

NATIONAL INSTITUTE OF TECHNOLOGY AGARTALA



COMPUTER NETWORK LABORATORY (UCS06P31)

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Enrollment no: 19UICS002

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Sem & sec : 6TH & C

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ACKNOWLEDGEMENT

I would like to express my special thanks to my faculty members Dr. Nirmalya Kar (Associate professor) & Mr. Joydip Deb (LAB/Technical Assistant), who gave me the golden opportunity to do this wonderful CN lab which also helped me in doing a lot of Research and I came to know about so many new things and valuable guidance and feedback has helped me in completing and learning these a lot.

I would again like to thank my teacher for putting efforts to help us grasp this subject and for generating interest in it.

My thanks and appreciation also goes to all the teaching staff of the computer science and engineering department for their kind and timely support.

**MD WASIF
19UICS002**

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EXPERIMENT-01

Objective :-

Draw Bus, Ring and Star topology

Resource :-

1. Laptop or desktop &
2. Cisco packet tracer

Theory :-

Standard Network topology

Network topology is the physical interconnections of the elements (links, nodes, etc.) of a computer network. A local area network (LAN) is one example of a network that exhibits both a physical topology and a logical topology. Any given node in the LAN has one or more links to one or more other nodes in the network and the mapping of these links and nodes in a graph results in a geometrical shape that may be used to describe the physical topology of the network. Likewise, the mapping of the data flows between the nodes in the network determines the logical topology of the network. The physical and logical topologies may or may not be identical in any particular way.

The various types of network topologies are as follows:

1. Tree topology
2. Bus topology
3. Star topology
4. Ring topology
5. Mesh topology
6. Hybrid topology

Bus Topology

In the bus topology, all the nodes are connected to the single backbone or bus with some medium such as twisted pair, coaxial cable etc. When a node wants to communicate with the other nodes in the network, it simply sends a message to the common bus. All the nodes in the network then receive the message but the node

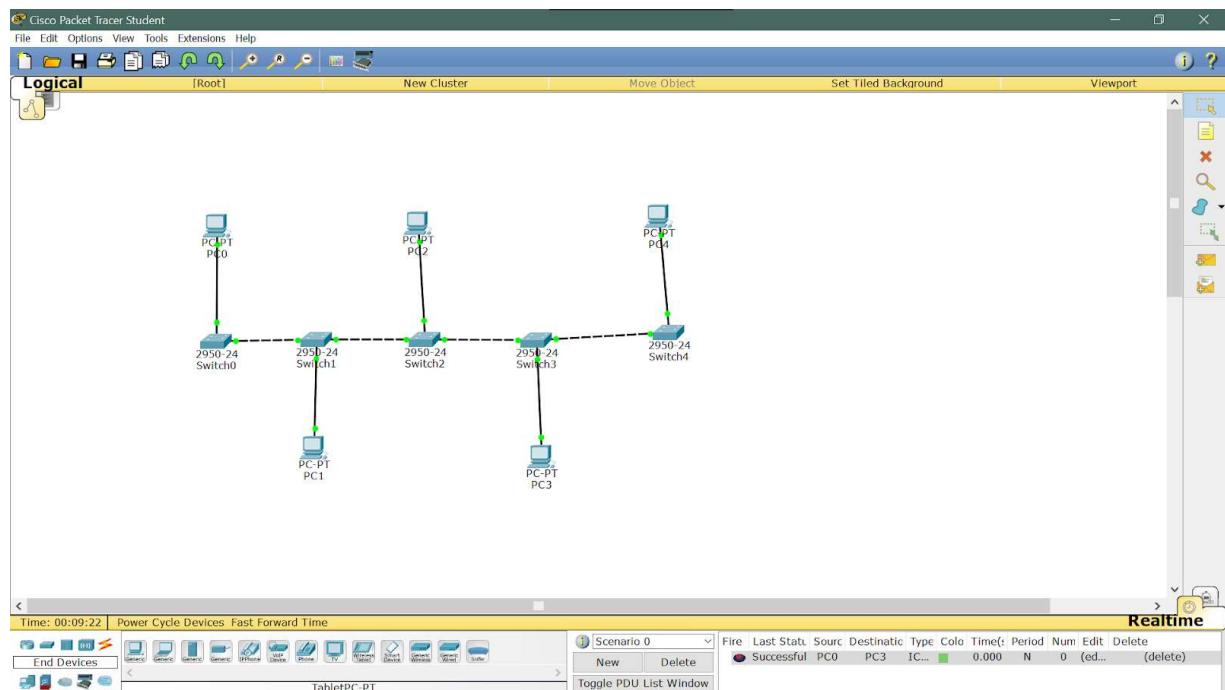
for which it was actually sent only processes it. The other nodes discard the message.

