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CN LAB – 6 : STUDY OF DHCP

Q7.1) 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. The diagram below details the current setup:

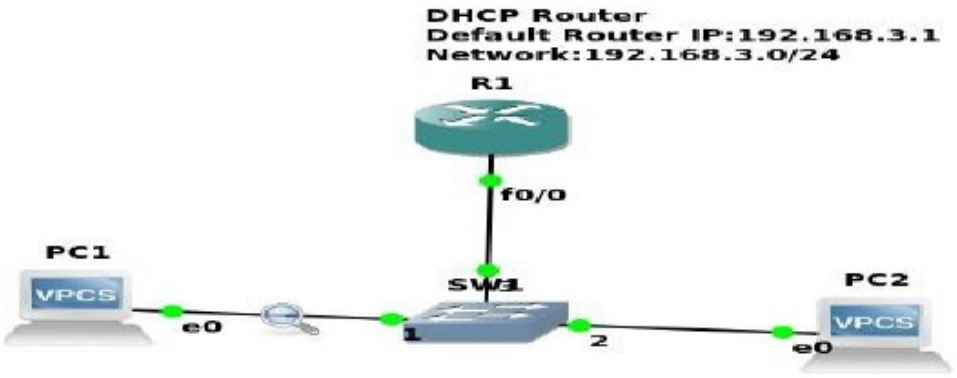


Figure 7.1 :Network Topology for DHCP Configuration

1. In order to configure our router as a DHCP server the following commands were used.

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

The commands above create a DHCP pool, adds the network that we want to assign IP addresses from, and specifies the default gateway for this subnet.

Note: There are many other parameters that go into configuring a DHCP server, but this will suffice for our test environment. That should be it for the DHCP configuration.

2.The next thing that you want to do is configure the fastethernet 0/0 interface which will connect to our switch.

R1(config)#Interface fastEthernet 0/0

R1(config-if)#No shutdown

R1(config-if)#ip address 192.168.3.1 255.255.255.0

The commands above will turn the interface on and assign an IP address.

3. Turn on the VPCS. In PC1 and PC2 type ***dhcp***

That is,

PC1>dhcp

PC2>dhcp

4. Let's analyse some of the traffic patterns using Wireshark.

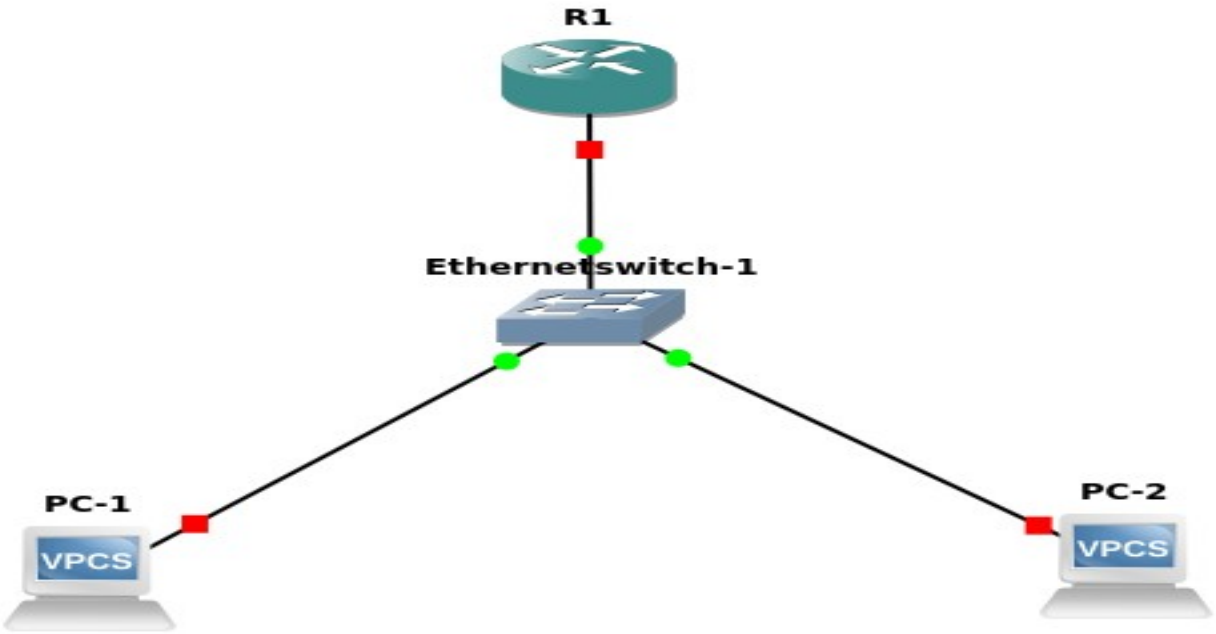
8	8.50813900	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x1028062c
9	8.53260900	192.168.3.1	192.168.3.3	DHCP	342	DHCP Offer - Transaction ID 0x1028062c
10	8.53274900	0.0.0.0	255.255.255.255	DHCP	357	DHCP Request - Transaction ID 0x1028062c
11	8.56323600	192.168.3.1	192.168.3.3	DHCP	342	DHCP ACK - Transaction ID 0x1028062c

