# Lab 7

Implement Router as DHCP server that can serve multiple VLAN's.

DHCP – Dynamic Host Configuration Protocol

DHCP Server

- A **DHCP Server** is a network server that automatically provides and assigns IP addresses, default gateways and other network parameters to client devices.

- *Without it*, the network administrator has to manually set up every client that joins the network, which can be cumbersome, especially in large networks.

Implement Router as DHCP server
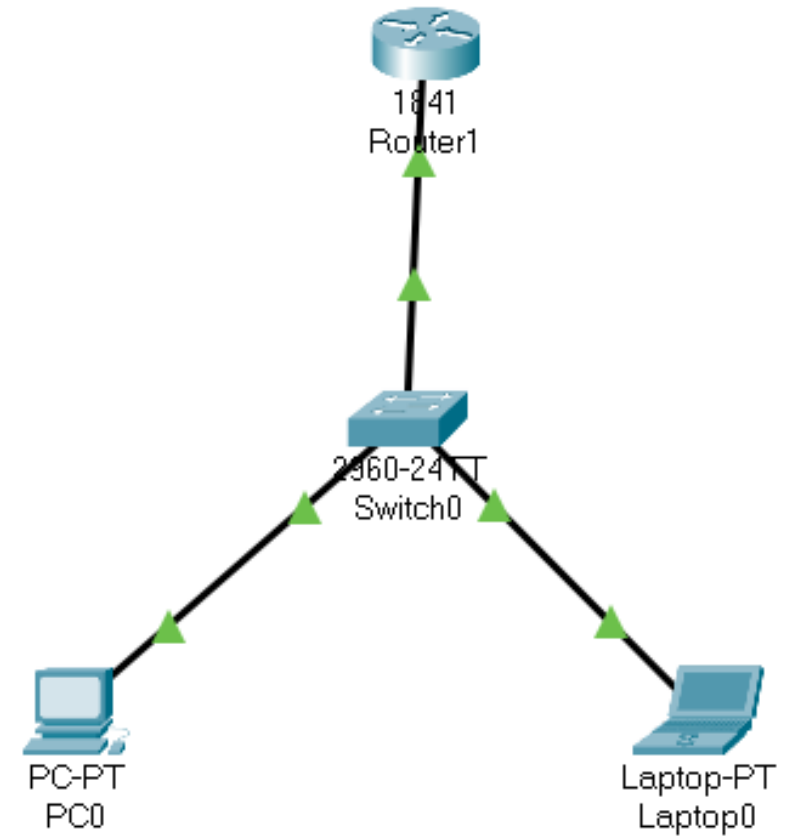
Commands to initially configure router link to the switch

```
              --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: n


Press RETURN to get started!



Router>en
Router#enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int f0/0
Router(config-if)#ip add 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
```

Commands to initially configure router link to the switch

- Router>en
- Router#enable
- Router#config t
- Router(config)#int f0/0
- Router(config-if)#ip add 192.168.1.1 255.255.255.0
- Router(config-if)#no shutdown
- Router#show ip interface brief

Commands to configure router as a DHCP server

```
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip dhcp ?
  excluded-address  Prevent DHCP from assigning certain addresses
  pool              Configure DHCP address pools
  relay             DHCP relay agent parameters
Router(config)#ip dhcp pool ?
  WORD  Pool name
Router(config)#ip dhcp pool abc
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#
```

Commands to configure router as a DHCP server

- Router#conf t
- Router(config)#ip dhcp ?

  excluded-address Prevent DHCP from assigning certain addresses

  pool   Configure DHCP address pools

  relay   DHCP relay agent parameters

- Router(config)#ip dhcp pool ?

