INDEX

Experiment No: 01

Experiment Name: Configure Local Area Network (Wired)

Objectives:

A Local Area Network, or LAN, is a network of computers and other electronic devices in one physical location such as a school, home, or small office. A LAN could contain just a small number of devices or thousands of devices. The defining factor is not the size but rather that the devices are all in a single location.

In contrast, Wide Area Networks, or WANs, are computer networks that connect devices spread across a larger geographic area, while the Internet connects computers worldwide. A computer can be part of more than one network and for computer programs to respond differently to requests from different networks. LANs are also different from Metropolitan Area Networks or MANs, which are networks with a network topology covering an entire single city or defined geographic area (e.g., a "metropolitan area."

Required Software: Cisco Packet Tracer 6.0

Required Component:

(1). Switch
(2). UTP Cable (Straight Through)
(3). End Device (Desktop, Laptop etc)
(4). IP Address (192.168.1.0)

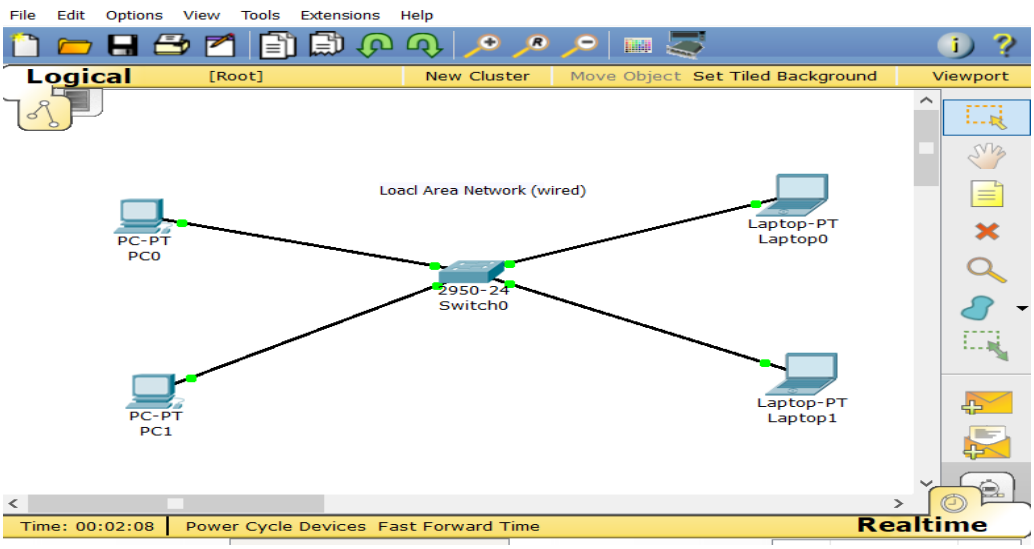
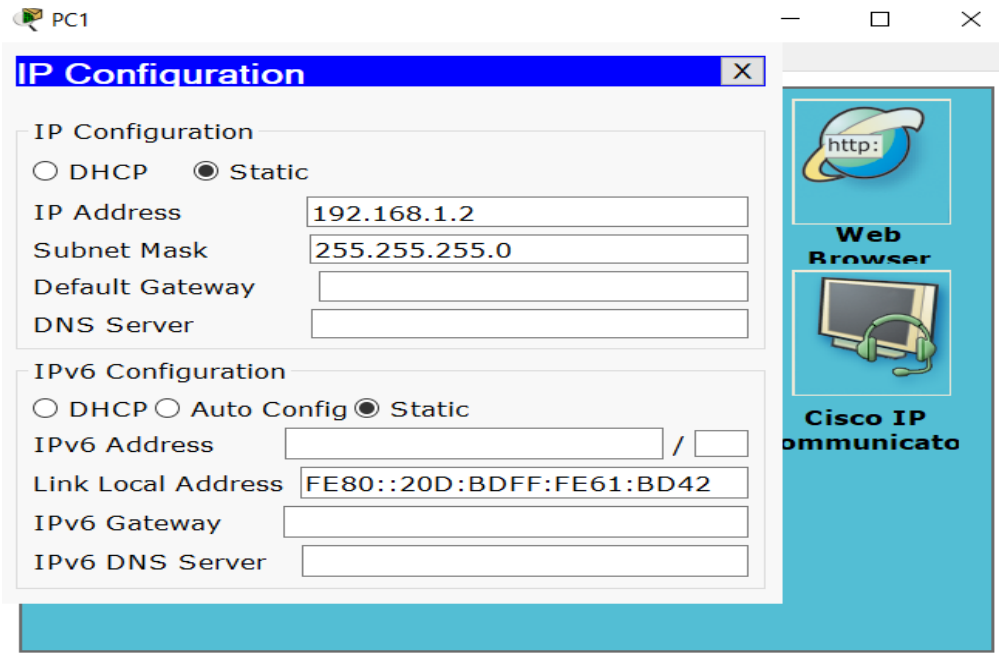


Fig: Configure Local Area Network (Wired)

Configuration Procedure:

(1). Drag and drop a switch on CISCO Packet Tracer interface.
(2). Take some end device which supports NIC Card with RJ45 connector.
(3). Choose Copper "Straight Through" UTP Cable for connect ion.