Figure 7.2: DHCP

We see a discover message followed by an offer, request, and an acknowledgement. This is

the process that clients go through in order to obtain an IP address via DHCP. The mnemonic for the steps above is DORA and it should help in memorizing the order of the steps.

Solution :



PC's Configeration :

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

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

Router Configeration :

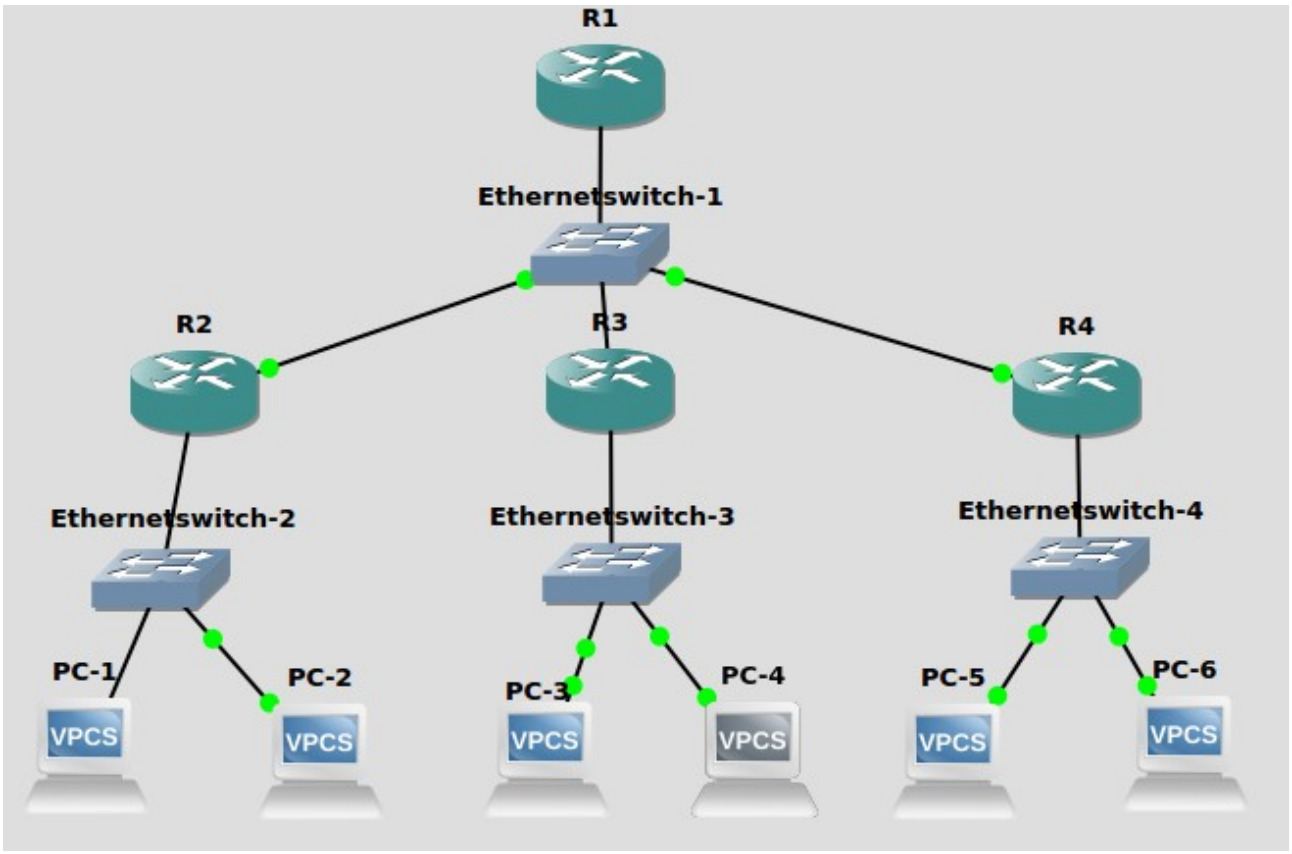
```
R1#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        192.168.3.1     YES manual up                    up
FastEthernet0/1        unassigned      YES unset  administratively down down
Serial1/0              unassigned      YES unset  administratively down down
Serial1/1              unassigned      YES unset  administratively down down
Serial1/2              unassigned      YES unset  administratively down down
Serial1/3              unassigned      YES unset  administratively down down
R1#
```

