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Problem No: 1
Problem Name: Configure Local Area Network (Wired).
Objectives:

- To understand how to set up and configure a Local Area Network (LAN) using wired connections to connect multiple devices.
- To assign IP addresses to connected devices and ensure they can communicate with each other within the network.
- To test the network to confirm connectivity and learn basic security practices to protect the LAN.

Description: A Wired Local Area Network (LAN) connects devices within a limited area, such as an office or campus, using Ethernet cables and switches. Wired LANs provide stable, high-speed connections and are less prone to interference compared to wireless networks. In this experiment, we configure a wired LAN by setting up IP addresses, subnet masks for each device. This allows devices on the same network to communicate efficiently, and it enables centralized resources like file sharing and printers.

Required Software: Cisco Packet Tracer 6.0

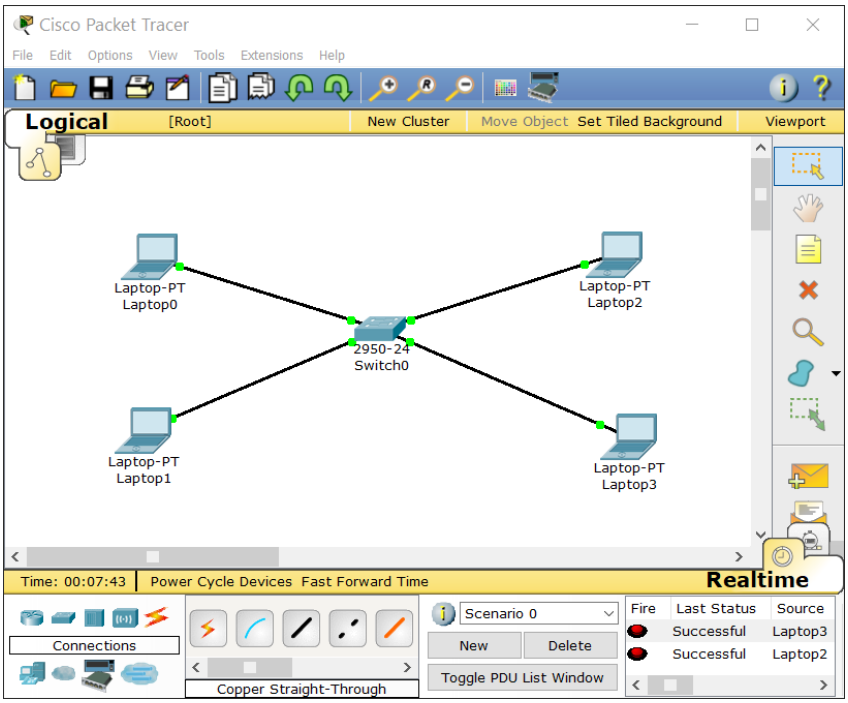

Figure 01: Configuration of Local Area Network (Wired).

Required Components:

i. Switch
ii. UTP Cable (Straight Through)
iii. End Device (Desktop, Laptop etc)
iv. IP Address (192.168.1.0)

Configuration Procedure:

i. We drag and dropped a switch on CISCO packet tracer interface.
ii. We take some end device which supports NIC Card with RJ45 connector.

iii. We choose copper “Straight Through” UTP cable for connection.
iv. We click on switch and select the specific port no for new connection.
v. Repeat procedure (iv) as much our end device remain connection less.
vi. We double click on an end device and we can see this interface is by default on “Physical” tab.
vii. Now we select Desktop tab and click on “IP Configuration”.
viii. Putting the IP address and click on submit section subnet mask will take automatically.
ix. Close the section
x. We put IP address on all the remaining end device.

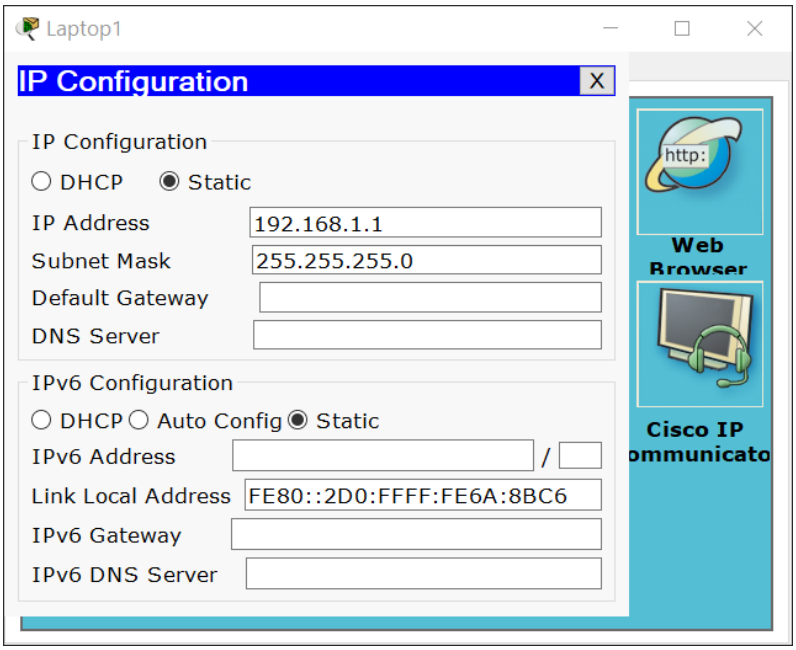

Figure 02: IP Configuration for Laptop0

Simulation Process:

i. Select a packet from right side bar, Mouse pointer will change with packet symbol.
ii. Select first a PC and then select another PC with packet symbol pointer.
iii. It implies that a packet will flow from first device to second device.
iv. Then we can see successful notification right side bottom section.
v. Double click on PC, select “Desktop” tab, click on “Command Prompt”.
vi. For example this pc with 192.168.1.1 and it will ping 192.168.1.2
vii. Write down “ping 192.168.1.2” press enter.
viii. If our physical and logical connection is ok then it will say that
Packet send = 4 Packet Received = 4 Packet Lost = 0%

Problem No: 2
Problem Name: Configure Local Area Network (Wireless).
Objectives:

- To set up a wireless LAN by configuring the SSID, security settings, and assign IP assignment.
- To enable secure communication between devices within a specified wireless network range.
- To test and verify wireless connectivity, signal strength, and network security configurations.

