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Experiment No: 01

Experiment Name: Configure Local Area Network (Wired).

Required software: Cisco Packet Tracer 8.2.0

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

Description: A Wired Local Area Network (LAN) is a type of network where devices are connected via physical cables, typically Ethernet, to facilitate communication and for sharing resources within a defined area such as a home, office, or building. Wired LAN depends on direct, hardwired connections between devices and network hardware. A LAN include various network components such as cables, switches, router, firewalls and load balancers. The fundamental component of a wired LAN is the Ethernet cable, which connects devices (such as computers, printers, and servers) to a central network device, typically a network switch or router. A network switch acts as the central hub in a wired LAN, facilitating communication between connected devices. When a device sends data, the switch examines the data packet and forwards it only to the intended recipient based on its Media Access Control (MAC) address.

Configuration Procedure: To configure Local Area Network (Wired) we need to follow the following steps:

Design network:

i. Open CISCO Packet Tracer software.
ii. Drag and Drop a switch on CISCO Packet Tracer interface.
iii. Take some end device which supports NIC Card with RJ45 connector.

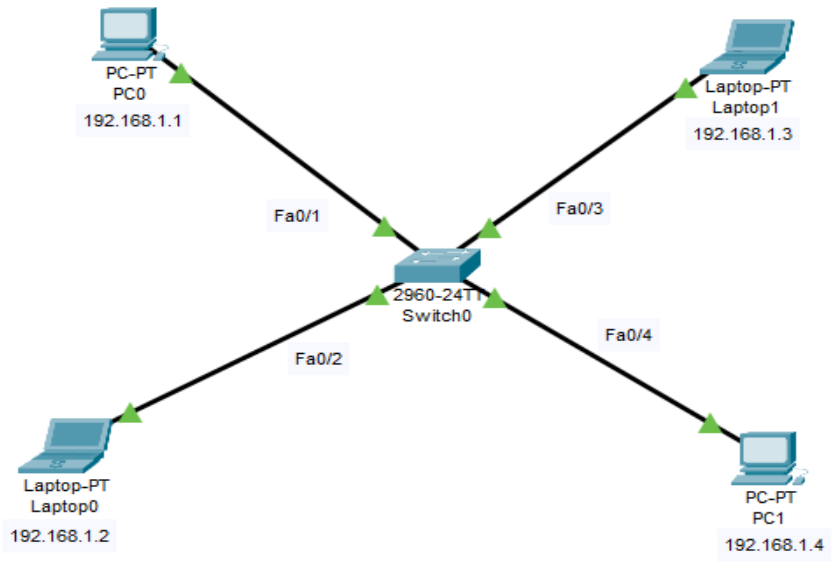


Fig-1: A Local Area Network(wired)

iv. Choose Copper “Straight Through” UTP Cable for connect ion.
v. Click on switch and select the specific port no for new connection.
vi. Repeat procedure (iv) as much your end device remain connection less.

IP configuration:

i. Double click on an end device and you can see this interface is by default on “Physical” tab.
ii. Select Desktop tab and click on “IP Configuration”.
iii. Put IP Address and Click on submit section Subnet Mask will take automatically.
iv. Just close the section.
v. Put IP Address on all the remaining end device.

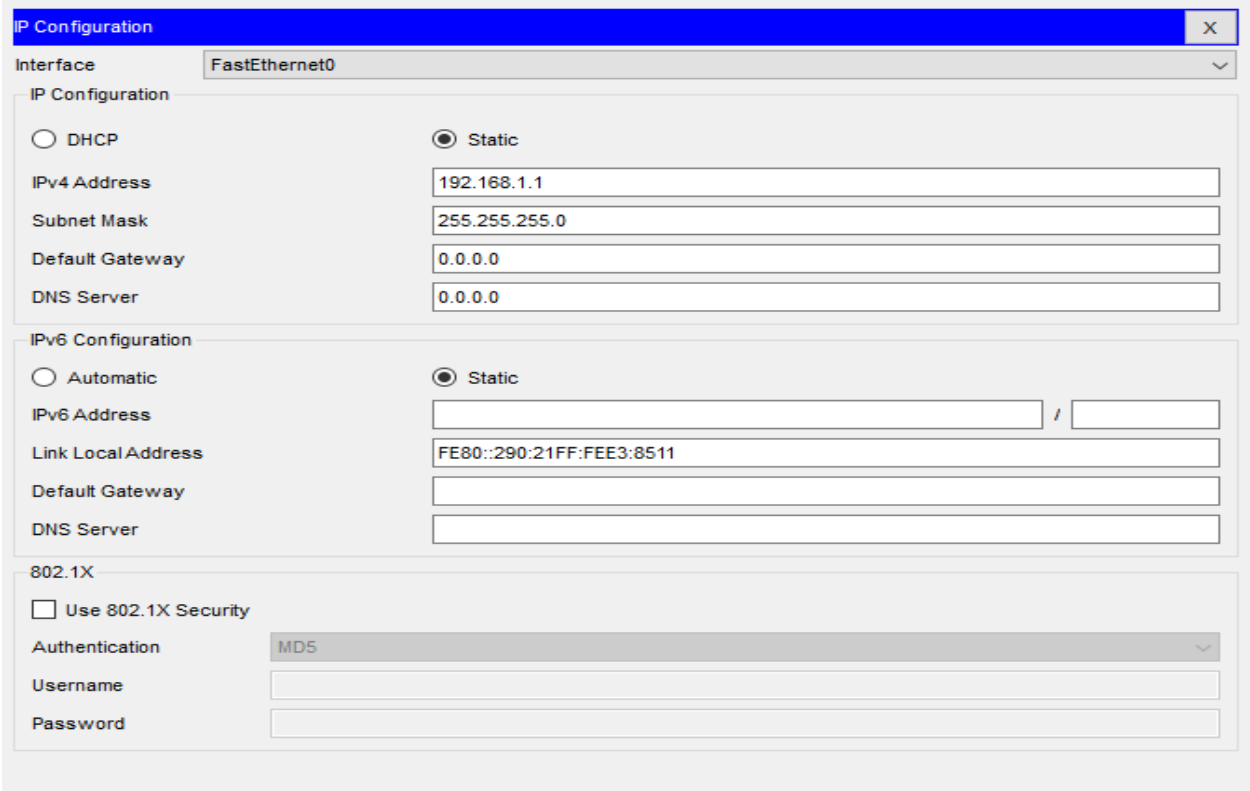


Fig: IP configuration for an end device.