(4). Click on switch and select the specific port no for new connection.
(5). Repeat procedure (4) as much your end device remain connection less.
(6). Double click on an end device and you can see this interface is by default on "Physical" tab.
(7). Select Desktop tab and click on "IP Configuration



(8). Put IP Address and Click on submit section Subnet Mask will take automatically.
(9). Just close the section.
(10). Put IP Address on all the remaining end device.

Simulation Process:

first way:

(1). Select a packet from right side bar Mouse pointer will change with packet symbol.
(2). Select first a PC and then select another PC with packet symbol pointer.
(3). It implies that a packet will flow from first device to second device.
(4). Then you can see successful notification right side bottom section.

Second way:

(5). Double click on PC, select "Desktop" tab, Click on "Command Prompt"
(6). for examples this pc with 192.168.1.1 and it will ping 192.168.1.2
(7). write down "ping 192.168.1.2" press enter.
(8). if your physical and logical connection is ok then it will say that...
Packet Send=4 Packet Received=4 Packet Lost=0%

Experiment No: 02

Experiment Name: Configure Local Area Network (Wireless)

Objectives:

A Wireless Local Area Network (WLAN) is used to connect devices wirelessly through access points (APs) managed by a central controller called a Wireless LAN Controller (WLC). This setup allows devices like laptops, tablets, and smartphones to connect to the network without cables, using Wi-Fi standards such as 802.11ac or 802.11ax (Wi-Fi 6) for high data speeds and reliability.

The WLAN uses security protocols, including WPA2 or WPA3 encryption, to protect data, while 802.1X authentication ensures that only authorized users can access the network. Access points broadcast specific network names, known as SSIDs, which help users identify and connect to the right network. Each SSID can be linked to a Virtual LAN (VLAN) to segment traffic, isolating different types of users and devices (like guests or lab staff), improving both security and network efficiency.

Required Software: Cisco Packet Tracer 6.0

Required Component:

(1) Router (Linksys-WRT300N)
(2) End Device (Desktop, Laptop, TabletPC, PDAetc)
(3) IP Address (192.168.1.0)

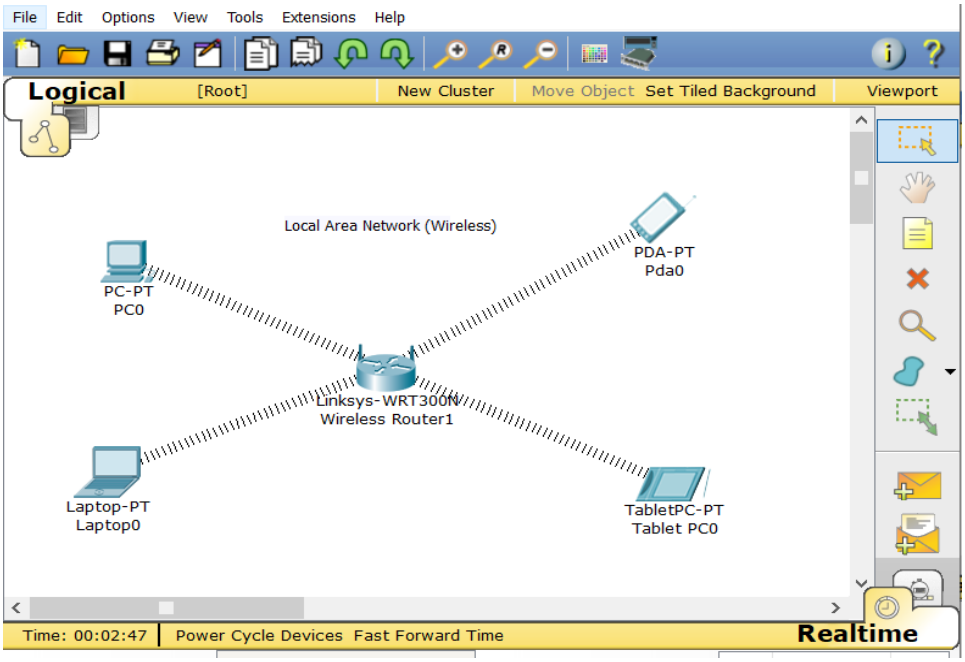


Fig: Configure Local Area Network (Wireless)

Configuration Procedure:

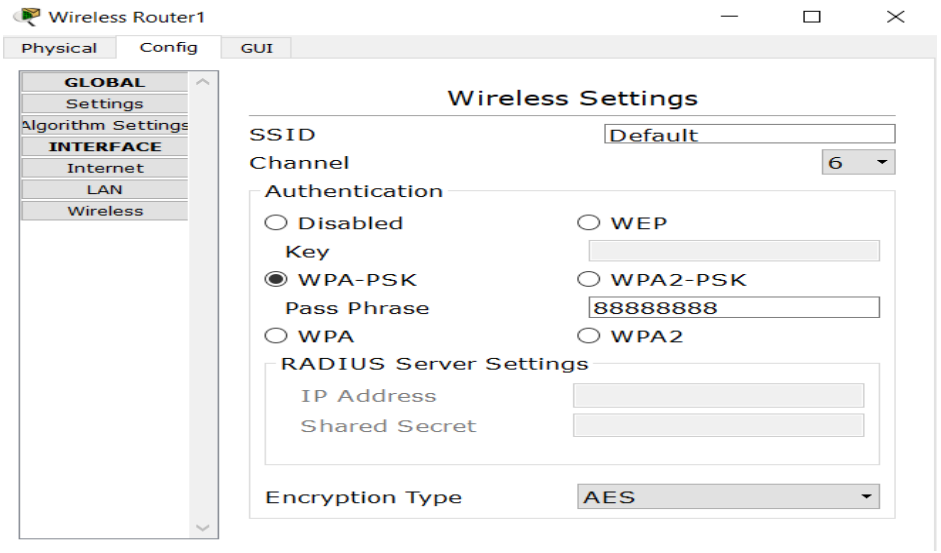
(1). Drag and Drop a wireless router some device which support wireless communication on CISCO Packet Tracer interface.

For Desktop PC

(2). Double click on PC-PT then by default "Physical" tab. first power off your pc. We need to add Linksys-WMP300N Module on this pc.
(3). Replace existing module with our "Linksys-WMP300N" module.
(4). power on your device.
For laptop same procedure will apply. Now desktop and laptop are ready to communicate over wireless media.

Router configuration:

(5). Double Click and go to "Config" tab. Then select wireless.
(6). Now give a name to your access point (SSID)
(7). Select an Authentication type. By default it will Disabled we will check out "WPA-PSK" and set password 88888888 and close it.



(8). Double click on desktop pc and open "PC Wireless" from "Desktop" tab.
(9). Click on "Connect" tab by default it will link information. Press "Refresh" button.
(10). Then we will see an access point and press "Connect" button.
(11). Put your password of network on "Pre Shared key" and then connect. Same on Laptop
(#) Config for PDA
(12). Double click on it and then select "Config" tab and also "Wireless" from left bottom.
(13). put your Access point name (SSID) and password "WPA-PSK" and close it. Same for Tablet

Simulation Process:

first way:

(1). Select a packet from right side bar Mouse pointer will change with packet symbol.
(2). Select first a PC and then select another PC with packet symbol pointer.
(3). It implies that a packet will flow from first device to second device.

(4). Then you can see successful notification right side bottom section.

Second way:

(5). Double click on PC, select “Desktop” tab, Click on “Command Prompt”

(6). For example this pc with 192.168.1.1 and it will ping 192.168.1.2

(7). write down “ping 192.168.1.2” press enter.

(8). if your physical and logical connection is ok then it will say that...

Packet Send=4 Packet Received=4 Packet Lost=0%

Third way: access router control panel through end device

(9) Double click on desktop or laptop then select “Web Browser” from “Desktop” tab

(10). write down router ip address on browser address bar and press inter.

(11). A command prompt will appear for authentication give username and password admin.

(12). If everything is ok then you will allow to access on router.

Experiment No: 03

Experiment Name: Transfer packets through two different networks.

Obectives:

Transferring packets between two different networks is a process managed by routers, which direct data based on IP addresses. When a device on one network sends data to a device on another network, it forwards the packet to its default gateway (a router) since the destination IP is outside its own network.

The router checks its routing table to find the best path to the destination network and forwards the packet accordingly. If there are multiple routers between the source and destination, each router reads the packet's destination IP, consults its own routing table, and forwards the packet along the best path until it reaches the router connected to the destination network.

Required Software: Cisco Packet Tracer 6.0

Required Component:

(1). Switch
(2). UTP Cable (Straight Through)
(3). End Device (Desktop, Laptop etc)
(4). IP Address (192.168.1.0, 192.168.2.0)
(5). Router