Procedure :-

- ★ Place a Switch on Network Draw Area
- ★ Configure Switch to Behave as a Terminal
- ★ Draw another Terminator
- ★ Add drop lines to your network
- ★ Connecting terminators and drop lines
- ★ Add end devices to your network
- ★ Connect end devices to drop line switches
- ★ Assign IP addresses to computers

Diagram:-

Bus topology using packet tracer.



Star Topology

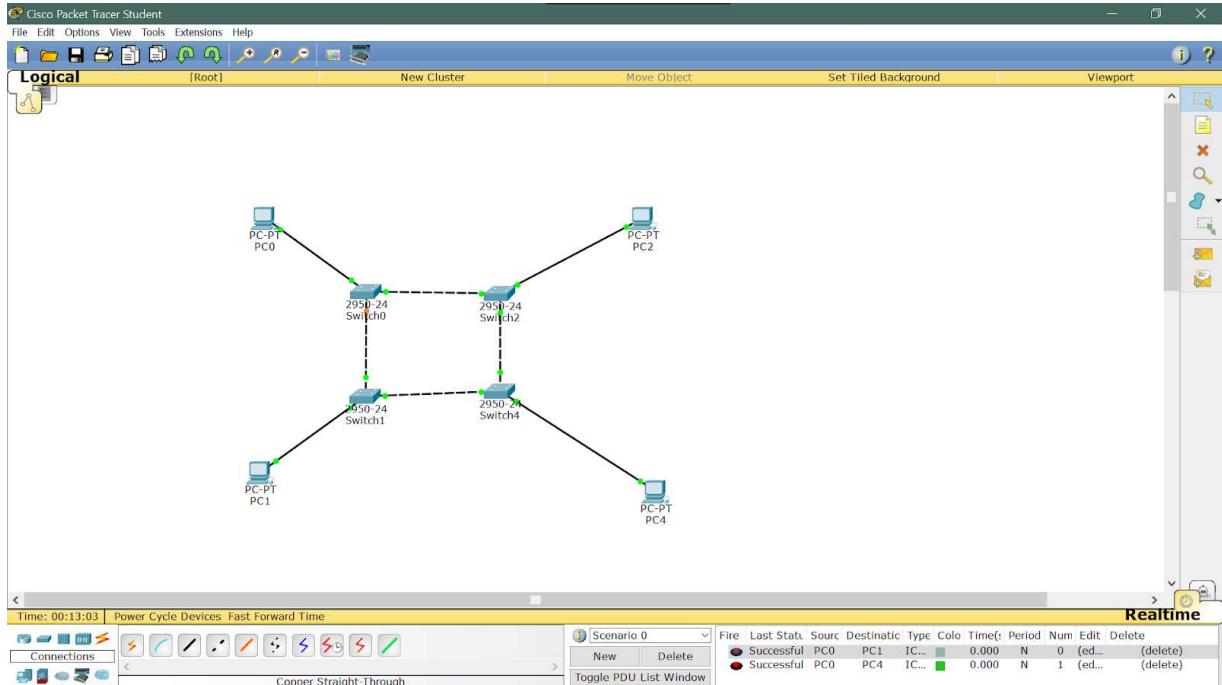
In the star topology, all the nodes are connected to a common device known as a hub. Nodes are connected with the help of twisted pair, coaxial cable or optical fiber. When a node wants to send a message to the other nodes, it first sends the message to the hub, which in turn forwards the message to the intended node. Each node in the network is connected with a point-to-point link to the centralized hub. The task of the hub is to detect the faulty node present in the network. On the other hand, it also manages the overall data transmission in the network.