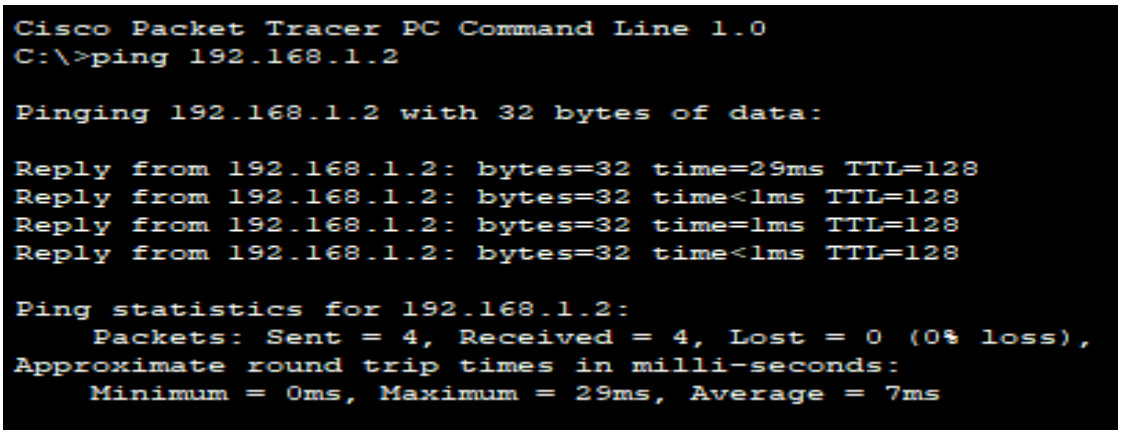
Simulation Procedure:

First way:

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

Second way:

- Double click on PC, select “Desktop” tab, Click on “Command Prompt”
- For example, this pc with 192.168.1.1 and it will ping 192.168.1.2
- Write down “ping 192.168.1.2” press enter.
- 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).

Required software: Cisco Packet Tracer 8.2.0

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

Description: A Wireless Local Area Network is a type of network that allows devices to communicate and exchange data wirelessly within a defined geographic area like a school, college or a single office. Wireless LANs use radio frequency (RF) signals to transmit data between devices and a central access point such as a wireless router. Here devices such as laptops, smartphones, and tablets are connected to the network through wireless network adapters, which communicate with a wireless access point (AP) or a router. The router acts as a central hub which manages network traffic and often provides internet connectivity. Wireless LANs operate primarily on two frequency bands: 2.4 GHz and 5 GHz. The 2.4 GHz band provides longer range but is more susceptible to interference due to the large number of devices. The 5 GHz band offers faster data transfer rates but covers a shorter range, making it ideal for environments with high-density devices.

Configuration Procedure: To configure Local Area Network (Wired) we need to follow the following steps:

Design network:

i. Open CISCO Packet Tracer software.
ii. Drag and Drop a wireless router some device which support wireless communication on CISCO Packet Tracer interface.

*****For Desktop PC,

iii. 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.
iv. Replace existing module with our "Linksys-WMP300N" module.
v. Power on your device.

*For laptop,

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

*For PDA and Tablet,

i. Double click on it and then select "Config" tab and also "Wireless" from left bottom.
ii. Put your Access point name (SSID) and password "WPA-PSK" and close it. Same for Tablet.

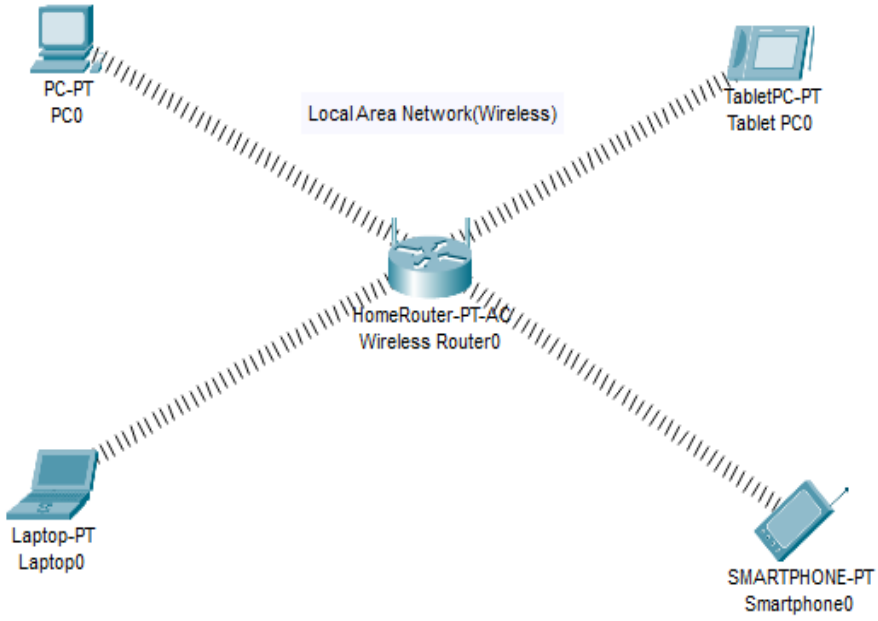


Fig-1: A Local Area Network (Wireless)

Router configuration:

i. Double Click and go to “Config” tab. Then select wireless.
ii. Now give a name to your access point (SSID)
iii. Select an Authentication type. By default it will Disabled we will check out “WPA-PSK”
iv. Set password 88888888 and close it.
v. Double click on desktop pc and open “PC Wireless” from “Desktop” tab.
vi. Click on “Connect” tab by default it will link information. Press “Refresh” button.
vii. Then we will see an access point and press “Connect” button.
viii. Put your password of network on “Pre Shared key” and then connect. Same on Laptop