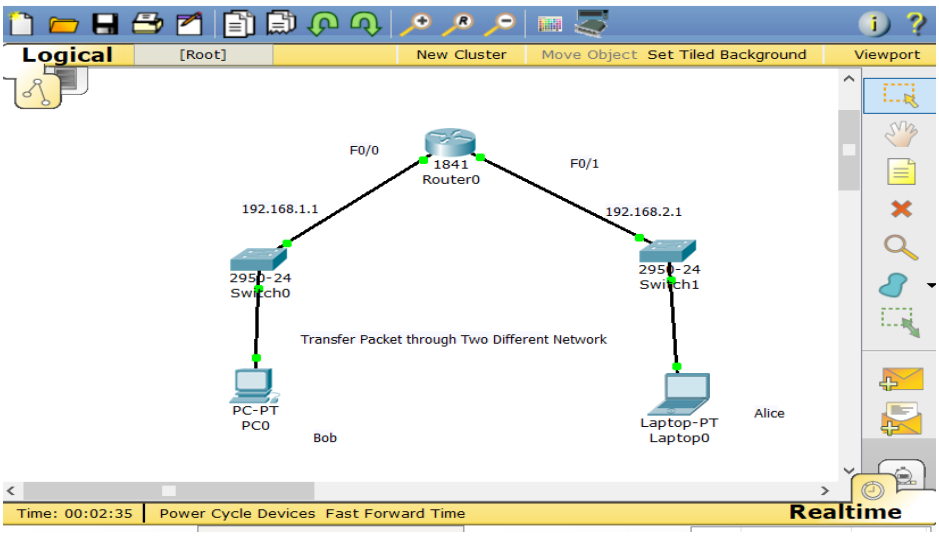


Fig: Transfer packets through two different networks.

Configuration Procedure:

(1). Drag and drop two switch one router and 2 end devices
(2). Select cable and connect two switches through router and then end device will connected with switch.
(3). 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 network.
(4). Click on CLI type no on the text edit option.
(5). If you 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.
(6). Router stay normally three stages. one is privilege mode then global config and Finlay specific configuration
(7). Now we are in privilege mode to promote global config type enable and press enter then you can see it's router symbol will change
(8). we are now global configuration mode so we need to access specific interface and configure it.
(9). 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
(10) By default every interface of Cisco device down state. So we need it to up. just write down "no shut" command
(11). go back to previlege mode by "exit" command.
(12). finally write down "wr" to save configuration
(13). we just configured only one interface. we need another one of different network with different ip address.
(14). After configure the router we need to mention ip address of each end device.