Procedure:-

- ★ Open Cisco Packet Tracer and Open Networking Device Menu
- ★ Select Desired Switch Model
- ★ Choose End Devices for your Star Network
- ★ Draw End Devices of your Star Network on the Drawing Area
- ★ Choose Connecting Cable for Device Connections
- ★ Initiating Cable Connections
- ★ Completing Cable Connections
- ★ Connecting All Devices to Central Switch
- ★ Open Device Settings
- ★ Device Settings Interface
- ★ Open Desktop Menu and Select IP Configuration Settings
- ★ Configure IP Address and Subnet Mask
- ★ Select Sample PDU to Initiate Testing
- ★ Choose Message Sender
- ★ Drop Message PDU on Receiver
- ★ See Results

Diagram:-

Ring topology using packet tracer.



Ring Topology

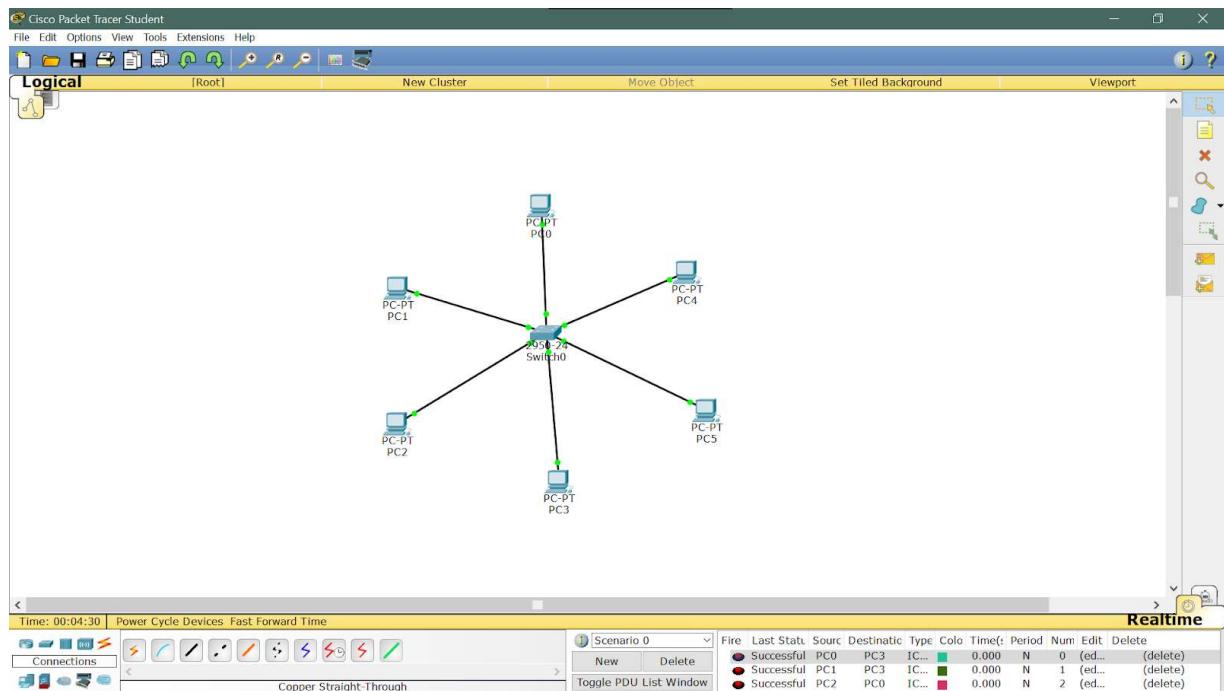
In the ring topology, the nodes are connected in the form of a ring with the help of twisted-pair cable. Each node is connected directly to the other two nodes in the network. The node, which wants to send a message, first passes the message to its consecutive node in the network. Data is transmitted in the clockwise direction from one node to another. Each node incorporates a repeater, which passes the message to the next node when the message is intended for another node.

Procedure :-

- ★ Place Computers on Drawing Area
- ★ Draw Switches on Drawing Area
- ★ Create Communication Links
- ★ Connect Computer to Switch
- ★ Connect Switches
- ★ Configure IP Address
- ★ Test Ring Topology Network in Cisco Packet Tracer

Diagram:-

Star topology using packet tracer.



Conclusion:-

Thus, the experiment was successfully implemented.