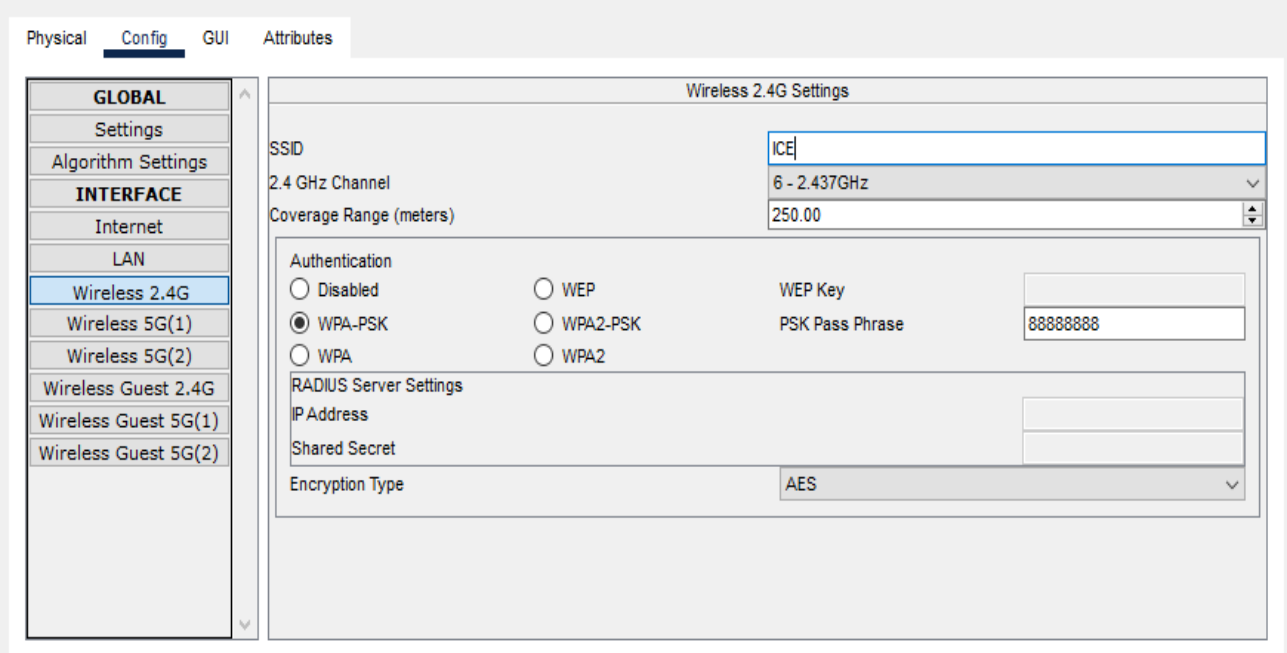


Fig-2: Configuration for a wireless router

Simulation Procedure:

First way:

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

Second way:

- Double click on PC, select “Desktop” tab, Click on “Command Prompt”
- For example this pc with 192.168.0.102 and it will ping 192.168.0.103
- Write down “ping 192.168.1.2” press enter.
- If your physical and logical connection is ok then it will say that...

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

```
C:\>ping 192.168.0.103

Pinging 192.168.0.103 with 32 bytes of data:

Reply from 192.168.0.103: bytes=32 time=37ms TTL=128
Reply from 192.168.0.103: bytes=32 time=40ms TTL=128
Reply from 192.168.0.103: bytes=32 time=31ms TTL=128
Reply from 192.168.0.103: bytes=32 time=41ms TTL=128

Ping statistics for 192.168.0.103:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 31ms, Maximum = 41ms, Average = 37ms
```

Experiment No: 03

Experiment Name: Transfer packets through two different networks.

Required software: Cisco Packet Tracer 8.2.0

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

Description: Transferring packet through two different network is a method of transferring data to a network in the form of packet. For transferring files fast and efficiently over the network and minimize the transmission latency, the data is broken into small pieces of variable length called Packet. Each packet contains the data payload and metadata, including the source and destination IP addresses. At the destination, all these small packets have to be reassembled, belonging to the same file. Here devices are connected by using routers or gateways which manage and direct the flow of data between networks. Router determines the optimal path for the packet to reach its destination. This is achieved through routing protocols that help routers exchange information about network topology and decide the best route based on metrics such as distance, cost, or congestion**.**

Configuration Procedure: To configure Local Area Network (Wired) we need to follow the following steps:

Design network:

i. Open CISCO Packet Tracer software.
ii. Drag and Drop two switch one router and 2 end device
iii. Select cable and connect two switch through router and then end device will connected with switch.

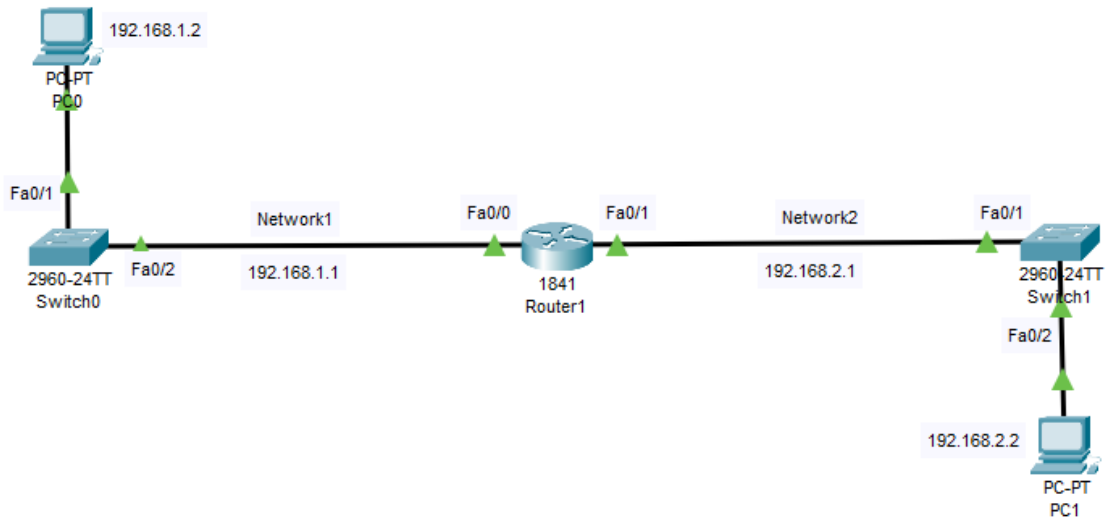


Fig-1: Transfer packets through two different network.

