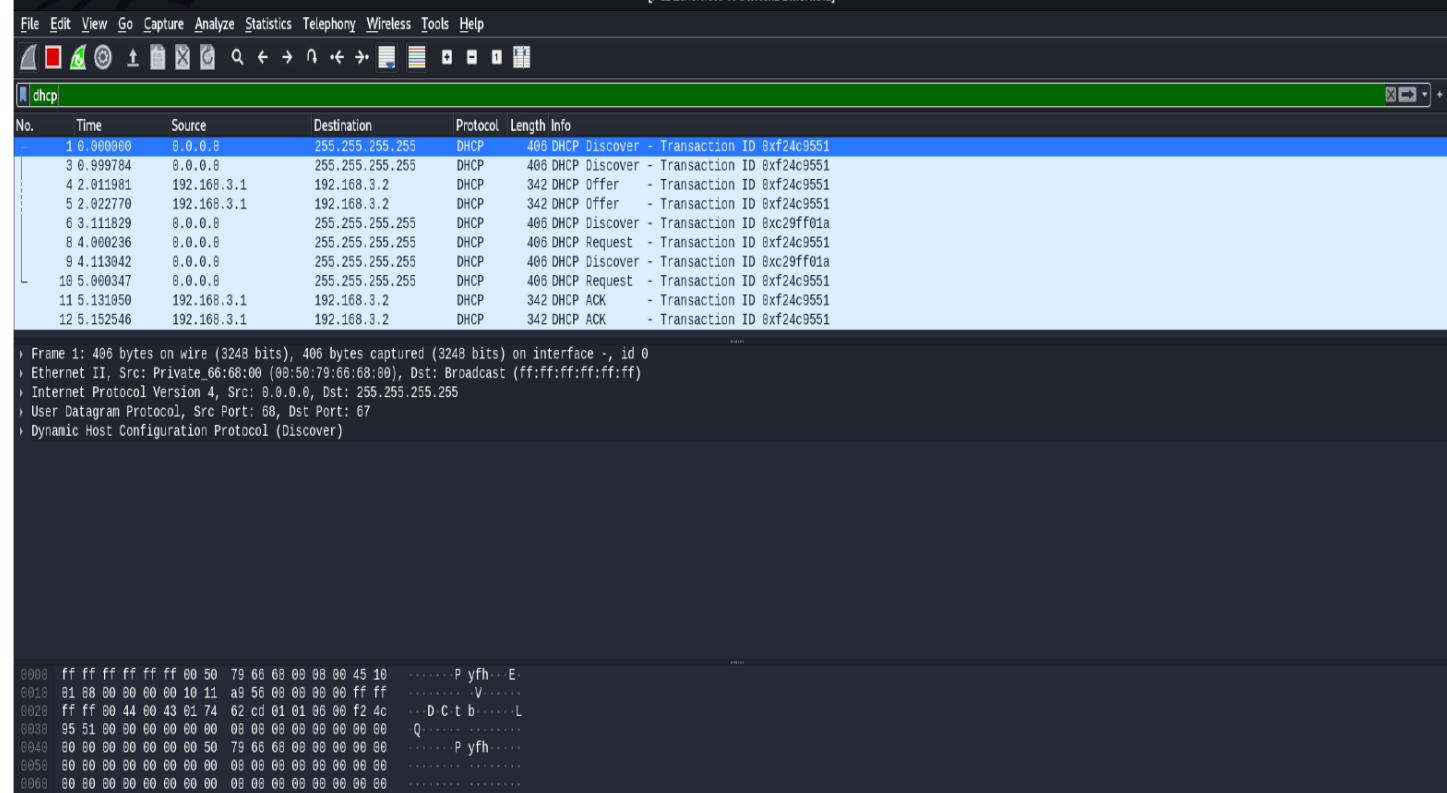
```
R1#show ip route
```

```
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route
```

```
Gateway of last resort is not set
```

```
C    192.168.3.0/24 is directly connected, FastEthernet0/0
```

```
R1#
```



