NWK780 – TRADITIONAL NETWORKS

Seneca | SCHOOL OF INFORMATION TECHNOLOGY ADMINISTRATION & SECURITY

Lab3B VLANs routing with DHCP

Prepared by:

Nagham Kubba

Modified by:

Ali Nezhad

Group Number: 1

Lab Theory

This lab is a continuation of Lab 3A (VLANs routing). You will be using the same IP address space provided to you which was X.X.0.0/16, where X is your group number.

DHCP provides one of the most commonly used services in a TCP/IP network. The vast majority of hosts in a TCP/IP network are user devices, and the vast majority of user devices learn their IPv4 settings using DHCP.

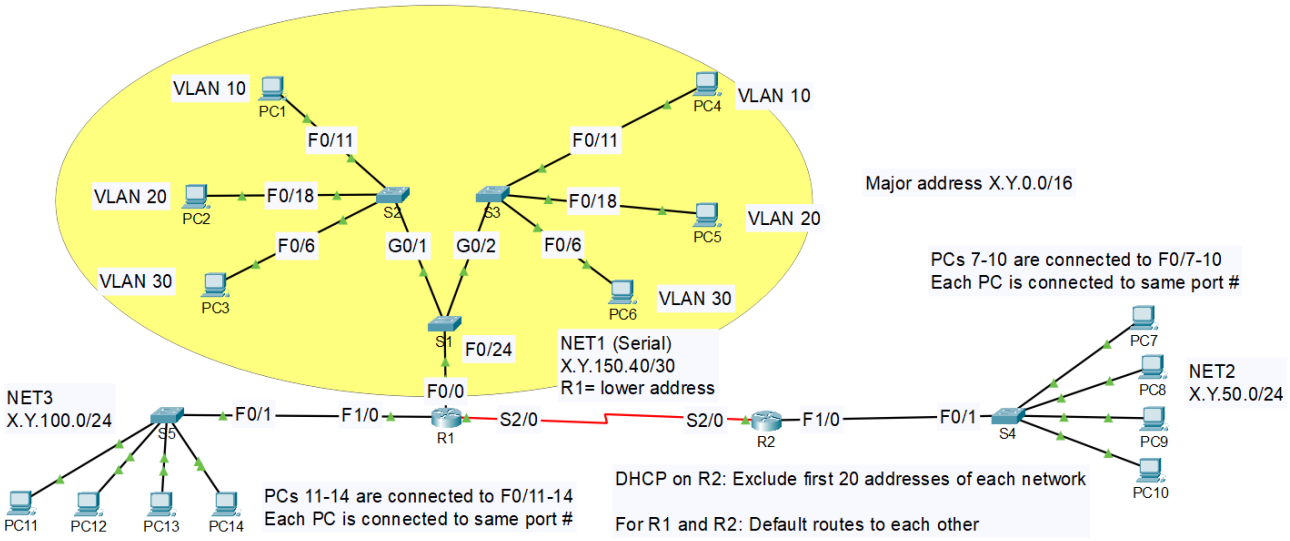
Lab Objectives

1. To understand how to configure DHCP on CISCO routers
2. To understand how to assign host IP addresses using DHCP
3. To understand the value of using a Relay Agent

Lab Instructions

1. Follow the procedure of the lab and fulfill all requirements.
2. Answer all questions in the provided spaces (preferably in the red-bold font).
3. Add all required screenshots into corresponding spaces
4. Save the file again as a " .pdf " file
5. Submit the PDF file on Blackboard by the due date.

Network Topology



Inter-VLAN routing with DHCP

X=Y= your group number

Procedure

1. Your major network address is X.X.0.0/16
2. The yellow part of the diagram is your lab 3A but you can ignore S1, S3 and all PCs connected to it. Also, once again ignore VLAN30.
3. In Net2 , only use PC11 and in Net3 only PC7.
4. Use the following table to set your IP addresses.

Network name	Address
VLAN10	1.1.10.0/24
VLAN20	1.1.20.0/24
NET1	1.1.150.40/30
NET2	1.1.50.0/24
NET3	1.1.100.0/24

5. The PCs and the router connected to switches should have the following addresses. You will be configuring R2 as a DHCP server.