EXPERIMENT-02

Objective :-

Draw Mesh, hybrid and tree topology

Resource :-

1. Laptop or desktop &
2. Cisco packet tracer

Theory :-

Standard Network topology

Network topology is the physical interconnections of the elements (links, nodes, etc.) of a computer network. A local area network (LAN) is one example of a network that exhibits both a physical topology and a logical topology. Any given node in the LAN has one or more links to one or more other nodes in the network and the mapping of these links and nodes in a graph results in a geometrical shape that may be used to describe the physical topology of the network. Likewise, the mapping of the data flows between the nodes in the network determines the logical topology of the network. The physical and logical topologies may or may not be identical in any particular way.

The various types of network topologies are as follows:

1. Tree topology
2. Bus topology
3. Star topology
4. Ring topology
5. Mesh topology
6. Hybrid topology

Mesh Topology

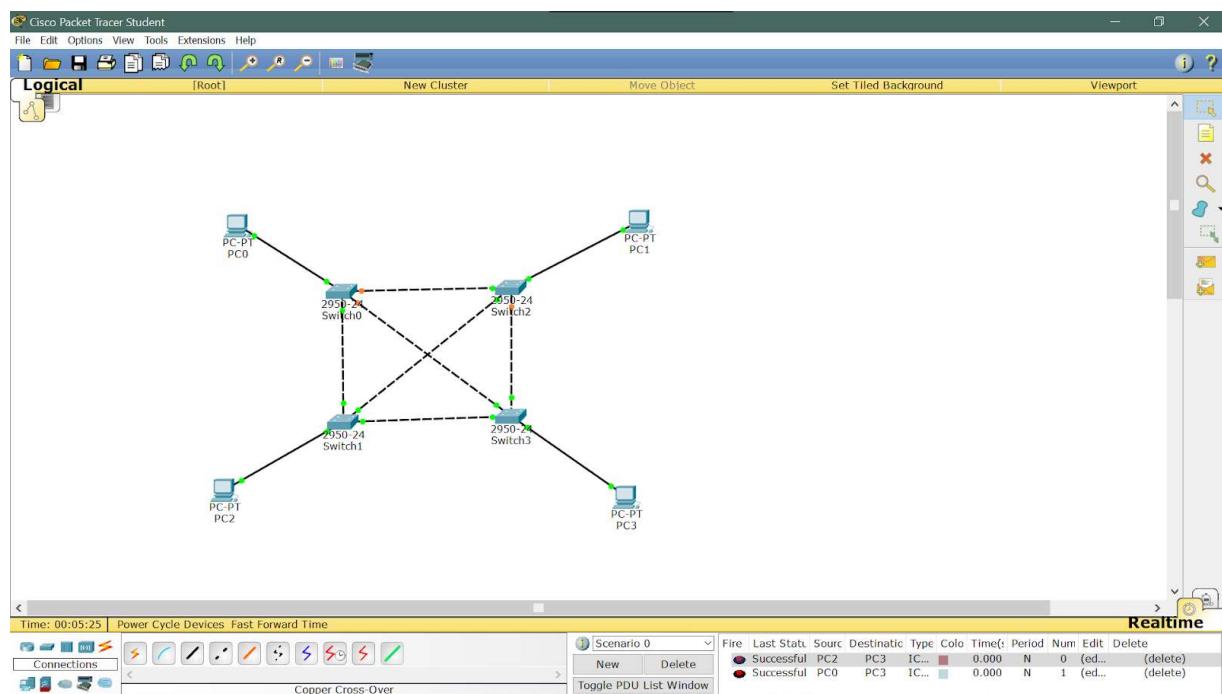
In mesh topology, each computer is connected to every other computer in point-to-point mode as shown in figure 5. For example, if we have four computers, we must have six links. If we have n computers, we must have $n(n-1)/2$ links. A message can take several possible paths to reach a destination.

Procedure :-

- ★ Open Cisco Packet Tracer
- ★ Select and Draw End Devices of Your Mesh Network
- ★ Select and Draw Switches for each End Device
- ★ Connect Each Pair of Computer and Switch
- ★ Select First Random Switch and Connect it to Other Remaining Switches
- ★ Select Second Random Switch and Connect it to Other Remaining Switches
- ★ Select Third Random Switch and Connect it to Other Remaining Switches
- ★ Choose Fourth Switch Randomly and Connect it to Remaining Switches
- ★ Open End Device Configurations
- ★ Go To Desktop
- ★ IP Configuration Settings
- ★ Configure IP Address

Diagram:-

Mesh topology using packet tracer.