  WORD Pool name

- Router(config)#ip dhcp pool abc
- Router(dhcp-config)#default-router 192.168.1.1
- Router(dhcp-config)#network 192.168.1.0 255.255.255.0

PC0

Physical | Config | Desktop | Programming | Attributes

IP Configuration

| Interface | FastEthernet0 |

IP Configuration

○ DHCP   ● Static

IPv4 Address

Subnet Mask

Default Gateway   0.0.0.0

DNS Server   0.0.0.0

IPv6 Configuration

PC0

Physical   Config   **Desktop**   Programming   Attributes

IP Configuration   ✕

Interface   FastEthernet0   ⌄
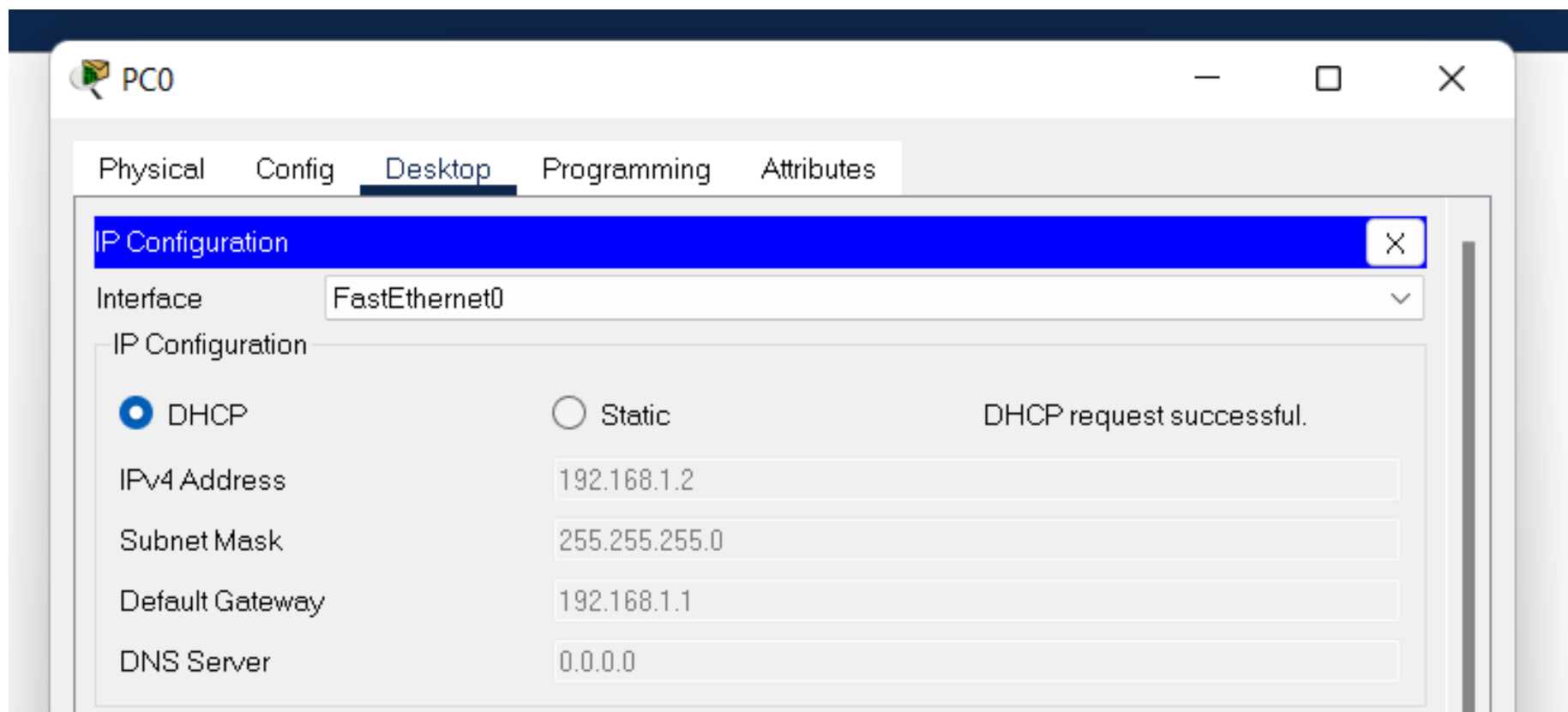
IP Configuration

○ DHCP   ○ Static   Requesting IP Address

IPv4 Address

Subnet Mask

Default Gateway

DNS Server

IPv6 Configuration

○ Automatic   ● Static

PC0

Physical | Config | **Desktop** | Programming | Attributes

IP Configuration   ✕

| Interface | FastEthernet0 ⌄ |

IP Configuration

( ) DHCP   ( ) Static   DHCP request successful.