Router Configuration:

i. 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 switch also two different network.
ii. Click on CLI type no on the text edit option.
iii. If you press yes then router will ask several question for his system maintains but all of those are not usable to us. so we just type no.
iv. Router stay normally three stages. one is privilege mode then global config and Finlay specific configuration
v. 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
vi. We are now global configuration mode so we need to access specific interface and configure it.
vii. 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
viii. By default every interface of Cisco device down state. So we need it to up. just write down "no shut" command
ix. Go back to previlege mode by "exit" command.
x. Finally write down "wr" to save configuration
xi. We just configured only one interface. we need another one of different network with different ip address.
xii. After configure the router we need to mention ip address of each end device.

CLI procedure:

```
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

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 Procedure:

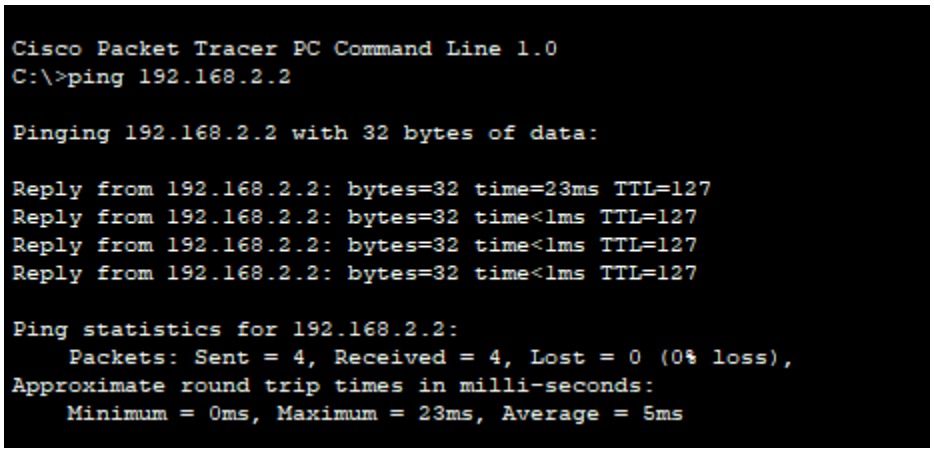
First way:

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

Second way:

- Double click on PC, select “Desktop” tab, Click on “Command Prompt”
- For example this pc with 192.168.0.102 and it will ping 192.168.0.103
- Write down “ping 192.168.1.2” press enter.
- If your physical and logical connection is ok then it will say that...

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



Experiment No: 04

Experiment Name: Dynamic IP through DHCP.

Required software: Cisco Packet Tracer 8.2.0

Description: Dynamic Host Configuration Protocol is a network protocol used to automate the process of assigning IP addresses and other network configuration parameters to devices such as computers, smartphones, and printers on a network. Instead of manually configuring each device with an IP address, DHCP allows devices to connect to a network and receive all necessary network information like IP address, subnet mask, default gateway, and DNS server addresses, automatically from a DHCP server. This makes it easier to manage and maintain large networks, ensuring devices can communicate effectively without conflicts in their network settings. DHCP plays a crucial role in modern networks by simplifying the process of connecting devices and managing network resources efficiently.

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

Configuration Procedure: To configure Local Area Network (Wired) we need to follow the following steps:

Design network:

i. Open CISCO Packet Tracer software.
ii. Drag and Drop one switch one router and 3 or more end device
iii. Connect them UTP Straight Through Cable as shown in figure bellow.