Hybrid Topology

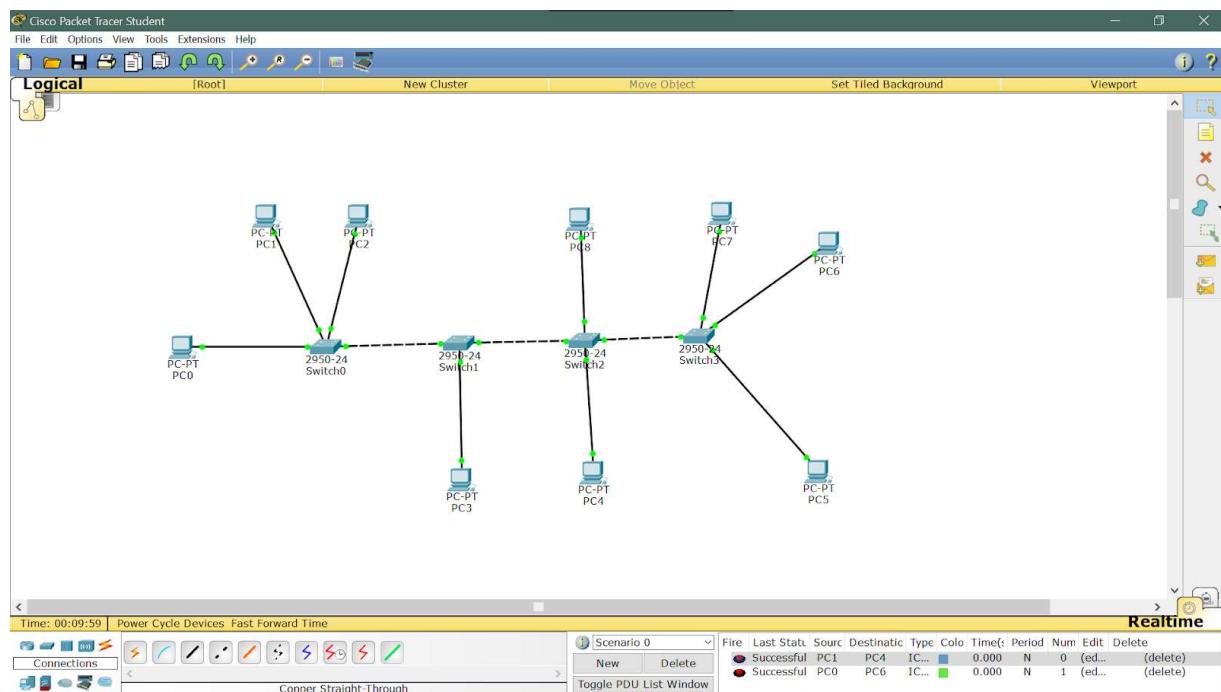
The hybrid topology is the combination of multiple topologies, used for constructing a single large topology. The hybrid topology is created when two different network topologies are interconnected. If two ring topologies are connected then the resultant topology is not the hybrid topology. On the other hand, if the ring topology is connected to the bus topology then the resulting topology is called the hybrid topology. This topology generally combines the features of the two topologies and is therefore more effective and efficient than the individual topologies.

Procedure :-

- ★ Open Cisco Packet Tracer
- ★ Select and Draw End Devices of Your hybrid Network
- ★ Select and Draw Switches for each End Device
- ★ Connect Each Pair of Computer with corresponding Switch
- ★ Select Random Switch and Connect it end devices
- ★ Choose Switch and Connect it to Remaining Switches
- ★ Open End Device Configurations
- ★ Go To Desktop
- ★ IP Configuration Settings
- ★ Configure IP Address

Diagram:-

Hybrid topology using packet tracer.