Device	Network	Address
PC1	VLAN10	1.1.10.1
PC2	VLAN20	1.1.20.1
PC7	NET2	DHCP on R2 (Pool name = NET2)
PC11	NET3	DHCP on R2 (Pool name = NET3)
Gateways	All networks	.100 address

6. R1 should have the lower address in NET1 and R2 the highest.
7. Configure R1 using a default route to reach Net2. Configure R2 similarly to reach Net3.
8. Take a screen capture of the routing table of R1, and insert it below ***[1 mark]***

```
R1#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        unassigned      YES unset  up                    up
FastEthernet0/0.10     1.1.10.100      YES manual up                    up
FastEthernet0/0.20     1.1.20.100      YES manual up                    up
FastEthernet0/1        1.1.100.100     YES manual up                    up
Serial0/0/0            1.1.150.41      YES manual up                    up
Serial0/0/1            unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#do sh ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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 1.1.150.42 to network 0.0.0.0

     1.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C       1.1.10.0/24 is directly connected, FastEthernet0/0.10
C       1.1.20.0/24 is directly connected, FastEthernet0/0.20
C       1.1.100.0/24 is directly connected, FastEthernet0/1
C       1.1.150.40/30 is directly connected, Serial0/0/0
S*   0.0.0.0/0 [1/0] via 1.1.150.42

R1(config)#Group 1
```

Fig1: Routing Table of R1

9. Take a screen capture of the routing table of R2, and insert it below ***[1 mark]***

```
R2#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        unassigned      YES unset  administratively down down
FastEthernet0/1        1.1.50.100      YES manual up                    up
Serial0/0/0            1.1.150.42      YES manual up                    up
Serial0/0/1            unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#do sh ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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 1.1.150.41 to network 0.0.0.0

     1.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       1.1.50.0/24 is directly connected, FastEthernet0/1
C       1.1.150.40/30 is directly connected, Serial0/0/0
S*   0.0.0.0/0 [1/0] via 1.1.150.41

R2(config)#Group 1
```

Fig2: Routing Table of R2

10. Configure R2 as a DHCP server for NET2 and NET3. Exclude the first 20 addresses from any range you are configuring on the DHCP server on R2. Also, exclude the **.100** address from each network because it will be used as a default gateway.

    Sample Commands:

    (config)#ip dhcp excluded-address X.X.100.100
    (config)#ip dhcp excluded-address X.X.100.1 X.X.100.20
    (config)#ip dhcp excluded-address …
    (config)#ip dhcp excluded-address …
    (config) #ip dhcp pool NET3
      (dhcp-config)#default-router X.X.100.1
      (dhcp-config)#network X.X.100.0 255.255.255.0
      (dhcp-config)#exit
    (config) #ip dhcp pool NET2
      (dhcp-config)#default-router …
      (dhcp-config)#network …

11. Let DHCP assign the IP address of PC7. Did it work?
    YES ***[0.25 marks]***
12. Let DHCP assign the IP address of PC11. Did it work?

YES *[0.25 marks]*

13. If the answer to Q11 or Q12 was negative what can you do to fix the problem? *[0.5 mark]*
    Implement your solution.

If the DHCP assignment didn't work, we would check the DHCP pool configuration on R2 to ensure it's correct and verify the excluded address ranges. We'd also make sure the interfaces and VLANs are configured and active. If needed, we'd use show ip dhcp binding and show ip dhcp pool to troubleshoot DHCP issues. Finally, we'd confirm that the DHCP service is running on R2 and that the PCs are properly connected.

14. Take a screen capture of the DHCP part on the running configurations of R2, and
    insert it below *[0.5 mark]*

```
R2#sh running-config
Building configuration...

Current configuration : 1049 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R2
!
!
!
!
ip dhcp excluded-address 1.1.50.1 1.1.50.20
ip dhcp excluded-address 1.1.50.100
ip dhcp excluded-address 1.1.100.1 1.1.100.20
ip dhcp excluded-address 1.1.100.100
!
ip dhcp pool NET2
 network 1.1.50.0 255.255.255.0
 default-router 1.1.50.100
ip dhcp pool NET3
 network 1.1.100.0 255.255.255.0
 default-router 1.1.100.100
!
```