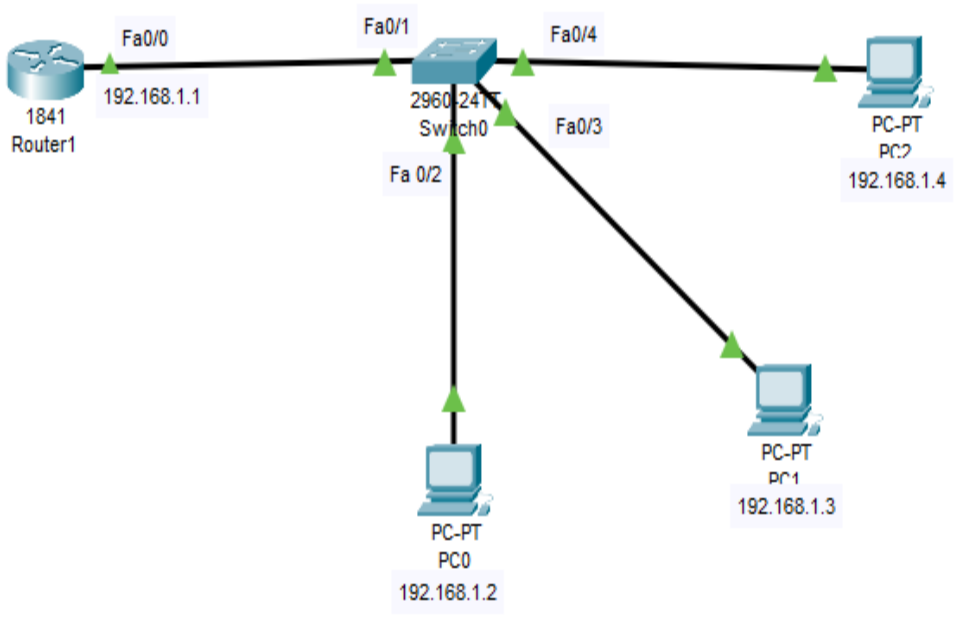


Fig-1: Dynamic IP through DHCP.

Router Configuratio:

i. Double click on router and then click on CLI Mode.
ii. Enter privilege then global configuration mode.
iii. Access an interface such as fa 0/0.
iv. Assign ip and subnet musk then “no shut” to up this state.
v. Exit from here to global configuration mode.
vi. Write down the command “ipdhcp pool myPoleName”
vii. Mention the network and then router default ip.
viii. Exit and save change.
ix. Double click on select “Desktop” and click on “IP configuration”.
x. Click on DHCP to send a request for ip.

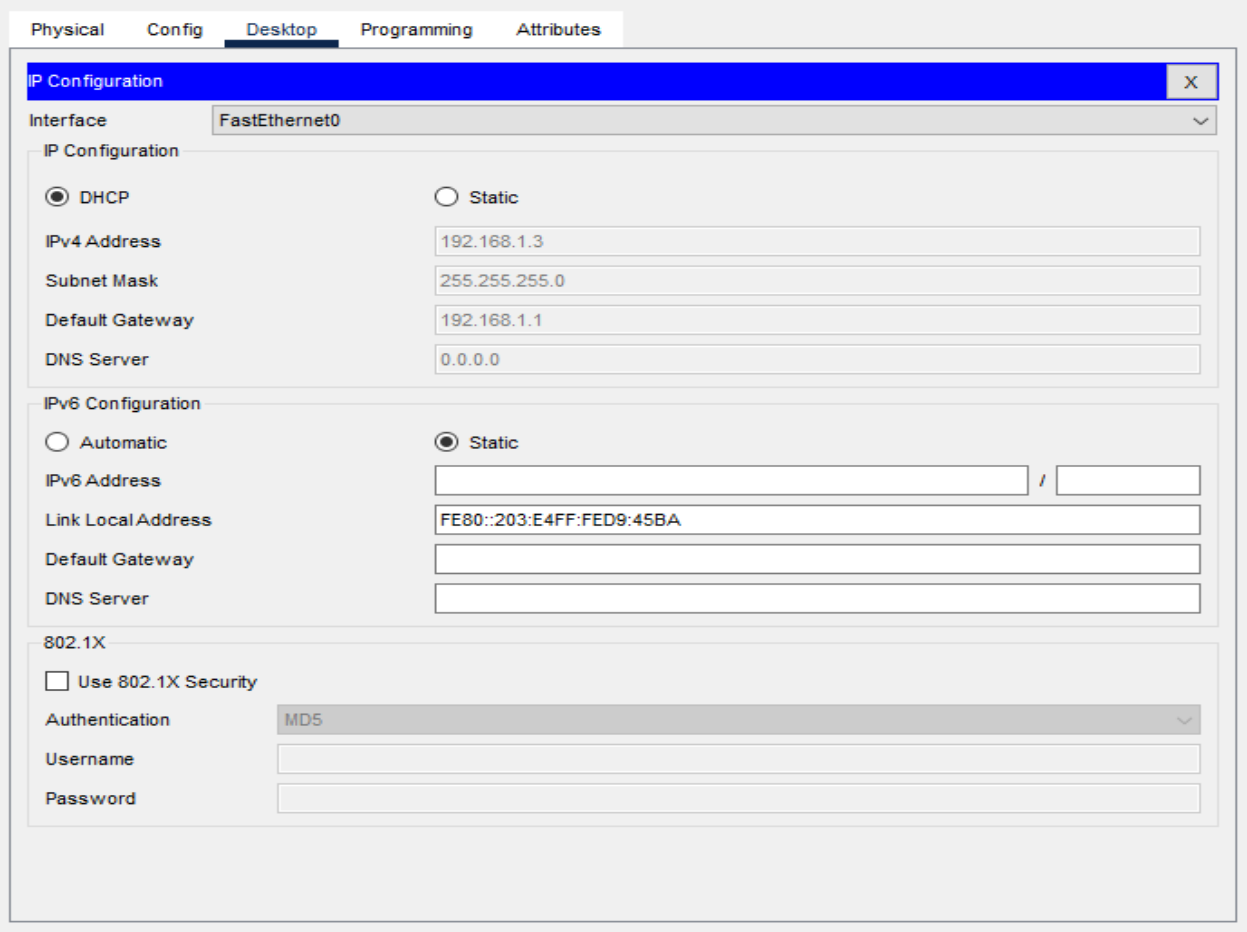


Fig-2: IP configuration for an end device.

CLI Procedure:

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#

Simulation Procedure:

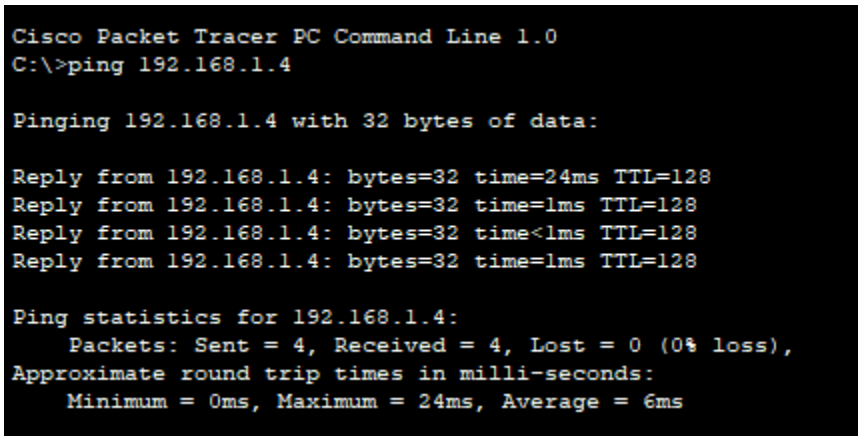
First way:

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

Second way:

- Double click on PC, select “Desktop” tab, Click on “Command Prompt”
- For example this pc with 192.168.1.2 and it will ping 192.168.1.4
- Write down “ping 192.168.1.2” press enter.
- If your physical and logical connection is ok then it will say that...

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



Experiment No: 05

Experiment Name: Configure Routing Information Protocol (RIP).

Required software: Cisco Packet Tracer 8.2.0

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

Description: Routing Information Protocol (RIP) is a dynamic routing protocol used to determine the best path between the source and destination networks. RIP is one of the oldest routing protocols designed to facilitate the exchange of routing information between routers enabling them to dynamically learn and maintain routes to various network destinations. It is a distance-vector routing protocol that uses hop count as a routing metric. 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. The maximum allowable hop count in RIP is 15, which means that if a destination is more than 15 hops away, it is considered unreachable. Each router maintains a routing table that contains information about available routes, including the destination network, the next-hop address, and the metric (hop count) associated with each route.

Configuration Procedure: To configure Local Area Network (Wired) we need to follow the following steps:

Design network:

i. Open CISCO Packet Tracer software.
ii. Drag and Drop Routers.
iii. Switches and PCs.
iv. Select cable and make sure a proper connection as shown in figure bellow.

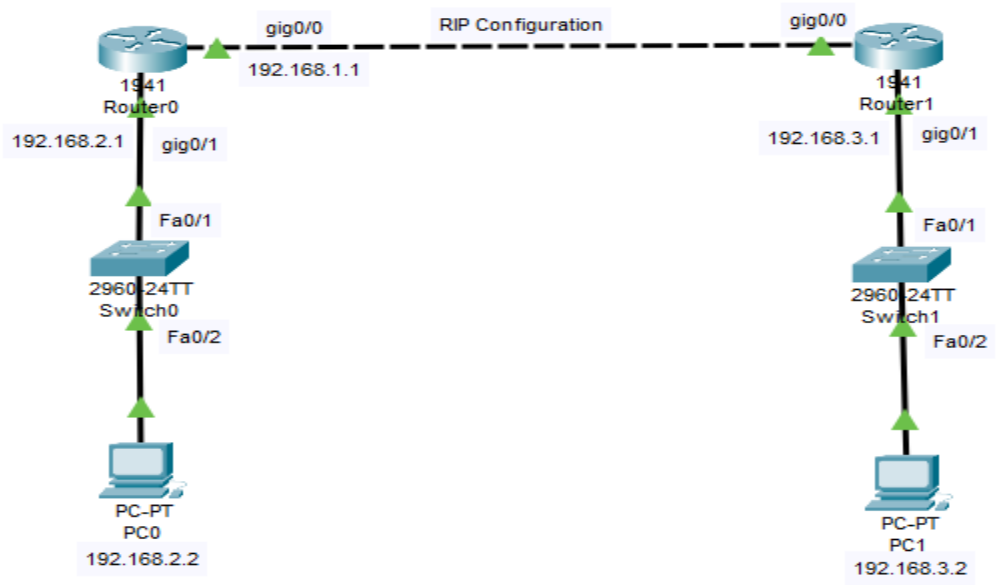


Fig-1: RIP Configure.

Router configuration:

i. Double click on router.
ii. Click on CLI Tab.
iii. First assign IP Address of on interface .
iv. Assign RIP command.
v. Mention RIP version .
vi. Finally save this configuration.

IP Configuration Router0:

```
Would you like to enter the initial configuration dialog? [yes/no]: no
Press RETURN to get started!
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int gig0/0
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(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
```

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

IP Configuration Router1:

Would you like to enter the initial configuration dialog? [yes/no]: no
Press RETURN to get started!
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
%LINEPROTO-5-UPDOWN: Line protocol on 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(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

RIP Configuration Router0:

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#
%SYS-5-CONFIG_I: Configured from console by console
Router#wr
Building configuration...
[OK]

RIP Configuration Router1:

```
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 192.168.3.0
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#wr
Building configuration...
[OK]
```

Simulation Procedure: (Router 0)

```
Router>show ip route
Codes: L - local, C - connected, S - static, 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

     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, GigabitEthernet0/0
L       192.168.1.2/32 is directly connected, GigabitEthernet0/0
R    192.168.2.0/24 [120/1] via 192.168.1.1, 00:00:16, GigabitEthernet0/0
     192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.3.0/24 is directly connected, GigabitEthernet0/1
L       192.168.3.1/32 is directly connected, GigabitEthernet0/1
```

Experiment No: 06

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

Required software: Cisco Packet Tracer 8.2.0

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

Description: Open Shortest Path First (OSPF) is a widely used link-state routing protocol designed for Internet Protocol (IP) networks. It is used to find the best path between the source and the destination router using its own shortest path first (SPF) algorithm. A link-state routing protocol is a protocol that uses the concept of triggered updates, i.e., if there is a change observed in the learned routing table then the updates are triggered only, not like the distance-vector routing protocol where the routing table is exchanged at a period of time. Developed as an improvement over distance-vector protocols like RIP, OSPF is designed for larger and more complex networks. OSPF operates at Layer 3 of the OSI model and is widely used in enterprise networks due to its efficiency

Configuration Procedure: To configure Local Area Network (Wired) we need to follow the following steps:

Design network:

i. Open CISCO Packet Tracer software.
ii. Drag and Drop Routers, Switches and PCs.
iii. Select cable and make sure a proper connection as shown in figure bellow.

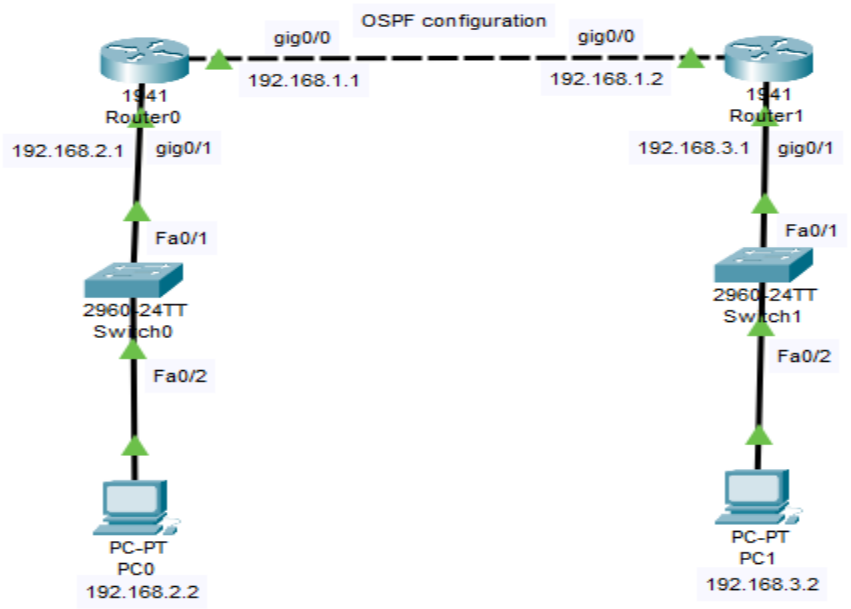


Fig-1: OSPF configuration.

Router configuration:

i. Double click on router.
ii. Click on CLI Tab.
iii. First assign IP Address of on interface.
iv. Assign OSPF command. (OSPF then numerical value such as 1,2,3)
v. Mention Network then Wild card mask then area.
vi. Finally save this configuration.

IP Configuration Router0:

```
Would you like to enter the initial configuration dialog? [yes/no]: no
Press RETURN to get started!
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int gig0/0
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(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