Description: A Wireless Local Area Network (WLAN) connects devices without physical cables, using radio waves to transmit data. WLANs are widely used for convenience and flexibility, as they allow mobile devices to connect within a certain range of a Wi-Fi router or access point. In this experiment, we configure a WLAN by setting SSID (network name), encryption (such as WPA-PSK for security). The experiment emphasizes network security and range, as these factors affect performance and access control.

Required Software: Cisco Packet Tracer 6.0

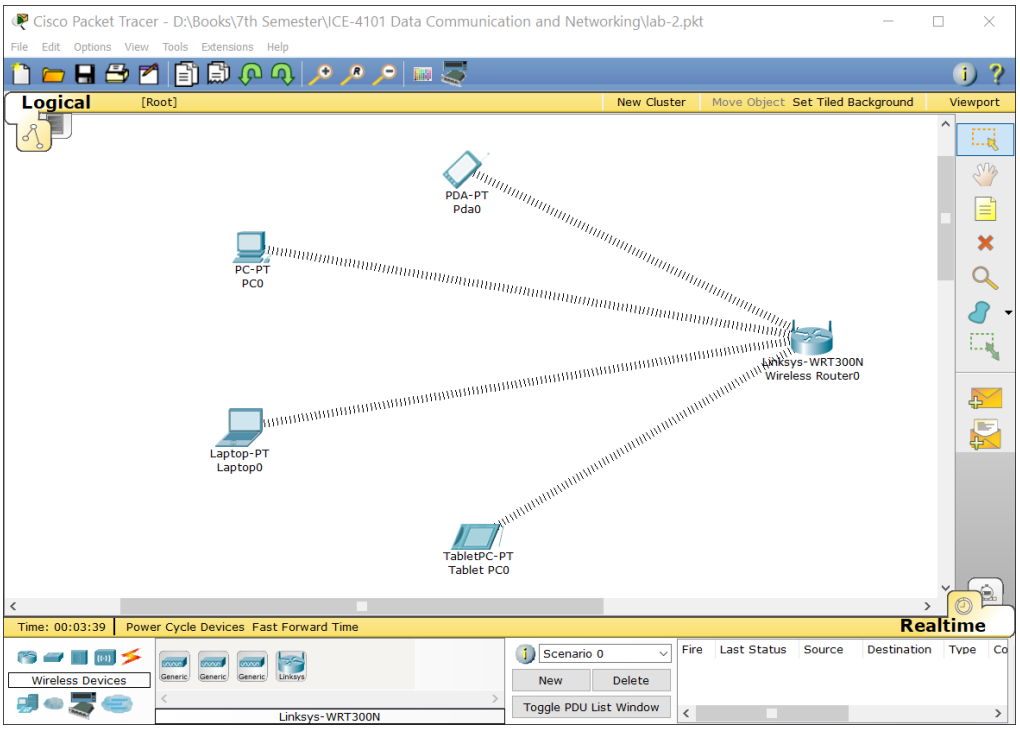

Figure 01: Configuration of Local Area Network (Wireless)

Required Component:

i. Router (Linksys-WRT300N)
ii. End Device (Desktop, Laptop, Tablet PC, PDA etc)
iii. IP Address (192.168.1.0)

Configuration Procedure:

i. Drag and drop a wireless router some device which support wireless on CISCO Packet Tracer Interface

 # For Desktop PC

ii. Double click on PC-PT then by default "Physical" tab. First power off our PC. We need to add Linksys-WMP300N module on this pc.

iii. Replace existing module with our Linksys-WMP300N module.

iv. Power on our device.

For laptop same procedure will apply. Now desktop and laptop are ready to communicate over wireless media.

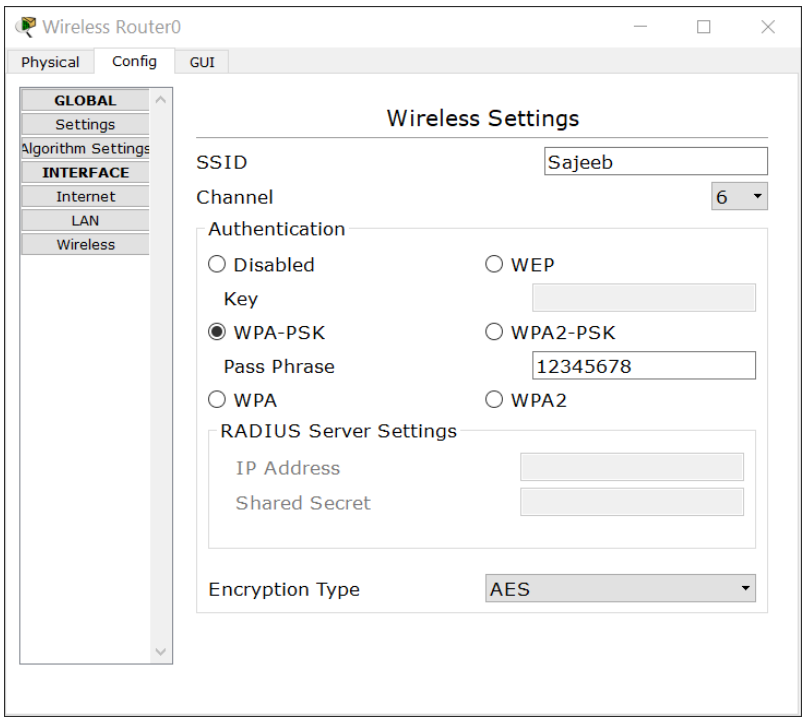

Figure 02: Wireless settings of Laptop 0

 # Router configuration

v. Double click and go to "Config" tab. Then select wireless.

vi. Now we give a name to our access point (SSID).

vii. Select and authentication type. By default, it will disable we will check out "WPA-PSK" and set password 12345678 and close it.

viii. Double click on desktop pc and open "PC Wireless" from "Desktop" tab.

ix. Click on "Connect" tab by default it will link information. Press "Refresh" button.

x. Then we will see an access point and press "Connect" button.

xi. Put our password of network on "Pre-Shared Key" and then connect. Same on laptop.