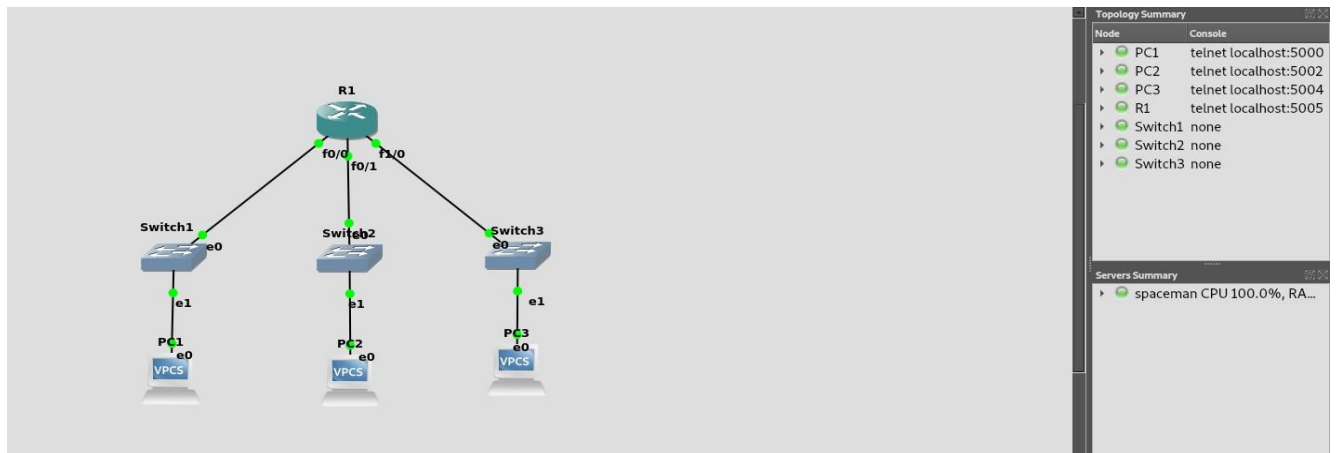
The image shows a Wireshark packet capture of DHCP traffic on interface 0. The packet list pane displays 12 packets, including DHCP Discover, Offer, Request, and ACK messages. The packet details pane shows the structure of the first packet (Frame 1), including Ethernet II, Internet Protocol Version 4, User Datagram Protocol, and Dynamic Host Configuration Protocol (Discover). The packet bytes pane shows the raw data of the first packet, with hex and ASCII representations.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 8xf24c9551
3	0.999784	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 8xf24c9551
4	2.011981	192.168.3.1	192.168.3.2	DHCP	342	DHCP Offer - Transaction ID 8xf24c9551
5	2.022770	192.168.3.1	192.168.3.2	DHCP	342	DHCP Offer - Transaction ID 8xf24c9551
6	3.111829	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 8xc29ff01a
8	4.000236	0.0.0.0	255.255.255.255	DHCP	406	DHCP Request - Transaction ID 8xf24c9551
9	4.113842	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 8xc29ff01a
10	5.000347	0.0.0.0	255.255.255.255	DHCP	406	DHCP Request - Transaction ID 8xf24c9551
11	5.131850	192.168.3.1	192.168.3.2	DHCP	342	DHCP ACK - Transaction ID 8xf24c9551
12	5.152546	192.168.3.1	192.168.3.2	DHCP	342	DHCP ACK - Transaction ID 8xf24c9551

Frame 1: 406 bytes on wire (3248 bits), 406 bytes captured (3248 bits) on interface 0, id 0
Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255
User Datagram Protocol, Src Port: 68, Dst Port: 67
Dynamic Host Configuration Protocol (Discover)

0000 ff ff ff ff ff ff 00 50 79 66 68 00 00 00 45 10P yfh...E-
0010 01 00 00 00 00 00 10 11 a9 56 00 00 00 00 ff ffV.....
0020 ff ff 00 44 00 43 01 74 62 cd 01 01 06 00 f2 4c ...D c t b.....L
0030 95 51 00 00 00 00 00 00 00 00 00 00 00 00 00 00 Q.....
0040 00 00 00 00 00 00 00 50 79 66 68 00 00 00 00 00P yfh.....
0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Ques 2. Configure DHCP server at R1 for the PART 2 Q2 Subnet configuration and topology. An organization is granted a block of addresses with the beginning address 14.24.74.0/24. The organization needs to have 3 subblocks of addresses to use in its three subnets: one subblock of 10 addresses, one subblock of 60 addresses, and one subblock of 120 addresses. Design the subblocks. Use the topology shown below.