IP Configuration Router1:

```
Would you like to enter the initial configuration dialog? [yes/no]: no
Press RETURN to get started!
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
%LINEPROTO-5-UPDOWN: Line protocol on 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(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

OSPF configuration Router0:

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#
%SYS-5-CONFIG_I: Configured from console by console
Router#wr
Building configuration...
[OK]

OSPF configuration Router1:

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#
%SYS-5-CONFIG_I: Configured from console by console
Router#wr

Building configuration...
[OK]

Simulation Procedure:

Router#showip route
Codes: L - local, C - connected, S - static, 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

192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.1.0/24 is directly connected, GigabitEthernet0/0
L 192.168.1.2/32 is directly connected, GigabitEthernet0/0
O 192.168.2.0/24 [110/2] via 192.168.1.1, 00:00:07, GigabitEthernet0/0
192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.3.0/24 is directly connected, GigabitEthernet0/1
L 192.168.3.1/32 is directly connected, GigabitEthernet0/1

Experiment No: 07

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

Required software: Cisco Packet Tracer 8.2.0

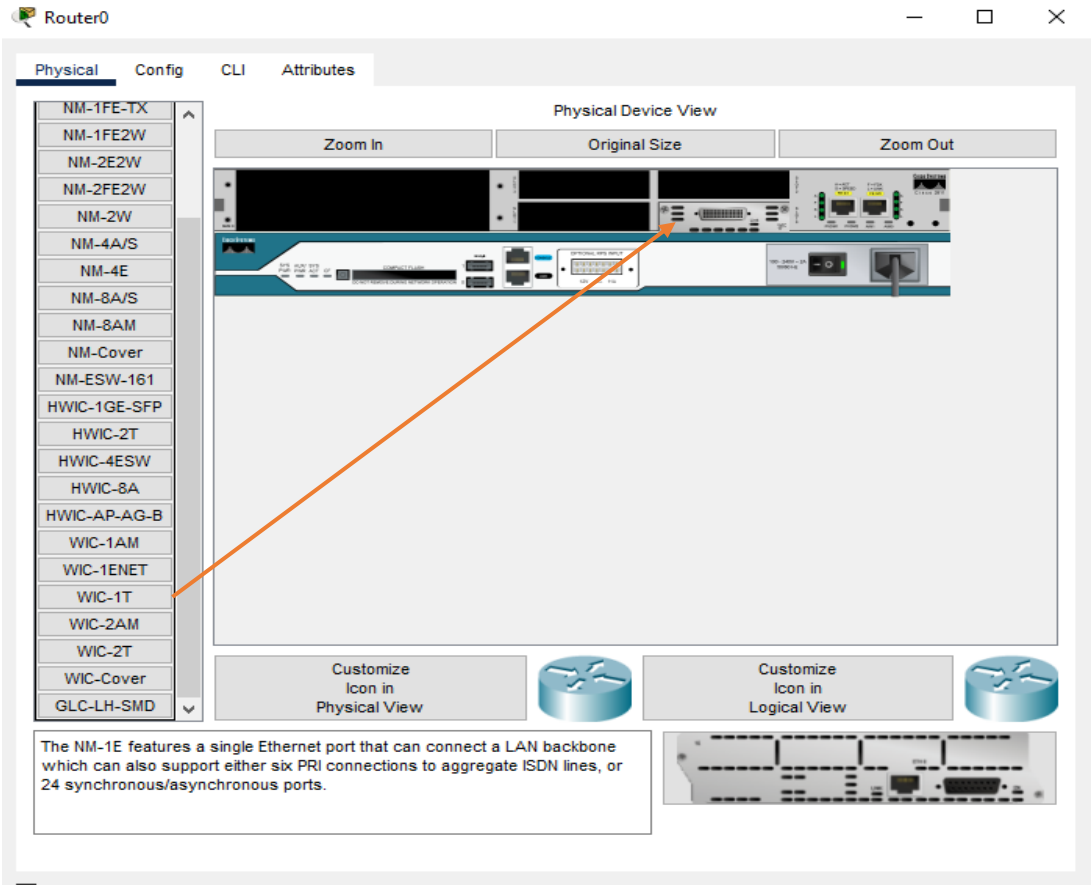
Required Component: (1). Switch (2). UTP Cable (Straight Through) (3). Serial DCE cable (4). End Device (Desktop, Laptop etc.) (5). Router

Description: Enhanced Interior Gateway Routing Protocol (EIGRP) is a dynamic routing protocol developed by Cisco that combines the best features of both distance-vector and link-state routing protocols. It is used to find the best path between any two-layer 3 devices to deliver the packet. EIGRP works on network layer Protocol of OSI model and uses protocol number 88. It uses metrics to find out the best path between two layer 3 devices (router or layer 3 switches) operating EIGRP.

Configuration Procedure: To configure Local Area Network (Wired) we need to follow the following steps:

Design network:

i. Open CISCO Packet Tracer software.
ii. Drag and Drop Routers (2811), Switches and PCs.
iii. 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.



iv. Select cable and make sure a proper connection as shown in figure bellow.

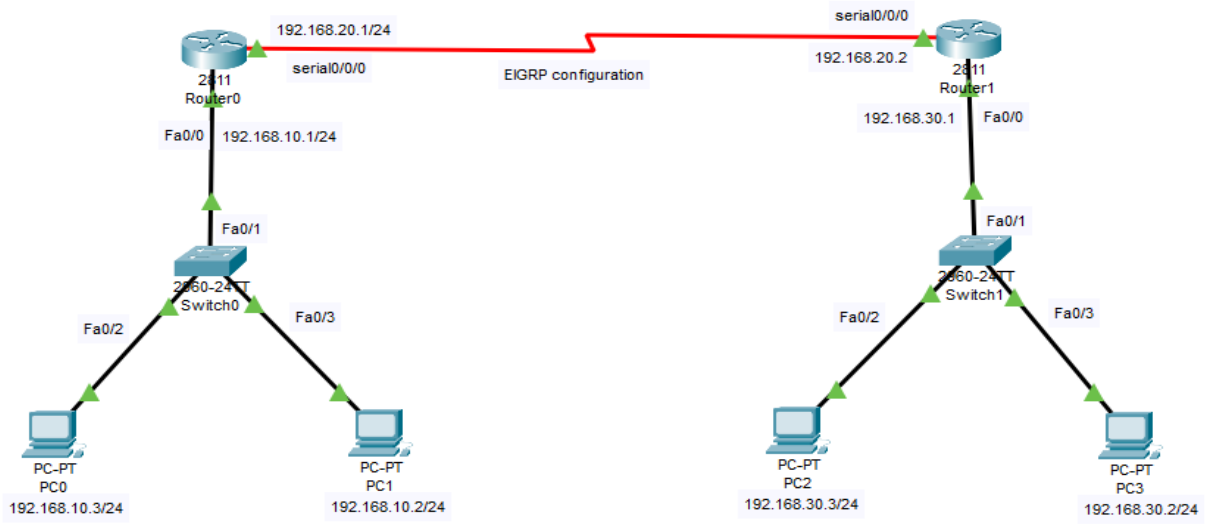


Fig-1: EIGRP configuration

Router configuration:

i. Double click on router.
ii. Click on CLI Tab.
iii. First assign IP Address of on interface
iv. Assign EIGRP command. (EIGRP then numerical value such as 1,2,3)
v. Mention network then subnet mask.
vi. Finally save this configuration.

IP Configuration Router0:

```
Would you like to enter the initial 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 192.168.10.1 255.255.255.0
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]
```

IP Configuration Router1:

```
Would you like to enter the initial 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 192.168.30.1 255.255.255.0
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
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]
```

EIGRP Configuration Router0:

```
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)#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]
```

EIGRP Configuration Router1:

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)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#copy running-config st
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

Simulation Process: (Router0)

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
Simulation Procedure:

Experiment No: 08

Experiment Name: Configure Virtual Local Area Network (VLAN).

Required software: Cisco Packet Tracer 8.2.0

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

Description: A Virtual Local Area Network (VLAN) is a logical grouping of devices within a network that allows them to communicate as if they were on the same physical LAN, even if they are not. VLANs are used to segment a network into smaller, more manageable sections, improving security, performance, and flexibility. Here we can divide the devices logically on layer 2 (data link layer). Generally, layer 3 devices divide the broadcast domain but the broadcast domain can be divided by switches using the concept of VLAN.

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.

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

Configuration Procedure: To configure Local Area Network (Wired) we need to follow the following steps:

Design network:

i. Open CISCO Packet Tracer software.
ii. Pick up two switches from the network devices.
iii. We have picked up four PCs for each switch from end devices.
iv. Connect the switches with each other using Copper Cross-Over.
v. Connect remaining components using Copper Straight-Through.
vi. Let us consider the name of the VLAN under IT departmentas "vlan 10"and VLAN under HR department as "vlan 20".
vii. Assigned IP Address for each end device.
viii. In figure-01 we have indicated the IT department's PCs and HR department's PCs as desired.

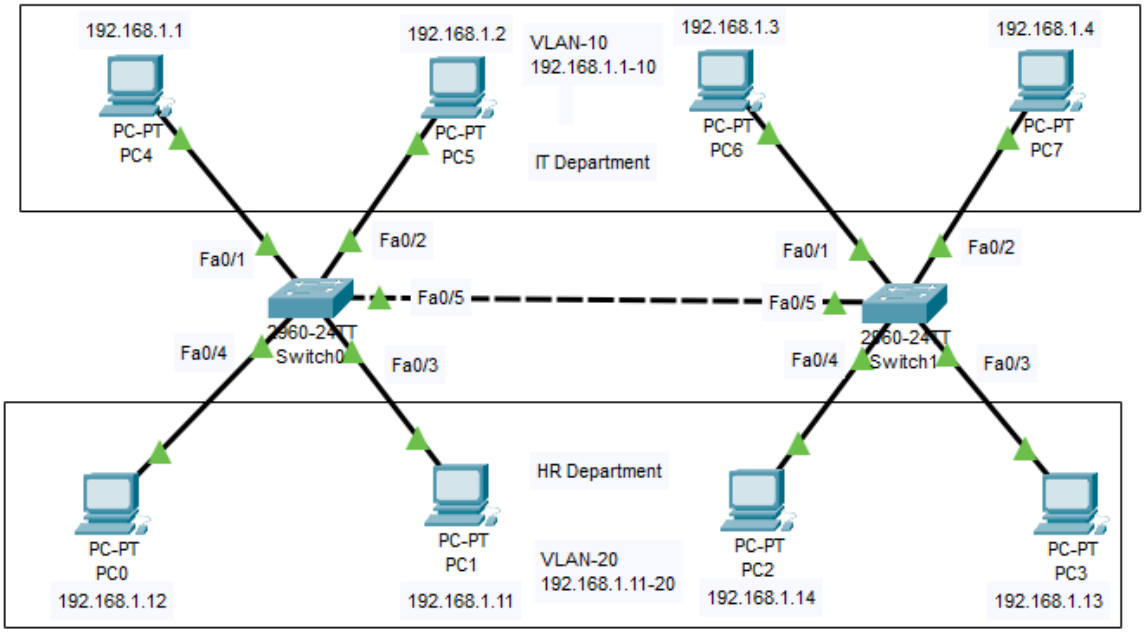


Fig-1: Configuration of Virtual Local Area Network (VLAN).

VLAN configuration: For VLAN Configuration write down the following CLI commands in each switch.

```
Switch>en
Switch#configure terminal
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)#interface fastEthernet 0/1
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface fastEthernet 0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface fastEthernet 0/3
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#interface fastEthernet 0/4
Switch(config-if)#switchport access vlan 20
```

Switch(config-if)#exit
Switch(config)#%SPANTREE-2-RECV_PVID_ERR: Received 802.1Q BPDU on non trunk FastEthernet0/5 VLAN1.

%SPANTREE-2-BLOCK_PVID_LOCAL: Blocking FastEthernet0/5 on VLAN0001. Inconsistent port type.

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

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

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

Switch configuration: For Switch Configuration write down the following CLI commands in each switch.

```
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface fastEthernet 0/5
Switch(config-if)#switchport mode trunk
Switch(config-if)#exit
Switch(config)#interface range fastEthernet 0/1-4
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

To know which port is assigned for which VLAN use the following command.

```
Switch#show vlan brief
```

```
VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/6, Fa0/7, Fa0/8, Fa0/9
                                                 Fa0/10, Fa0/11, Fa0/12, Fa0/13
                                                 Fa0/14, Fa0/15, Fa0/16, Fa0/17
                                                 Fa0/18, Fa0/19, Fa0/20, Fa0/21
                                                 Fa0/22, Fa0/23, Fa0/24, Gig0/1
                                                 Gig0/2
10   IT                                active    Fa0/1, Fa0/2
20   HR                                active    Fa0/3, Fa0/4
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
```

Simulation Procedure:

First way:

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

Second way:

- Double click on PC, select “Desktop” tab, Click on “Command Prompt”
- For example this pc with 192.168.0.2 and it will ping 192.168.0.3
- Write down “ping 192.168.1.2” press enter.
- If your physical and logical connection is ok then it will say that...

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