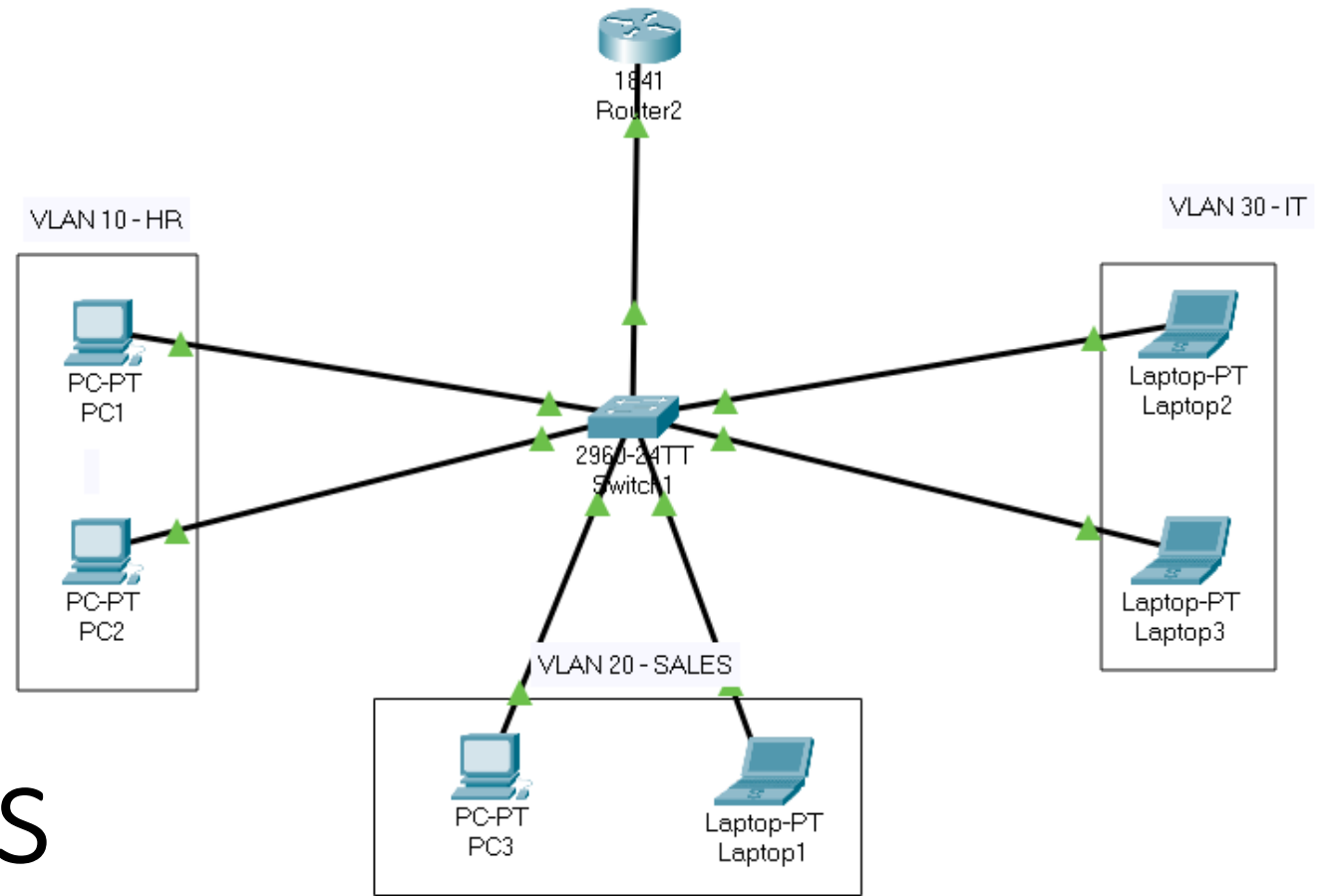|	
IPv4 Address	192.168.1.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