 # Config for PDA

xii. Double click on it and then select “Config” tab and also “Wireless” from left bottom.

xiii. Now putting our access point name (SSID) and password “WPA-PSK” and close it. Same for Tablet.

Simulation Process:

 # First way:

i. Select a packet from right side bar.Mouse pointer will change with packet symbol.

ii. Select first a PC and then select another PC with packet symbol pointer.

iii. It implies that a packet will flow from first device to second device.

iv. Then we can see successful notification right side bottom section.

 # Second way:

v. Double click on PC, select “Desktop” tab, Click on “Command Prompt”

vi. for example, this pc with 192.168.1.1 and it will ping 192.168.1.2

vii. write down “ping 192.168.1.2” press enter.

viii. if our physical and logical connection is ok then it will say that... Packet Send=4 Packet Received=4 Packet Lost=0%

 # Third way:

ix. Double click on desktop or laptop then selects “Web Browser” from “Desktop” tab.

x. write down router ip address on browser address bar and press inter.

xi. A command prompt will appear for authentication give username and password admin.

xii. If everything is ok then we will allow to access on router.

Problem No: 3
Problem Name: Transfer packets through two different networks.
Objectives:

- To configure and establish connectivity between two different networks using routers.
- To enable data packet transfer across different IP address ranges.
- To verify successful communication between devices in separate networks using routing protocols or static routes.

Description: In this experiment, we explore how packets are transferred between two different networks, a process that typically involves routers. Each network has its own IP address range, and routers handle the transfer of data packets between them. Routing is essential for enabling communication across different networks. This experiment may involve configuring IP addressing, setting up static or dynamic routes, and verifying successful packet transfer using tools like ping or traceroute.

Required Software: Cisco Packet Tracer 6.0

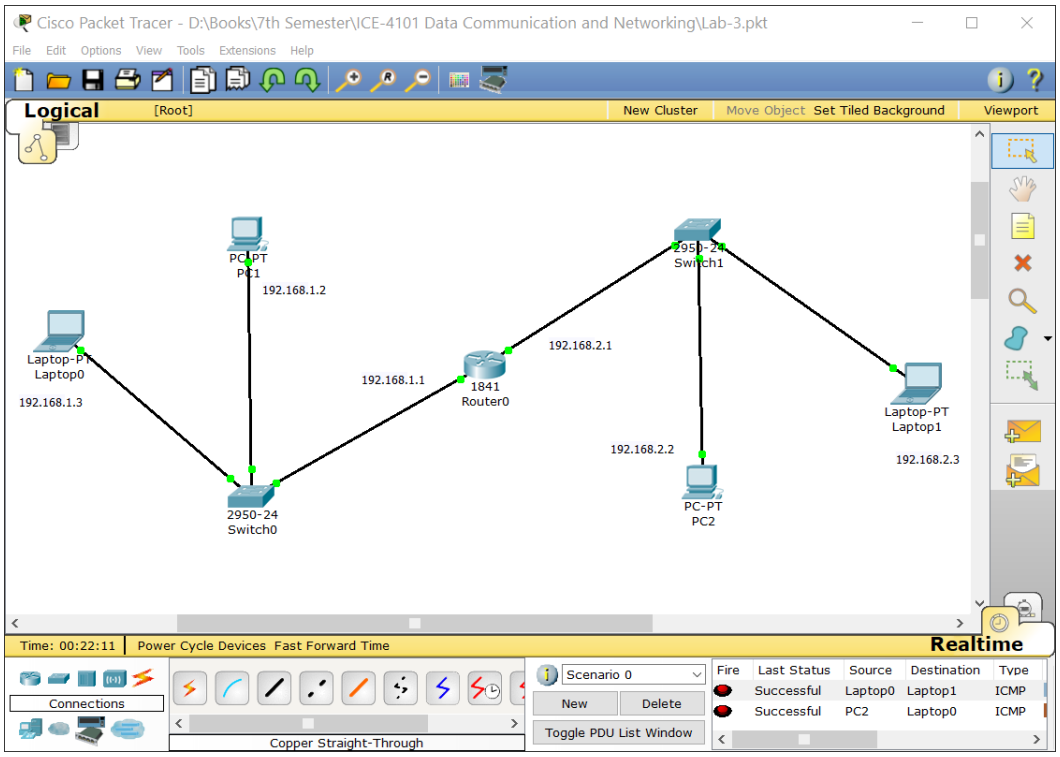

Figure 01: Configuration of Transfer packets through two different networks.

Required Component:

i. Switch
ii. UTP Cable (Straight Through)
iii. End Device (Desktop, Laptop etc)
iv. IP Address (192.168.1.0, 192.168.2.0)
v. Router

Configuration Procedure:

i. Drag and drop two switch one router and two end devices.
ii. Select cable and connect two switches through router and then end device will be connected with switch.
iii. Double click on router, here this router by default two interface fa 0/0 and fa 0/1. those two interface are connected two different switches also two different networks.
iv. Click on CLI type no on the text edit option.
v. If we press yes then router will ask several questions for his system maintains but all of those are not usable to us so we just type no.
vi. Router stay normally three stages. one is privilege mode then global config and finally specific configuration.
vii. Now we are in privilege mode to promote global config type enable and press enter then we can see it's router symbol will change.
viii. We are now global configuration mode so we need to access specific interface and configure it.
ix. Just write down "interface fa 0/0" this is for interface 0/0 of router. Then it need to add ip address so that just type e.g "ip address 192.168.1.1" then put subnet musk 255.255.255.0
x. By default, every interface of Cisco device down state. So we need it to up. just write down "no shut" command.
xi. Go back to privilege mode by "exit" command.
xii. Finally write down "wr" to save configuration
xiii. We just configured only one interface. we need another one of different network with different ip address.
xiv. After configure the router we need to mention ip address of each end device.