CLC Command:

```
Continue with configuration dialog? [yes/no]: no
Press RETURN to get started!
Router>enable
Router#configure terminal
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown

%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
(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shutdown

%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:

first way:

(1). Select a packet from right side bar Mouse pointer will change with packet symbol.
(2). Select first a PC and then select another PC with packet symbol pointer.
(3). It implies that a packet will flow from first device to second device.
(4). Then you can see successful notification right side bottom section.

Experiment No: 04

Experiment Name: Dynamic IP through DHCP

Objectives:

Dynamic IP addressing through DHCP (Dynamic Host Configuration Protocol) allows devices to automatically obtain an IP address from a DHCP server. When a device joins a network, it requests an IP address, and the DHCP server responds with an available one, along with other necessary network configurations. This IP is assigned temporarily, for a specific lease time, after which it may be renewed or reassigned.

The client's device will send a request for an IP address; the request will consist of the device's media access control (MAC) address, which identifies the network card of the device. The request will then reach DHCP server which after verifying, assign an available IP address to the device, and the device will be connected to that network.

The IP address that the DHCP server assigns will be in a specific range called subnets, there are different ranges of IP addresses given to the DHCP server for assigning. For example, a server might consist of IP addresses ranging from 195.22.9.1 to 195.22.9.10.

Required Software: Cisco Packet Tracer 6.0

Required Component:

(1). Switch
(2). UTP Cable (Straight Through)
(3). End Device (Desktop, Laptop etc)
(4). IP Address (192.168.1.0)
(5). Router

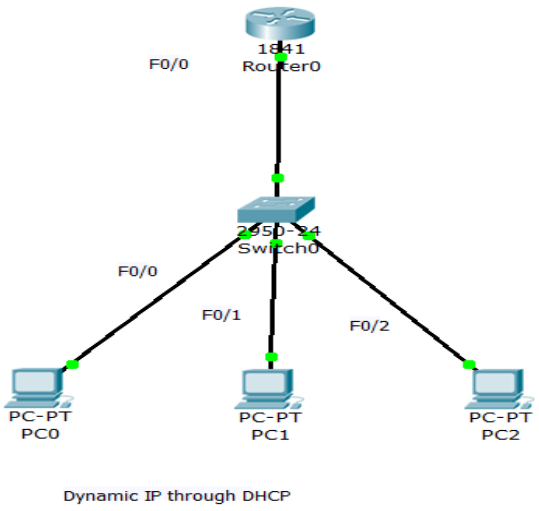
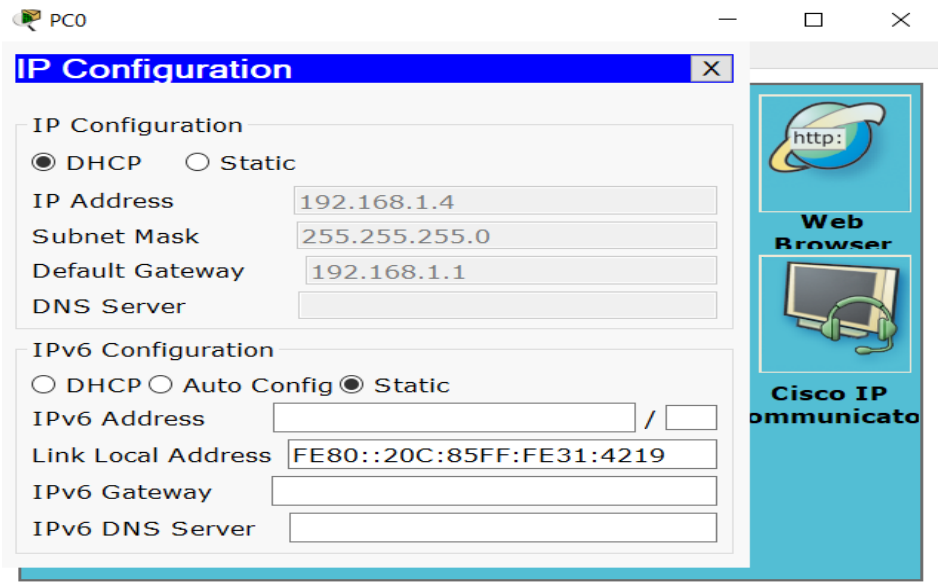


Fig: Dynamic IP through DHCP

Configuration Procedure:

(1). Drag and drop one switch one router and 3 or more end device
(2). Connect them UTP Straight Through Cable

(3). Double click on router and then click on CLI Mode
(4). enter privilege then global configuration mode.
(5). Access an interface such as fa 0/0
(6). Assign ip and subnet musk then “no shut” to up this state.
(7). exit from here to global configuration mode
(8). write down the command “ip dhcp pool myPoleName”
(9). Mention the network and then router default ip
(10). exit and save change.
(11) double click on select “Desktop” and click on “IP configuration”
(12). click on DHCP to send a request for ip



CLI Command:

Continue with configuration dialog? [yes/no]: no
Press RETURN to get started!

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
%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#

Experiment No: 05

Experiment Name: Configure Routing Information Protocol (RIP)

Objectives:

Routing Information Protocol (RIP) is a dynamic routing protocol that uses hop count as a routing metric to find the best path between the source and the destination network. It is a distance-vector routing protocol that has an AD value of 120 and works on the Network layer of the OSI model. RIP uses port number 520.

Hop Count

Hop count is the number of routers occurring in between the source and destination network. The path with the lowest hop count is considered as the best route to reach a network and therefore placed in the routing table. RIP prevents routing loops by limiting the number of hops allowed in a path from source and destination. The maximum hop count allowed for RIP is 15 and a hop count of 16 is considered as network unreachable.

Required Software: Cisco Packet Tracer 6.0

Required Component:

(1). Switch
(2). UTP Cable (Straight Through)
(3). Ethernet crossover cable
(4). End Device (Desktop, Laptop etc)
(5). Router

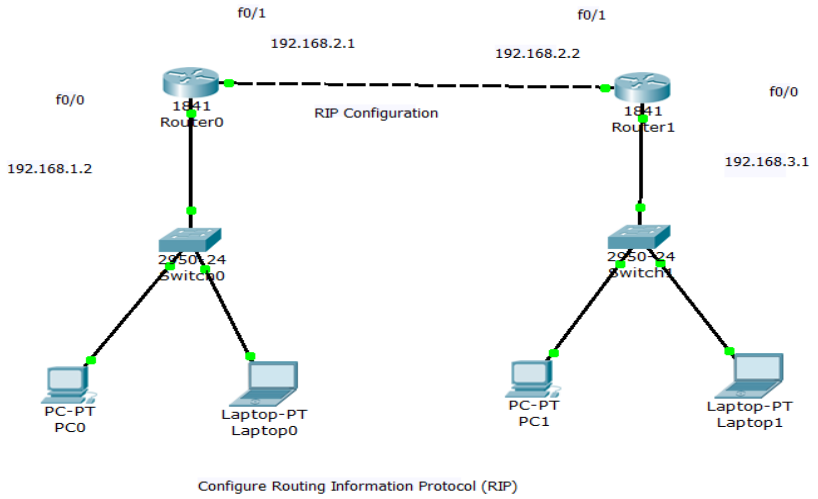


Fig: Configure Routing Information Protocol (RIP)

Configuration Procedure:

(1). Drag and Drop Routers, Switches and PCs.
(2). Select cable and make sure a proper connections.
(3). Double click on router.
(4). Click on CLI Tab.
(5). First assign IP Address of on interface
(6). Assign RIP command.
(7). Mention RIP version
(8). Finally save this configuration

CLI Command:

Router 0:

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int gig 0/0
Page 13 of 26
Router(config-if)#ip add 192.168.1.1 255.255.255.0
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#int gig 0/1
Router(config-if)#ip add 192.168.2.1 255.255.255.0
Router(config-if)#no shut
```