	0.0.0.0
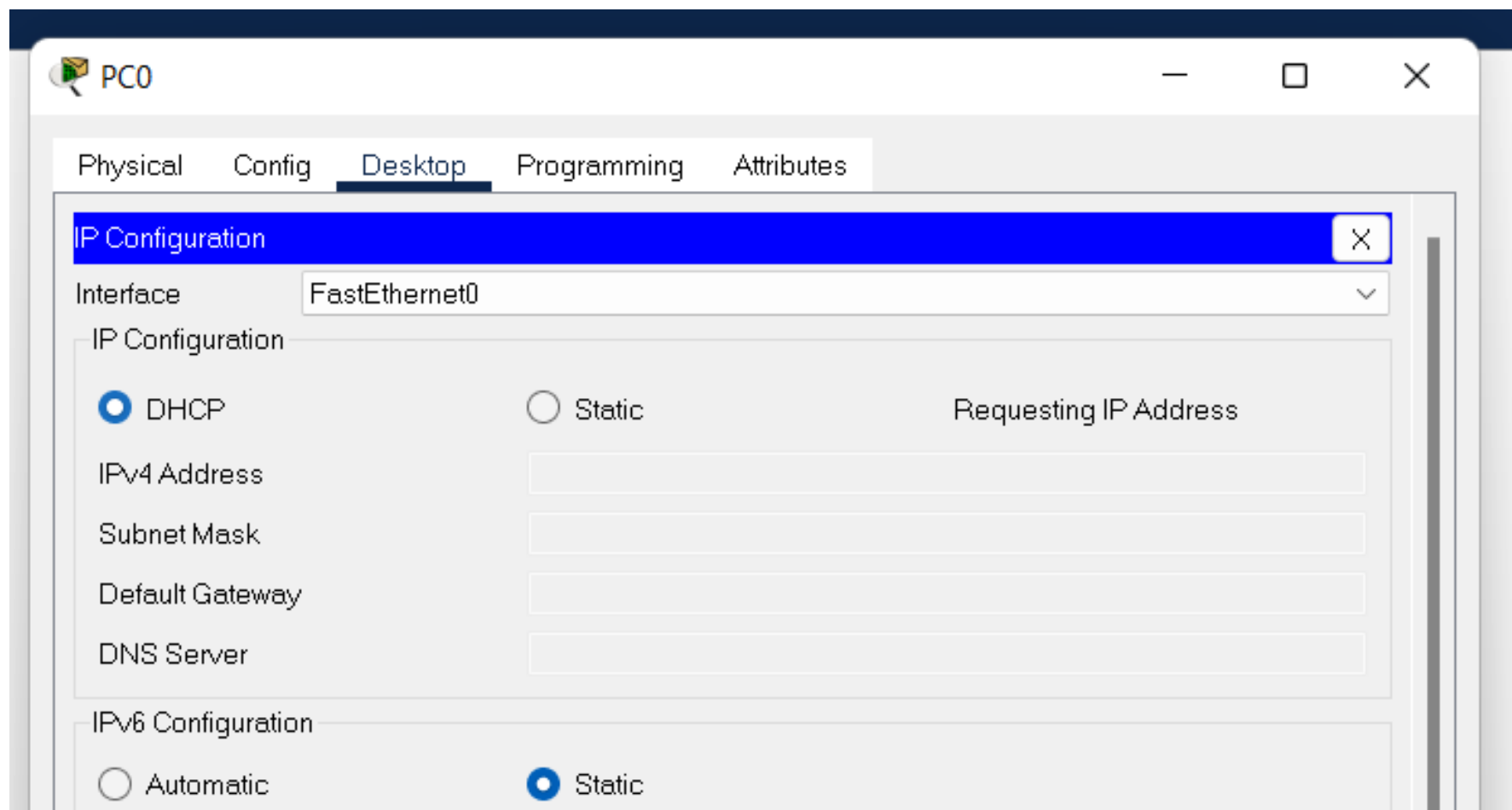
Multiple VLAN's