Fig4: Excluded IP addresses

15. Take a screen capture of the interface Fa0/1 on the running configurations of R1, and
    insert it below *[0.5 mark]*

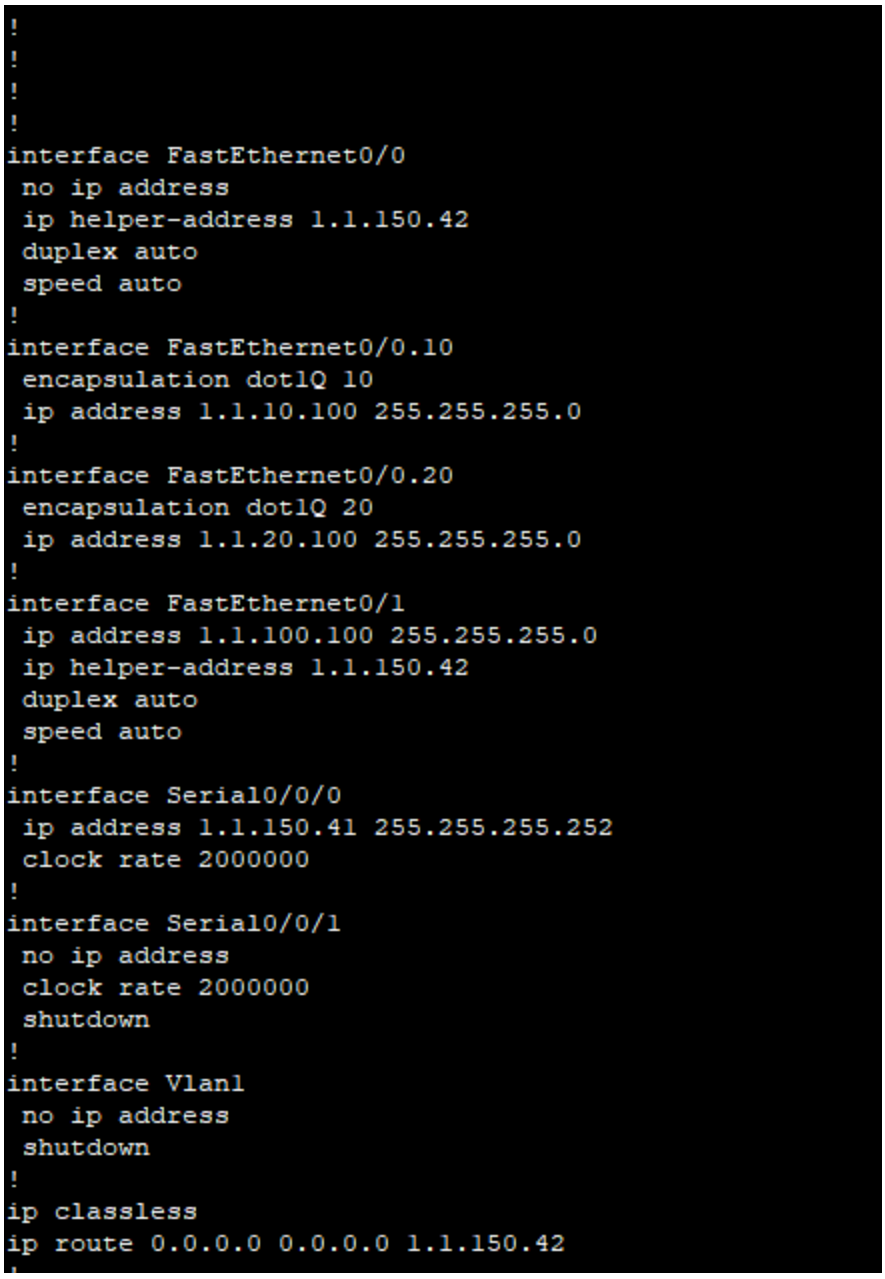


Fig5: R1: Int Fa1/0

16. On R2: use the command **R2#sh ip dhcp binding**

    Take a screen capture of the result of the above command, and insert it below ***[0.25 marks]***

```
R2#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        unassigned      YES unset  administratively down down
FastEthernet0/1        1.1.50.100      YES manual up                    up
Serial0/0/0            1.1.150.42      YES manual up                    up
Serial0/0/1            unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#do show ip dhcp binding
IP address       Client-ID/              Lease expiration        Type
                 Hardware address
1.1.50.21        00E0.F977.1E39           --                     Automatic
1.1.100.21       0006.2A83.A0D2           --                     Automatic
R2(config)#
R2(config)#Group 1
```