Router 1:

```
Router>en Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int gig 0/0
Router(config-if)#ip add 192.168.1.2 255.255.255.0
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#int gig 0/1
Router(config-if)#ip add 192.168.3.1 255.255.255.0
Router(config-if)#no shut
```

Router 0:

```
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router RIP
Router(config-router)#version 2
Router(config-router)#net 192.168.1.0
Router(config-router)#net 192.168.2.0 Router(config-router)#exit Router(config)#exit
Router#
Router#wr
Building configuration...
[OK]
```

Router 1:

```
Router#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router RIP
Router(config-router)#version 2
Page 14 of 26
Router(config-router)#net 192.168.1.0
Router(config-router)#net 192.168.3.0 Router(config-router)#exit
Router(config)#exit
Router#
Router#wr
Building configuration...
[OK]
```

Simulation Process:

```
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
C    192.168.2.0/24 is directly connected, FastEthernet0/1
R    192.168.3.0/24 [120/1] via 192.168.2.2, 00:00:14, FastEthernet0/1
Router#
```

Experiment No: 06

Experiment Name: Configure Open Shortest Path First (OSPF) Routing Protocol

Objectives:

The OSPF stands for Open Shortest Path First. It is a widely used and supported routing protocol. It is an intradomain protocol, which means that it is used within an area or a network. It is an interior gateway protocol that has been designed within a single autonomous system. It is based on a link-state routing algorithm in which each router contains the information of every domain, and based on this information, it determines the shortest path. The goal of routing is to learn routes. The OSPF achieves by learning about every router and subnet within the entire network. Every router contains the same information about the network. The way the router learns this information by sending LSA (Link State Advertisements). These LSAs contain information about every router, subnet, and other networking information. Once the LSAs have been flooded, the OSPF stores the information in a link-state database known as LSDB. The main goal is to have the same information about every router in an LSDBs.

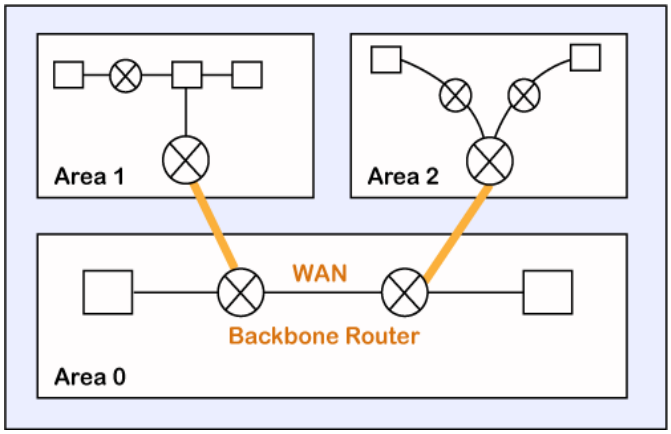


Fig: Open Shortest Path First (OSPF) Routing Protocol

Required Software: Cisco Packet Tracer 6.0

Required Component:

(1). Switch
(2). UTP Cable (Straight Through)
(3). Ethernet crossover cable
(4). End Device (Desktop, Laptop etc)
(5). Router

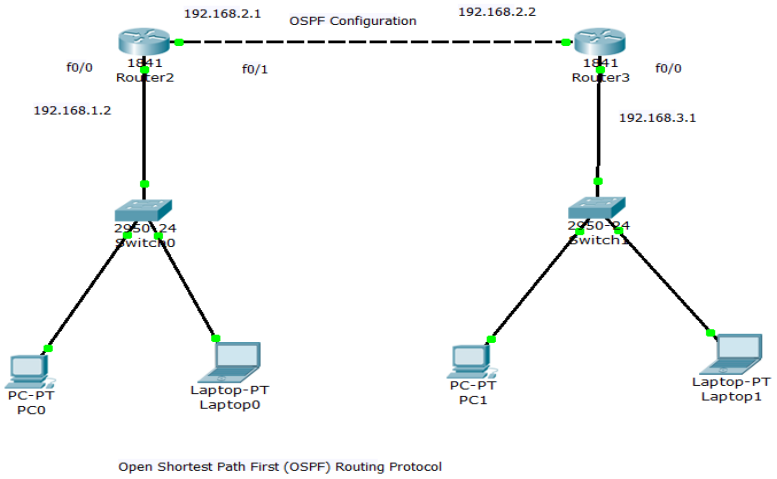


Fig: Configure Open Shortest Path First (OSPF) Routing Protocol

Configuration Procedure:

(1). Drag and Drop Routers, Switches and PCs.
(2). Select cable and make sure a proper connections.
(3). Double click on router.
(4). Click on CLI Tab.
(5). First assign IP Address of on interface
(6). Assign OSPF command. (ospf then numerical value such as 1,2,3)
(7). Mention Network then Wild card mask then area.
(8). Finally save this configuration

CLI Command:

Router 0:

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int gig 0/0
Router(config-if)#ip add 192.168.1.1 255.255.255.0

Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#int gig 0/1
Router(config-if)#ip add 192.168.2.1 255.255.255.0

Router(config-if)#no shut
```

Router 1:

```
Router>en Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int gig 0/0
Router(config-if)#ip add 192.168.1.2 255.255.255.0
Router(config-if)#no shut
Router(config-if)#
```

%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#int gig 0/1
Router(config-if)#ip add 192.168.3.1 255.255.255.0

Router(config-if)#no shut

OSPF Router 0:

Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#network 192.168.1.0 0.0.0.255 area 0
Router(config-router)#network 192.168.2.0 0.0.0.255 area 0
Router(config-router)#exit
Router(config)#exit
Router#wr
Building configuration...
[OK]

OSPF Router 1:

Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#network 192.168.1.0 0.0.0.255 area 0
Router(config-router)#network 192.168.3.0 0.0.0.255 area 0
Router(config-router)#exit
Router(config)#exit
Router#
Router#wr
Building configuration...
[OK]

Simulation Process:

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
C 192.168.2.0/24 is directly connected, FastEthernet0/1
O 192.168.3.0/24 [110/2] via 192.168.2.2, 00:02:43, FastEthernet0/1

Experiment No: 07

Experiment Name: Configure Enhanced Interior Gateway Routing Protocol (EIGRP)

Objectives:

Enhanced Interior Gateway Routing Protocol (EIGRP) is an advanced routing protocol developed by Cisco for efficiently managing routing within a network. It is a hybrid protocol, blending features of distance-vector and link-state protocols to provide faster convergence and loop-free routing.

EIGRP calculates the best route using a composite metric based on factors like bandwidth and delay, allowing for flexible path selection. It uses the Diffusing Update Algorithm (DUAL) to ensure fast convergence and maintain backup routes for quick failover.

Unlike simpler protocols, EIGRP only sends updates when there's a change in the network, reducing unnecessary traffic. It supports classless routing, enabling efficient IP address allocation with Variable Length Subnet Masking (VLSM).

Required Software: Cisco Packet Tracer 6.0

Required Component:

(1). Switch
(2). UTP Cable (Straight Through)
(3). Serial DCE cable
(4). End Device (Desktop, Laptop etc.)
(5). Router

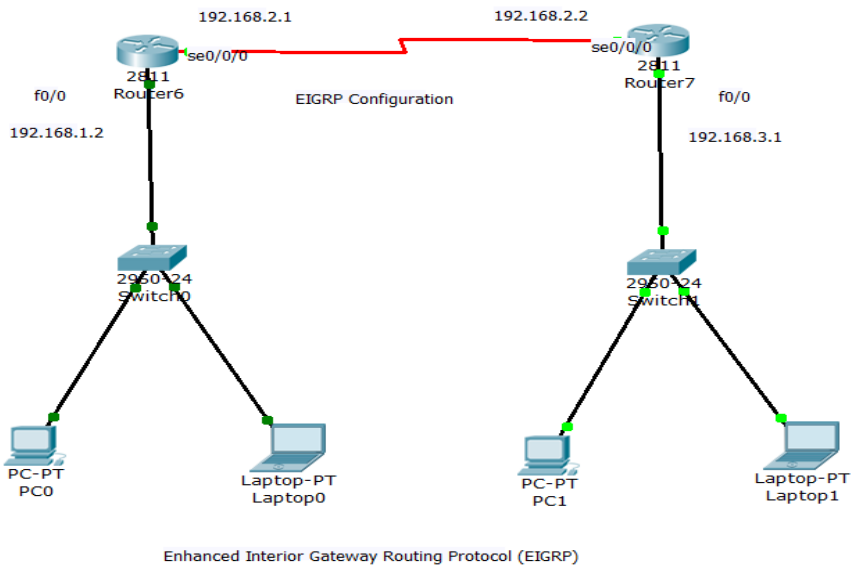
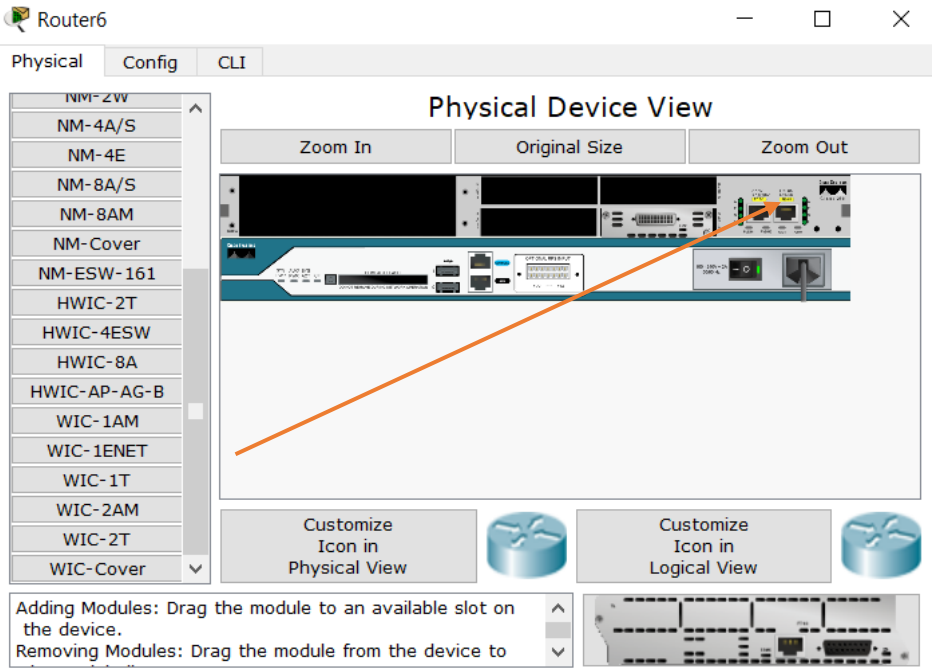


Fig: Configure Enhanced Interior Gateway Routing Protocol (EIGRP)

Configuration Procedure:

(1) Drag and Drop Routers (2811), Switches and PCs.
(2) Double click on router then by default “Physical” tab. first power off your router. We need to add WIC-!T Module on this router. Then power on your router.



(2). Select cable and make sure a proper connections.
(3). Double click on router.
(4). Click on CLI Tab.
(5). First assign IP Address of on interface
(6). Assign EIGRP command. (eigrp then numerical value such as 1,2,3)
(7). Mention network then subnet mask.
(8). Finally save this configuration

CLI Command:

Router 0:

```
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 192.168.10.1 255.255.255.0
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 serial 0/0/0
```

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

Router 1:

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 192.168.30.1 255.255.255.0
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 serial 0/0/0
Router(config-if)#ip address 192.168.20.2 255.255.255.0
Page 21 of 26
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#exit
Router(config)#exit Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#

EIGRP Router 0:

Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
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)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#

EIGRP Router 1:

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router eigrp 10
Router(config-router)#network 192.168.20.0 255.255.255.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 10: Neighbor 192.168.20.1 (Serial0/0/0) is up:
new adjacency
Router(config-router)#network 192.168.30.0 255.255.255.0
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#copy runn
Router#copy running-config st
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, Serial0/0/0
D 192.168.30.0/24 [90/20514560] via 192.168.20.2, 00:12:51, Serial0/0/0
```

Experiment No: 08

Experiment 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:

(1). Switch
(2). Automatically choose connection type cable
(3). End Device (Desktop, Laptop etc)
(4). Router

Configuration Procedure:

1. Open Cisco Packet Tracer
2. Pic up two switches from the network device
3. We have picked up four PC's for each switch from end devices.
4. Connection the switch with each other using Copper Cross-Over.
5. Connection remaining components using Copper Straight-Through
6. Let us consider the name of the VLAN under IT department as "vlan 10 and VLAN under HR department as "valn 20"
7. In figure 01 we have indicate the IT the department's PC's and HR department's PC's as desired.

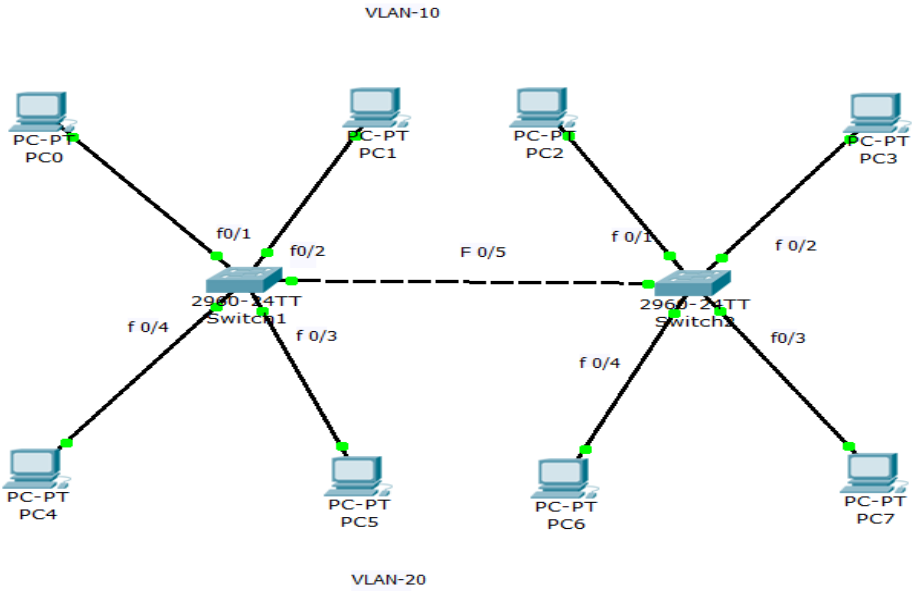


Fig: Configure Virtual Local Area Network (VLAN).

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
```