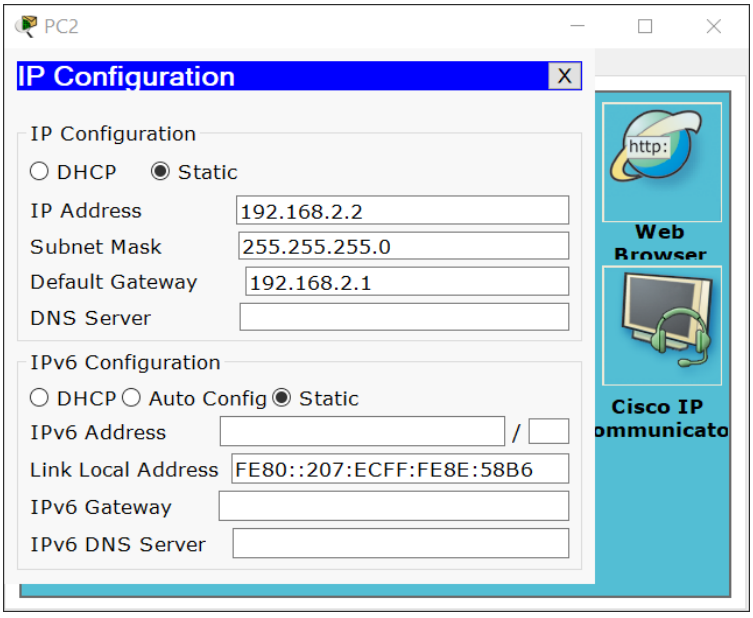

Figure 02: IP configuration of Laptop0

CLI Command:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 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

Router(config-if)#exit
Router(config)#interface fastEthernet 0/1
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up

Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
```

Simulation Process:

i. Select a packet from right side bar. Mouse pointer will change with packet symbol.
ii. Select first a PC and then select another PC with packet symbol pointer.
iii. It implies that a packet will flow from first device to second device.
iv. Then we can see successful notification right side bottom section.

Problem No: 4
Problem Name: Dynamic IP through DHCP.
Objectives:

- To set up a DHCP server for automatic IP address allocation to devices in a network.
- To configure network settings such as subnet mask, default gateway, and DNS via DHCP.
- To verify that devices receive dynamic IP addresses and can connect to the network seamlessly.

Description: Dynamic Host Configuration Protocol (DHCP) is used to automatically assign IP addresses to devices in a network. DHCP reduces the need for manual IP configuration, which simplifies network management and avoids IP conflicts. In this experiment, we set up a DHCP server, which dynamically allocates IP addresses, subnet masks, and gateway information to connected devices. This is essential in large networks where manually configuring IPs would be impractical.

Required Software: Cisco Packet Tracer 6.0

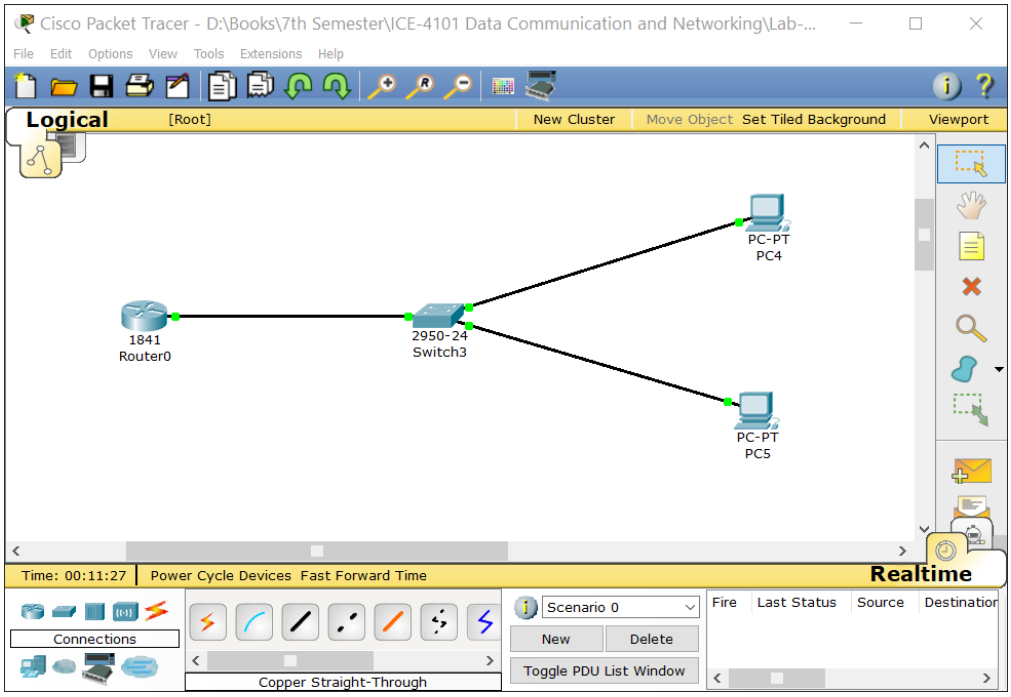

Figure 01: Configuration of Dynamic IP through DHCP.

Required Component:

i. Switch
ii. UTP Cable (Straight Through)
iii. End Device (Desktop, Laptop etc)
iv. IP Address (192.168.1.0)
v. Router

Configuration Procedure:

i. Drag and drop one switch one router and three or more end device
ii. Connect them UTP Straight Through Cable
iii. Double click on router and then click on CLI Mode
iv. Enter privilege then global configuration mode.
v. Access an interface such as fa 0/0
vi. Assign IP and subnet musk then “no shut” to up this state.
vii. Exit from here to global configuration mode
viii. Write down the command “ipdhcp pool myPoleName”
ix. Mention the network and then router default IP
x. Exit and save change.
xi. Double click on select “Desktop” and click on “IP configuration”
xii. Click on DHCP to send a request for IP

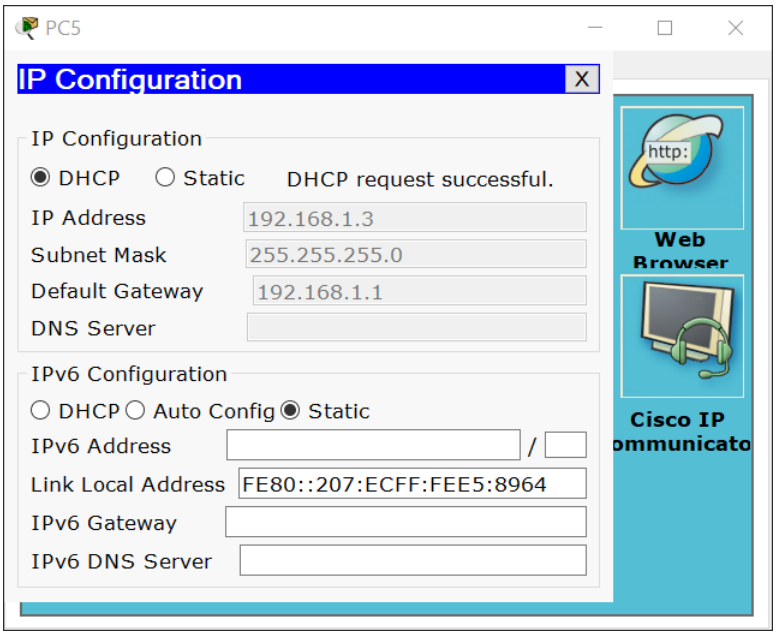

Figure 01: DHCP information of PC0

CLI Command:

```
Continue with configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#inter f 0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no sh

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

Router(config-if)#exit
Router(config)#ip dhcp pool ice
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#

Simulation Process:

i. Select a packet from right side bar. Mouse pointer will change with packet symbol.
ii. Select first a PC and then select another PC with packet symbol pointer.
iii. It implies that a packet will flow from first device to second device.
iv. Then we can see successful notification right side bottom section.

Problem No: 5
Problem Name: Configure Routing Information Protocol (RIP).
Objectives:

- To configure the Routing Information Protocol (RIP) on network routers for dynamic route sharing.
- To enable routers to exchange routing information and learn routes to different network segments automatically.
- To verify successful routing and connectivity between multiple networks using RIP.

Description: The Routing Information Protocol (RIP) is a distance-vector routing protocol used for managing routes in a local or wide area network. RIP uses the hop count as its metric, and each router periodically shares its routing table with neighboring routers. In this experiment, we configure RIP on routers to automatically learn the routes to different network segments. This protocol is simple and best suited for smaller networks, as it has limitations with large networks and converges slowly.

Required Software: Cisco Packet Tracer 6.0

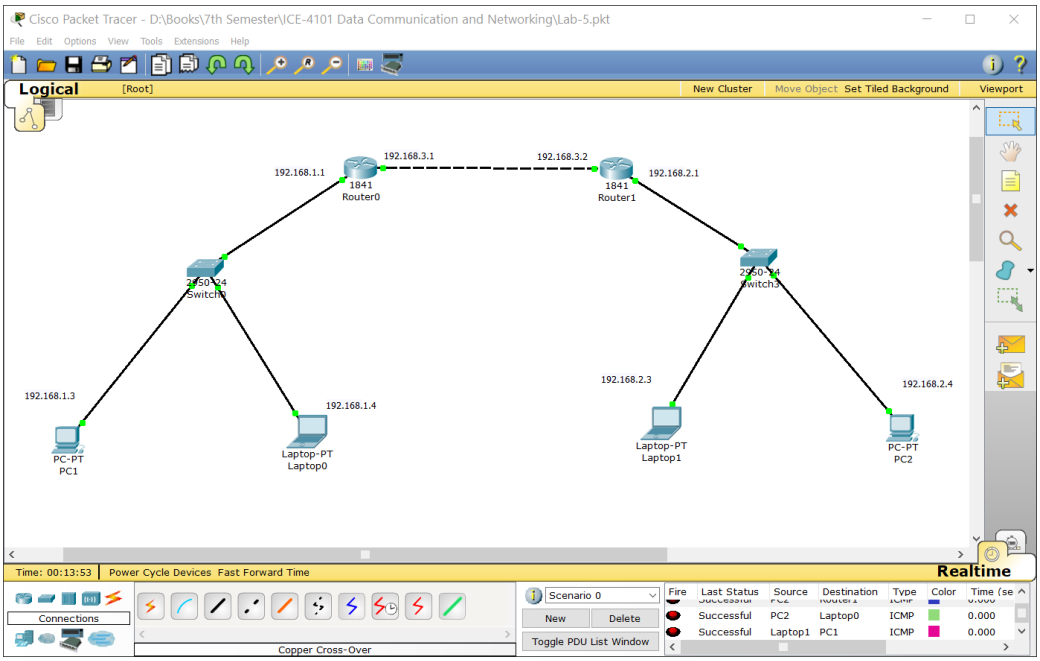

Figure 01: Configuration of Routing Information Protocol (RIP).

Required Component:

i. Switch
ii. UTP Cable (Straight Through)
iii. Ethernet crossover cable
iv. End Device (Desktop, Laptop etc)
v. Router

Configuration Procedure:

i. Drag and drop Routers, Switches and PCs.
ii. Select cable and make sure a proper connections.
iii. Double click on router.
iv. Click on CLI Tab.
v. First assign IP Address of on interface
vi. Assign RIP command.
vii. Mention RIP version
viii. Finally save this configuration

CLI Command:

 # Configuration for Router 0

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

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

Router(config-if)#exit
Router(config)#int f 0/1
Router(config-if)#ip add 192.168.3.1 255.255.255.0
Router(config-if)#no sh

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to up
Router(config-if)#exit
```

 # RIP Configuration

```
Router(config)#router RIP
Router(config-router)#version 2
Router(config-router)#net 192.168.1.0
Router(config-router)#net 192.168.3.0
Router(config-router)#exit
Router(config)#exit

Router#wr
Building configuration...
[OK]
Router#
```

 # Configuration for Router 1

```
Router>en
```

```
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#inter f0/1
Router(config-if)#ip add 192.168.2.1 255.255.255.0
Router(config-if)#no sh

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to up

Router(config-if)#exit
Router(config)#inter f0/0
Router(config-if)#ip add 192.168.3.2 255.255.255.0
Router(config-if)#no sh

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
Router(config-if)#exit
```

 # RIP Configuration

```
Router(config)#router RIP
Router(config-router)#version 2
Router(config-router)#net 192.168.2.0
Router(config-router)#net 192.168.3.0
Router(config-router)#exit
Router(config)#exit
Router#wr
Building configuration...
[OK]
Router#
```

Simulation Process:

```
Router>show 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 not set

C    192.168.1.0/24 is directly connected, FastEthernet0/0
R    192.168.2.0/24 [120/1] via 192.168.3.2, 00:00:17, FastEthernet0/1
C    192.168.3.0/24 is directly connected, FastEthernet0/1
```

Problem No: 6
Problem Name: Configure Open Shortest Path First (OSPF) Routing Protocol.
Objectives:

- To configure the Open Shortest Path First (OSPF) routing protocol on network routers for efficient route discovery.
- To enable routers to create a dynamic map of the network topology and determine the shortest paths.
- To verify network connectivity and observe OSPF's ability to quickly adapt to network changes.

Description: Open Shortest Path First (OSPF) is a link-state routing protocol widely used in large and complex networks. OSPF finds the shortest path for data packets by creating a map of the network topology. Each router in an OSPF network has a complete view of the network, which allows for faster convergence and more efficient routing decisions. In this experiment, we configure OSPF on routers, define areas, and observe how OSPF maintains an accurate routing table through periodic updates.

Required Software: Cisco Packet Tracer 6.0

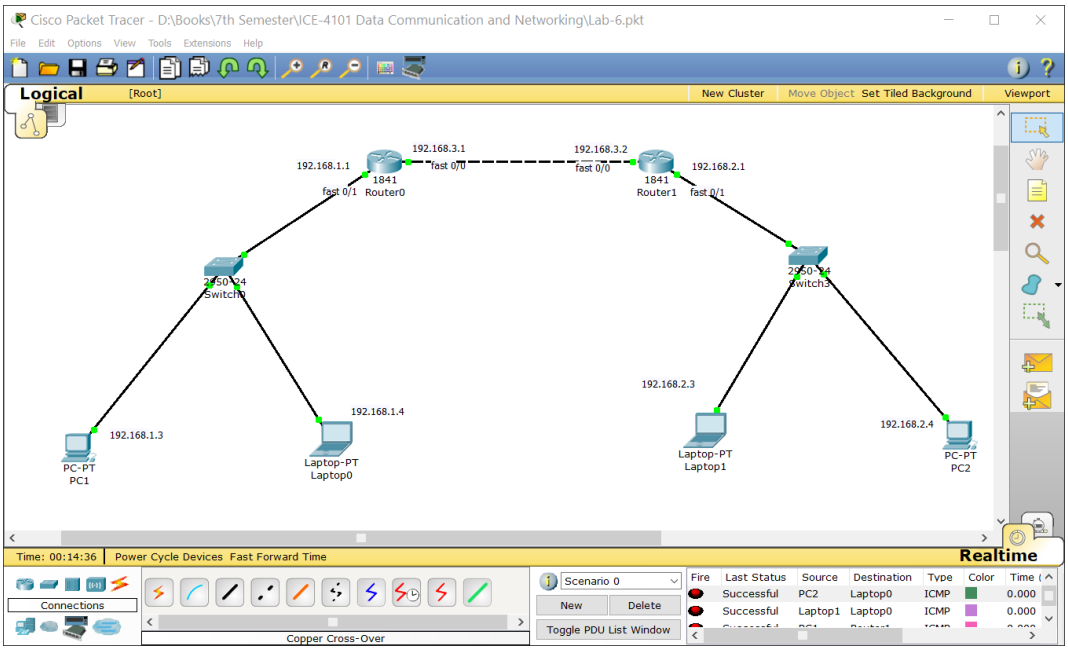

Figure 01: Configuration of Open Shortest Path First (OSPF) Routing Protocol.

Required Component:

i. Switch
ii. UTP Cable (Straight Through)
iii. End Device (Desktop, Laptop etc)
iv. Ethernet crossover cable
v. Router

Configuration Procedure:

i. Drag and drop Routers, Switches and PCs.
ii. Select cable and make sure a proper connections.
iii. Double click on router.
iv. Click on CLI Tab.
v. First assign IP Address of on interface
vi. Assign OSPF command. (ospf then numerical value such as 1,2,3)
vii. Mention Network then Wild card mask then area.
viii. Finally save this configuration

CLI Command:

 # Configuration of router 0

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#inter f0/1
Router(config-if)#ip add 192.168.1.1 255.255.255.0
Router(config-if)#no sh

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to up

Router(config-if)#exit
Router(config)#inter f0/0
Router(config-if)#ip add 192.168.3.1 255.255.255.0
Router(config-if)#no sh

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

 # OSPF Configuration

```
Router(config)#router ospf 1
Router(config-router)#net 192.168.1.0 0.0.0.255 area 0
Router(config-router)#net 192.168.3.0 0.0.0.255 area 0
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
```

 # Configuration of Router 1

```
Continue with configuration dialog? [yes/no]: no
```

```
Press RETURN to get started!
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#inter f0/1
Router(config-if)#ip add 192.168.2.1 255.255.255.0
Router(config-if)#no sh

Router(config-if)#exit
Router(config)#inter f 0/0
Router(config-if)#ip add 192.168.3.2 255.255.255.0
Router(config-if)#no sh
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up
Router(config-if)#exit
```

 # OSPF Configuration

```
Router(config)#router ospf 1
Router(config-router)#net 192.168.2.0 0.0.0.255 area 0
Router(config-router)#net 192.168.3.0 0.0.0.255 area 0
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#wr
Building configuration...
[OK]
Router#
00:11:36: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.3.1 on FastEthernet0/0 from
LOADING to FULL, Loading Done
```

Simulation Process:

```
Router>show 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 not set

C    192.168.1.0/24 is directly connected, FastEthernet0/1
C    192.168.3.0/24 is directly connected, FastEthernet0/0
Router>
```

Problem No: 7
Problem Name: Configure Enhanced Interior Gateway Routing Protocol (EIGRP).
Objectives:

- To configure the Enhanced Interior Gateway Routing Protocol (EIGRP) on network routers for efficient and reliable routing.
- To enable routers to exchange routing information using EIGRP's advanced metrics, such as bandwidth and delay.
- To verify network connectivity and observe EIGRP's fast convergence and load balancing capabilities.

Description: Enhanced Interior Gateway Routing Protocol (EIGRP) is a hybrid routing protocol developed by Cisco. EIGRP combines the features of distance-vector and link-state protocols, making it more efficient and flexible. It uses metrics such as bandwidth and delay to determine the best route and supports fast convergence. In this experiment, we configure EIGRP on routers, examine its advanced features like unequal-cost load balancing, and observe how EIGRP adapts to changes in the network.

Required Software: Cisco Packet Tracer 6.0

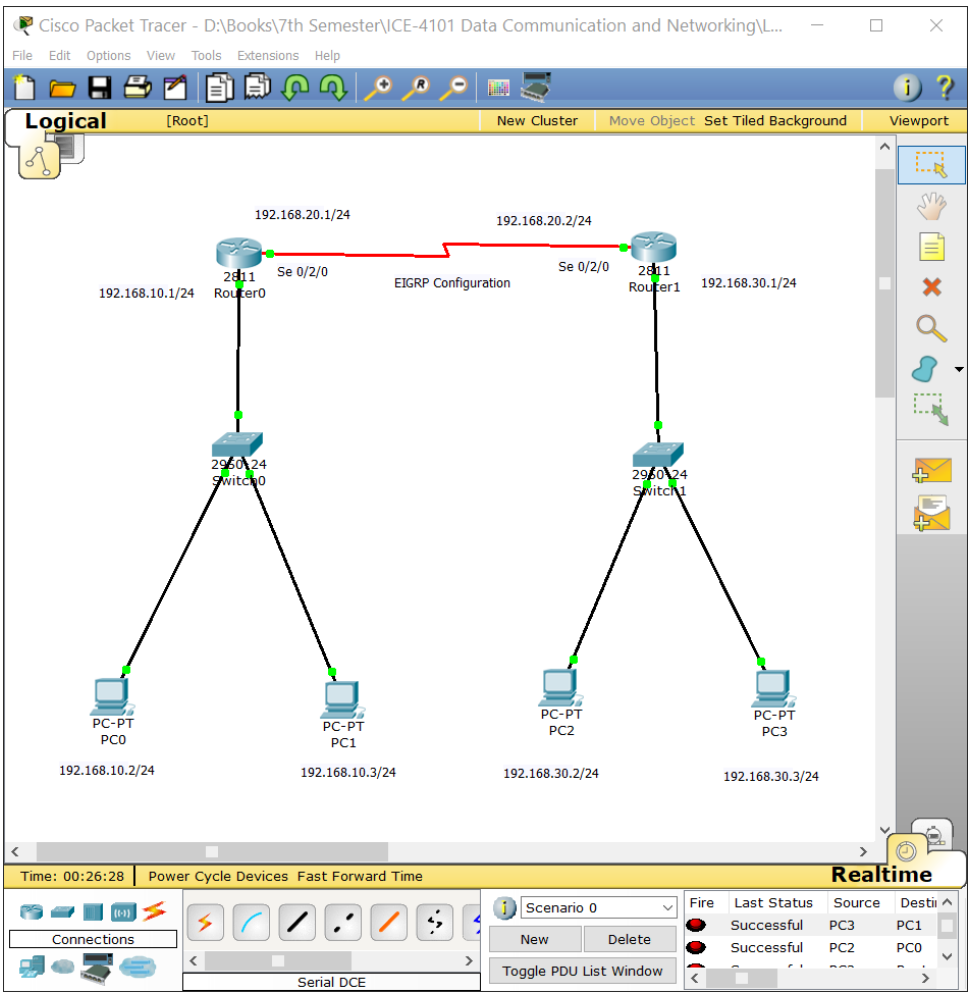

Figure 01: Configuration of Enhanced Interior Gateway Routing Protocol (EIGRP).

Required Component:

i. Switch
ii. UTP Cable (Straight Through)
iii. End Device (Desktop, Laptop etc)
iv. Serial DCE Cable
v. Router

Configuration Procedure:

i. Drag and drop Routers (2811), Switches and PCs.
ii. Double click on router then by default "Physical" tab. first power off our router. We need to add WIC-1T Module on this router. Then power on our router
iii. Select cable and make sure a proper connection.
iv. Double click on router.
v. Click on CLI Tab.
vi. First assign IP Address of on interface
vii. Assign EIGRP command. (EIGRP then numerical value such as 1,2,3)
viii. Mention network then subnet mask.
ix. Finally save this configuration

CLI Command:

 # IP configuration of Router 0

```
Continue with configuration dialog? [yes/no]: no
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#inter f 0/1
Router(config-if)#ip add 192.168.10.1 255.255.255.0
Router(config-if)#no sh

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up

Router(config-if)#exit
Router(config)#inter serial 0/2/0
Router(config-if)#ip add 192.168.20.1 255.255.255.0
Router(config-if)#no sh

%LINK-5-CHANGED: Interface Serial0/2/0, changed state to down
Router(config-if)#
Router(config-if)#ip add 192.168.20.1 255.255.255.0
Router(config-if)#clock rate 128000
Router(config-if)#no sh
Router(config-if)#exit
```

```
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
```

 # EIGRP Configuration

```
Router(config)#router eigrp 10
Router(config-router)#network 192.168.10.0 255.255.255.0
Router(config-router)#network 192.168.20.0 255.255.255.0
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#
```

 # IP configuration of Router 1

```
Continue with configuration dialog? [yes/no]: no


Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#inter f0/1
Router(config-if)#ip add 192.168.30.1 255.255.255.0
Router(config-if)#no sh

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up

Router(config-if)#exit
Router(config)#inter serial 0/2/0
Router(config-if)#ip add 192.168.20.2 255.255.255.0
Router(config-if)#no sh

Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/2/0, changed state to up
```

```
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/2/0,
changed state to up

Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
```

 # EIGRP Configuration

```
Router(config)#router eigrp 10

Router(config-router)#net 192.168.30.0 255.255.255.0
Router(config-router)#net 192.168.20.0 255.255.255.0
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#
```

Simulation Process:

```
Router#show 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 not set

C    192.168.10.0/24 is directly connected, FastEthernet0/0
C    192.168.20.0/24 is directly connected, Serial0/2/0
D    192.168.30.0/24 [90/20514560] via 192.168.20.2, 00:02:33, Serial0/2/0
Router#
```

Problem No: 8
Problem Name: Configure Virtual Local Area Network (VLAN).
Objectives:

- Configure VLANs to enable efficient communication within departmental groups (IT and HR) across two switches.
- Isolate network traffic to improve performance and security between IT and HR departments.
- Ensure cross-switch connectivity within the same department without router dependency.

Description: A virtual LAN (Local Area Network) is a logical subnetwork that can group together a collection of devices from different physical LANs. Larger business computer networks often set up VLANs to re-partition their network for improved traffic management. Several different kinds of physical networks support virtual LANs including both Ethernet and Wi-Fi.

When set up correctly, virtual LANs can improve the overall performance of busy networks. VLANs are intended to group together client devices that communicate with each other most frequently. The traffic between devices split across two or more physical networks ordinarily needs to be handled by a networks core routers, but with a VLAN that traffic can be handled more efficiently by network switches instead. VLANs also bring additional security benefits on larger networks by allowing greater control over which devices have local access to each other. Wi-Fi guest networks are often implemented using wireless access points that support VLAN.

In this experiment we are using two switches which are located in different places under a same network. Each switch has four PCs under it, two for IT department and two for HR department of an office. We have to connect the IT department's PCs together and HR department of an office. We have to connect the IT department's PCs together an HR department's PCs together, so that same departments PCs can communicate with each other although they belong to different switches.

IP addresses assigned to each department are given below:
IT department 198.168.1.1 – 198.168.1.10
HR department 198.168.1.11 – 198.168.1.20

Required Software: Cisco Packet Tracer 6.0

Required Component:

i. Switch
ii. UTP Cable (Straight Through)
iii. End Device (Desktop, Laptop etc)

Configuration Procedure:

i. Open Cisco Packet Tracer.
ii. Pick up two switches from the network devices.
iii. Connect the switches with each other using Copper Cross-Over.
iv. Connect the switches with each other using Copper Straight-Through.

v. Let us consider the name of the VLAN under IT as “vlan 10” and VLAN under HR department as “vlan 20”.

vi. In figure 1 we have indicated the IT department’s PCs and HR department’s PCs as desired.

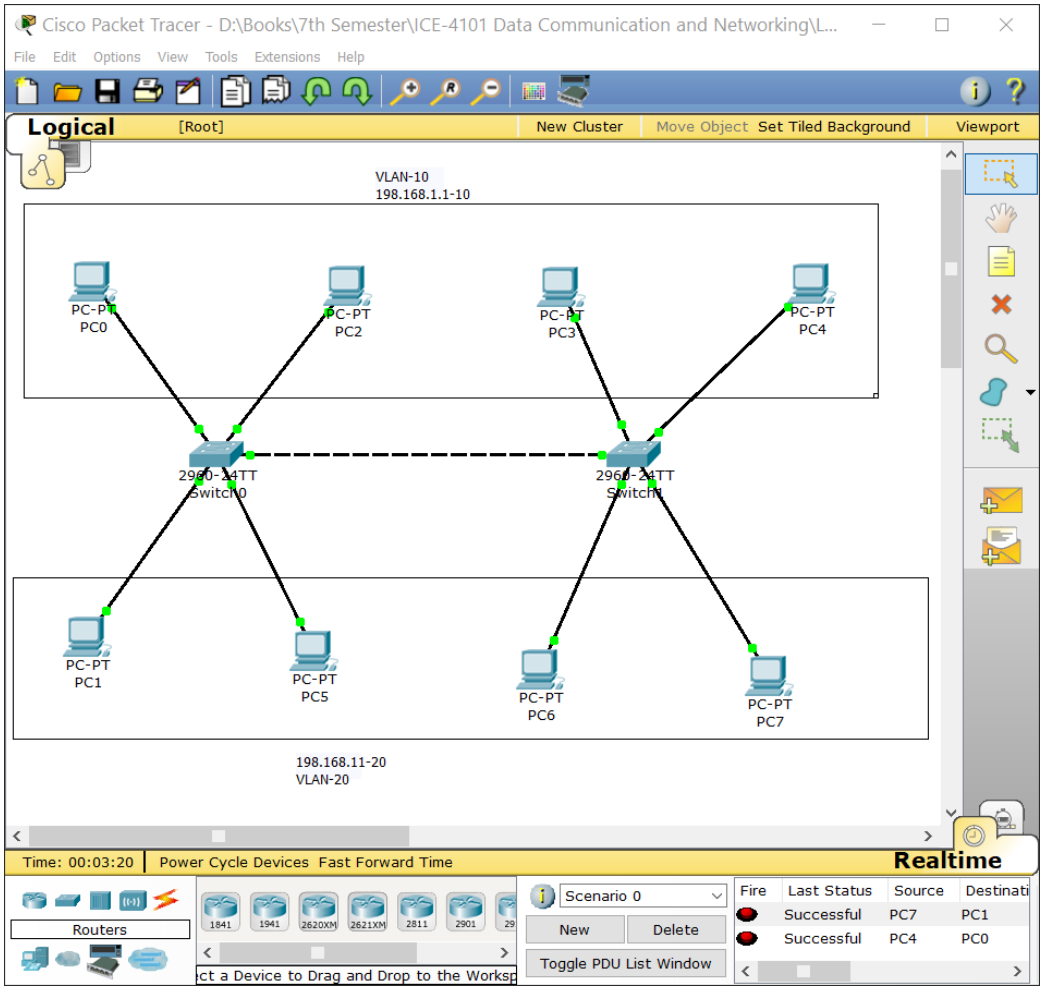

Figure 01: Configuration of Virtual Local Area Network (VLAN).

CLI Command:

 # Each Switch Command for VLAN Configuration.

```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name IT
Switch(config-vlan)#exit

Switch(config)#vlan 20
Switch(config-vlan)#name HR
Switch(config-vlan)#exit

Switch(config)#inter f0/1
```

```
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#inter f0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#inter f0/3
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#inter f0/4
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
```

 # Command for configuring Switch

```
Switch(config)#inter f0/5
Switch(config-if)#switchport mode trunk
Switch(config-if)#exit
Switch(config)#interface range f0/1-4
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#
```