Router configuration (shown only for interface f0/0, since other interfaces configuration commands are equally similar):

```

R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#IP dhcp pool r1pool
R1(dhcp-config)#network 14.24.74.4 255.255.255.0
% Invalid input detected at '^' marker.
R1(dhcp-config)#network 14.24.74.4 255.255.255.0
R1(dhcp-config)#default-router 14.24.74.5
R1(dhcp-config)#exit
R1(config)#exit
R1#wr
*Mar 1 00:04:17.771: %SYS-5-CONFIG_I: Configured from console by console
R1#write
Building configuration...
[OK]
R1#interface f0/0
% Invalid input detected at '^' marker.

R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface f0/0
R1(config-if)#no shutdown
R1(config-if)#ip address 14.24.74.1 255.255.255.0
R1(config-if)#exit
R1(config)#exit
R1#w
*Mar 1 00:06:34.567: %SYS-5-CONFIG_I: Configured from console by console
R1#write

```

[DK]

```
R1#show ip route
```

```
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
```

```
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
```

```
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
```

```
E1 - OSPF external type 1, E2 - OSPF external type 2
```

```
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
```

```
ia - IS-IS inter area, * - candidate default, U - per-user static route
```

```
o - ODR, P - periodic downloaded static route
```

```
Gateway of last resort is not set
```

```
14.0.0.0/24 is subnetted, 1 subnets
```

```
C       14.24.74.0 is directly connected, FastEthernet0/0
```

```
R1#
```

Capturing from - [Switch1 Ethernet1 to PC1 Ethernet0]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

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

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	c4:01:07:9c:00:00	CDP/VTP/DTP/PagP/UD...	CDP	350	Device ID: R1 Port ID: FastEthernet0/0
2	59.987812	c4:01:07:9c:00:00	CDP/VTP/DTP/PagP/UD...	CDP	350	Device ID: R1 Port ID: FastEthernet0/0
3	73.385000	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 0x3d12929
4	73.387449	14.24.74.1	14.24.74.2	DHCP	342	DHCP Offer - Transaction ID 0x3d12929
5	74.385781	0.0.0.0	255.255.255.255	DHCP	406	DHCP Request - Transaction ID 0x3d12929
6	74.392856	14.24.74.1	14.24.74.2	DHCP	342	DHCP ACK - Transaction ID 0x3d12929
7	75.386042	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 14.24.74.2 (Request)
8	76.385837	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 14.24.74.2 (Request)
9	77.387432	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 14.24.74.2 (Request)
10	119.990429	c4:01:07:9c:00:00	CDP/VTP/DTP/PagP/UD...	CDP	350	Device ID: R1 Port ID: FastEthernet0/0
11	120.000000	c4:01:07:9c:00:00	CDP/VTP/DTP/PagP/UD...	CDP	350	Device ID: R1 Port ID: FastEthernet0/0

Frame 1: 350 bytes on wire (2800 bits), 350 bytes captured (2800 bits) on interface -, id 0

- IEEE 802.3 Ethernet
- Logical-Link Control
- Cisco Discovery Protocol

0000 01 00 0c cc cc c4 01 07 9c 00 00 01 50 aa aaP..

0010 03 00 00 0c 20 00 02 b4 9f b4 00 01 00 06 52 31R1

0020 00 05 00 fb 43 69 73 63 6f 20 49 4f 53 20 53 6fCisco IOS So

0030 66 74 77 61 72 65 2c 20 33 37 30 30 20 53 6f 66 ftware, 3700 Sof

0040 74 77 61 72 65 20 28 43 33 37 34 35 2d 41 44 56 tware (C 3745-ADV

0050 49 50 53 45 52 56 49 43 45 53 4b 39 2d 4d 29 2c IPSERVIC ESK9-M),

0060 20 56 65 72 73 69 6f 6e 20 31 32 2e 34 28 32 35 Version 12.4(25

0070 64 29 2c 20 52 45 4c 45 41 53 45 20 53 4f 46 54 d), RELE ASE SOFT

0080 57 41 52 45 20 28 66 63 31 29 0a 54 65 63 68 6e WARE (fc 1) Techn

0090 69 63 61 6c 20 53 75 70 70 6f 72 74 3a 20 68 74 ical Sup port: ht

00a0 74 70 3a 2f 2f 77 77 7f 2e 63 69 73 63 6f 2e 63 tp://www.cisco.c

00b0 6f 6d 2f 74 65 63 68 73 75 70 70 6f 72 74 0a 43 om/techs support

00c0 6f 70 79 72 69 67 68 74 20 28 63 29 20 31 39 38 opyright (c) 198

00d0 36 2d 32 30 31 30 20 62 79 20 43 69 73 63 6f 20 6-2010 b y Cisco

00e0 53 79 73 74 65 6d 73 2c 20 49 6e 63 2e 0a 43 6f Systems, Inc. Co

Ready to load or capture

Packets: 15 · Displayed: 15 (100.0%)

Profile: Default

```
PC1> dhcp
DDORA IP 14.24.74.2/24 GW 14.24.74.5

PC1> dhcp
DORA IP 14.24.74.2/24 GW 14.24.74.5

PC1>
```

(Note – All procedures carefully done on GNS3, Wireshark and CISCO 3745 router)