Capturing packets through DHCP Protocol in Wireshark :

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transacti…
2	0.002457	192.168.3.1	192.168.3.2	DHCP	342	DHCP Offer - Transacti…
3	1.000137	0.0.0.0	255.255.255.255	DHCP	406	DHCP Request - Transacti…
4	1.011245	192.168.3.1	192.168.3.2	DHCP	342	DHCP ACK - Transacti…
5	2.000186	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.16…
6	3.000574	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.16…
7	4.000961	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.16…
8	24.075524	c4:01:1f:d3:00:00	CDP/VTP/DTP/PAgP/UD…	CDP	350	Device ID: R1 Port ID: F…

Q7.2) Configure DHCP server at R1 for the PART 2 Q2 Subnet configuration and topology.

Solution :



PC's Configeration :

```
PC-4> ip 14.24.74.130/26 14.24.74.131
Checking for duplicate address...
PC1 : 14.24.74.130 255.255.255.192 gateway 14.24.74.131

PC-4> ping 14.24.74.129
84 bytes from 14.24.74.129 icmp_seq=1 ttl=64 time=0.424 ms
84 bytes from 14.24.74.129 icmp_seq=2 ttl=64 time=0.358 ms
84 bytes from 14.24.74.129 icmp_seq=3 ttl=64 time=0.380 ms
84 bytes from 14.24.74.129 icmp_seq=4 ttl=64 time=0.334 ms
84 bytes from 14.24.74.129 icmp_seq=5 ttl=64 time=0.316 ms
```

```
PC-3> ping 14.24.74.130/26
84 bytes from 14.24.74.130 icmp_seq=1 ttl=64 time=0.403 ms
84 bytes from 14.24.74.130 icmp_seq=2 ttl=64 time=0.317 ms
84 bytes from 14.24.74.130 icmp_seq=3 ttl=64 time=0.324 ms
84 bytes from 14.24.74.130 icmp_seq=4 ttl=64 time=0.289 ms
84 bytes from 14.24.74.130 icmp_seq=5 ttl=64 time=0.303 ms
```

Router's Configeration :

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#int f0/0
R1(config-if)#ip address 14.24.74.212 255.255.255.248
R1(config-if)#no shut
R1(config-if)#end
R1#
*Mar  1 00:15:32.395: %SYS-5-CONFIG_I: Configured from console by console
R1#
```

```
R2(config-if)#int f0/1
R2(config-if)#ip address 14.24.74.195 255.255.255.240
R2(config-if)#no shut
R2(config-if)#end
*Mar  1 00:09:23.487: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state t
o up
*Mar  1 00:09:24.487: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to up
R2(config-if)#end
R2#
*Mar  1 00:09:27.419: %SYS-5-CONFIG_I: Configured from console by console
R2#
```

```
R3(config-if)#int f0/1
R3(config-if)#ip address 14.24.74.131 255.255.255.192
R3(config-if)#no shut
R3(config-if)#end
R3#
*Mar  1 00:09:02.411: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state t
o up
R3#
*Mar  1 00:09:02.803: %SYS-5-CONFIG_I: Configured from console by console
*Mar  1 00:09:03.411: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to up
R3#
```

```
R4(config-if)#ip address 14.24.74.3 255.255.255.128
R4(config-if)#no shut
R4(config-if)#end
R4#
*Mar  1 00:09:27.063: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state
o up
R4#
*Mar  1 00:09:27.507: %SYS-5-CONFIG_I: Configured from console by console
*Mar  1 00:09:28.063: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEther
et0/1, changed state to up
R4#
```