Fig6: DHCP bindings

17. On R2: use the command **R2#sh ip dhcp pool**

    Take a screen capture of the result of the above command, and insert it below ***[0.25 marks]***

```
R2#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        unassigned      YES unset  administratively down down
FastEthernet0/1        1.1.50.100      YES manual up                    up
Serial0/0/0            1.1.150.42      YES manual up                    up
Serial0/0/1            unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#sh ip dhcp pool
           ^
% Invalid input detected at '^' marker.

R2(config)#do sh ip dhcp pool

Pool NET2 :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 1
 Excluded addresses             : 4
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                    Leased/Excluded/Total
 1.1.50.1             1.1.50.1        - 1.1.50.254        1    / 4     / 254

Pool NET3 :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 1
 Excluded addresses             : 4
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                    Leased/Excluded/Total
 1.1.100.1            1.1.100.1       - 1.1.100.254       1    / 4     / 254
R2(config)#
R2(config)#Group 1
```

Fig7: DHCP Pools

Connectivity Tests

At this point, all your PCs should be able to ping each other.

18. Ping PC11 from PC7 and insert a screen capture here: ***[0.5 marks]***

```
C:\>ping 1.1.100.21

Pinging 1.1.100.21 with 32 bytes of data:

Reply from 1.1.100.21: bytes=32 time=19ms TTL=126
Reply from 1.1.100.21: bytes=32 time=13ms TTL=126
Reply from 1.1.100.21: bytes=32 time=1ms TTL=126
Reply from 1.1.100.21: bytes=32 time=12ms TTL=126

Ping statistics for 1.1.100.21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 19ms, Average = 11ms

C:\>Group 1
Invalid Command.

C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::2E0:F9FF:FE77:1E39
   IPv6 Address.....: ::
   IPv4 Address.....: 1.1.50.21
   Subnet Mask.....: 255.255.255.0
   Default Gateway.....: ::
                                 1.1.50.100
```

Fig8: PC11 pinging PC7

19. Ping PC1 from PC7 and insert a screen capture here: ***[0.5 marks]***

```
C:\>ping 1.1.10.1

Pinging 1.1.10.1 with 32 bytes of data:

Reply from 1.1.10.1: bytes=32 time=15ms TTL=126
Reply from 1.1.10.1: bytes=32 time=11ms TTL=126
Reply from 1.1.10.1: bytes=32 time=11ms TTL=126
Reply from 1.1.10.1: bytes=32 time=10ms TTL=126

Ping statistics for 1.1.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 15ms, Average = 11ms

C:\>Group 1
Invalid Command.

C:\>ipconfig /all

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Physical Address.................: 00E0.F977.1E39
   Link-local IPv6 Address.........: FE80::2E0:F9FF:FE77:1E39
   IPv6 Address....................: ::
   IPv4 Address....................: 1.1.50.21
   Subnet Mask.....................: 255.255.255.0
   Default Gateway.................: ::
                                     1.1.50.100
   DHCP Servers....................: 1.1.50.100
```

Fig8: PC7 pinging PC1

20. Ping PC11 from PC1 and insert a screen capture here: ***[0.5 marks]***

```
C:\>ping 1.1.100.21

Pinging 1.1.100.21 with 32 bytes of data:

Reply from 1.1.100.21: bytes=32 time<1ms TTL=127
Reply from 1.1.100.21: bytes=32 time<1ms TTL=127
Reply from 1.1.100.21: bytes=32 time=1ms TTL=127
Reply from 1.1.100.21: bytes=32 time<1ms TTL=127

Ping statistics for 1.1.100.21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>Group 1
Invalid Command.

C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::205:5EFF:FEED:745D
   IPv6 Address.....: ::
   IPv4 Address.....: 1.1.10.1
   Subnet Mask.....: 255.255.255.0
   Default Gateway.....: ::
                                 1.1.10.100
```

Fig8: PC1 pinging PC11

21. Submit your file to BB.