A network 10.0.0.0/24 with 3 subnets. Design the network.

- 3 subnets = 2^2 subnets will be given [2 bits will be borrowed from host bits into network bits.
- Without subnetting = 10.0.0.0/24 means 24 bits define network ID

00001010. 00000000. 00000000. 00000000/24

11111111. 11111111. 11111111. 00000000 = 255.255.255.0

[default mask]

- With subnetting = 24 + 2 = 26 bits will define network ID part.

11111111. 11111111. 11111111. 11000000 = 255.255.255.192

[subnet mask]

A network 10.0.0.0/24 with 3 subnets. Design the network.

- Number of network bits = 26

- Number of host bits = 32 − 26 = 6

- Total host PC(s) in One subnet = 2^6 = 64

- Three subnet :

10.0.0.0/26 - 10.0.0.63/26 [Net ID : 10.0.0.0/26]

10.0.0.64/24 - 10.0.0.127/24 [Net ID : 10.0.0.64/26]

10.0.0.128/24 - 10.0.0.191/24 [Net ID : 10.0.0.128/26]

Commands to configure VLANs in switch

- Switch# enable
- Switch# configure terminal
- Switch(config)# vlan 10
- Switch(config)# name HR
- Switch(config)# vlan 20
- Switch(config)# name sales
- Switch(config)# vlan 30
- Switch(config)# name IT
- Switch(config)# int range fa0/1-2
- Switch(config-if-range)# switchport mode access
- Switch(config-if-range)# switchport access vlan 10
- Switch(config-if-range)#exit

Commands to configure VLANs in switch

- Switch(config)# int range fa0/3-4
- Switch(config-if-range)# switchport mode access
- Switch(config-if-range)# switchport access vlan 20
- Switch(config-if-range)#exit
- Switch(config)# int range fa0/5-6
- Switch(config-if-range)# switchport mode access
- Switch(config-if-range)# switchport access vlan 30
- Switch(config-if-range)#exit
- Switch(config)#show vlan
- Switch(config)#interface fa0/7
- Switch(config-if)#switchport mode trunk

Commands to configure VLANs in Router

- router# enable
- router# configure terminal
- router(config)# int fa0/0
- router(config-if)# no shutdown
- router(config-if)# int fa0/0.10
- router(config-subif)# encapsulation ?

dot1q IEEE 802.1q Virtual LAN

- router(config-subif)# encapsulation dot1q ?

<1-4094> IEEE 802.1q VLAN ID

- router(config-subif)# encapsulation dot1q 10
- router(config-subif)# ip add 10.0.0.1 255.255.255.192
- router(config-subif)#int fa0/0.20
- router(config-subif)# encapsulation dot1q 20
- router(config-subif)# ip add 10.0.0.65 255.255.255.192
- router(config-subif)#int fa0/0.30
- router(config-subif)# encapsulation dot1q 30
- router(config-subif)# ip add 10.0.0.129 255.255.255.192

Commands to configure router as a DHCP server

- Router#enable

- Router#configure enable

- Router(config)#ip dhcp pool VLAN10

- Router(dhcp-config)#network 10.0.0.0 255.255.255.192

- Router(dhcp-config)#default-router 10.0.0.1

- Router(dhcp-config)#ip dhcp excluded-address 10.0.0.1

- Router(config)#ip dhcp pool VLAN20

- Router(dhcp-config)#network 10.0.0.64
  255.255.255.192

- Router(dhcp-config)#default-router 10.0.0.65

- Router(dhcp-config)#ip dhcp excluded-address 10.0.0.65

- Router(config)#ip dhcp pool VLAN30

- Router(dhcp-config)#network 10.0.0.128 255.255.255.192

- Router(dhcp-config)#default-router 10.0.0.129

- Router(dhcp-config)#ip dhcp excluded-address 10.0.0.129

- Router(config)#exit

- Router#sh ip dhcp pool

Thank You !