Tree Topology

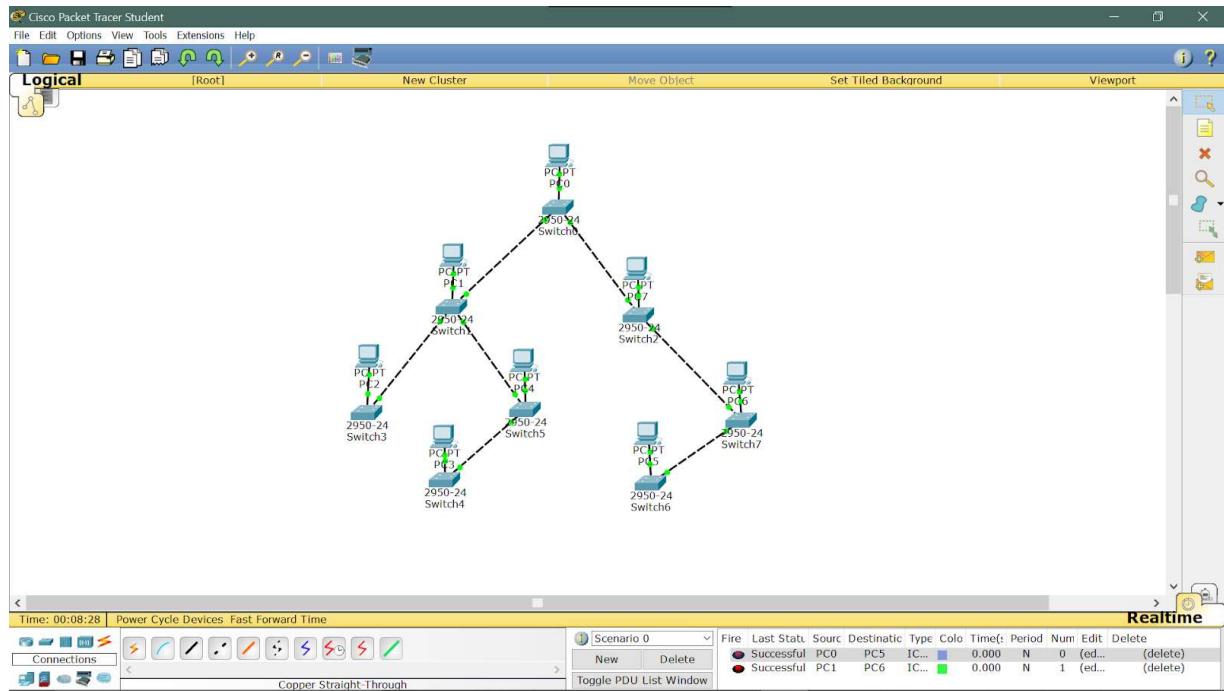
The hierarchical topology is also known as tree topology, which is divided into different levels connected with the help of twisted pair, coaxial cable or fiber optics. This type of topology is arranged in the form of a tree structure in which the top level contains the parent node (root node), which is connected with the child nodes in the second level of hierarchy with point-to-point link. The second level nodes are connected to the third level nodes, which in turn are connected to the fourth level nodes and so on. Except the top level nodes, each level node has a parent node. The number of point-to-point links in the hierarchical type of topology is generally one less than the total number of nodes in the structure. The hierarchical topology is symmetrical, having a fixed branching factor, f , associated with each node. The branching factor is the number of point-to-point links between the levels of hierarchy.

Procedure :-

- ★ Open Cisco Packet Tracer
- ★ Select and Draw End Devices of Your tree Network
- ★ Select and Draw Switches for each End Devices
- ★ Connect Each Pair of Computer and Switch
- ★ Open End Device Configurations
- ★ Go To Desktop
- ★ IP Configuration Settings
- ★ Configure IP Address

Diagram:-

Tree topology using packet tracer.



Conclusion:-

Thus, the experiment was successfully implemented.

EXPERIMENT-03

Objective :-

Create a LAN using a hub and LAN using a switch in packet tracer

Resource :-

1. Laptop or desktop &
2. Cisco packet tracer

Theory :-

Hubs

A hub is often used to connect small LAN segments in which the number of devices is generally 24 or fewer, and hubs are multiport repeaters. Hubs provide the signal amplification required to allow a segment to be extended a greater distance. A hub takes an incoming signal on any one port and repeats it out all ports to enable users to share the Ethernet network resources. Ethernet hubs create star topologies in 10-Mbps or 100-Mbps half-duplex Ethernet LANs. It is the hub that enables several point-to-point segments to be joined together into one single network. A shared Ethernet LAN means that all members of the network are contending for transmission of data onto a single network.

Procedure :-

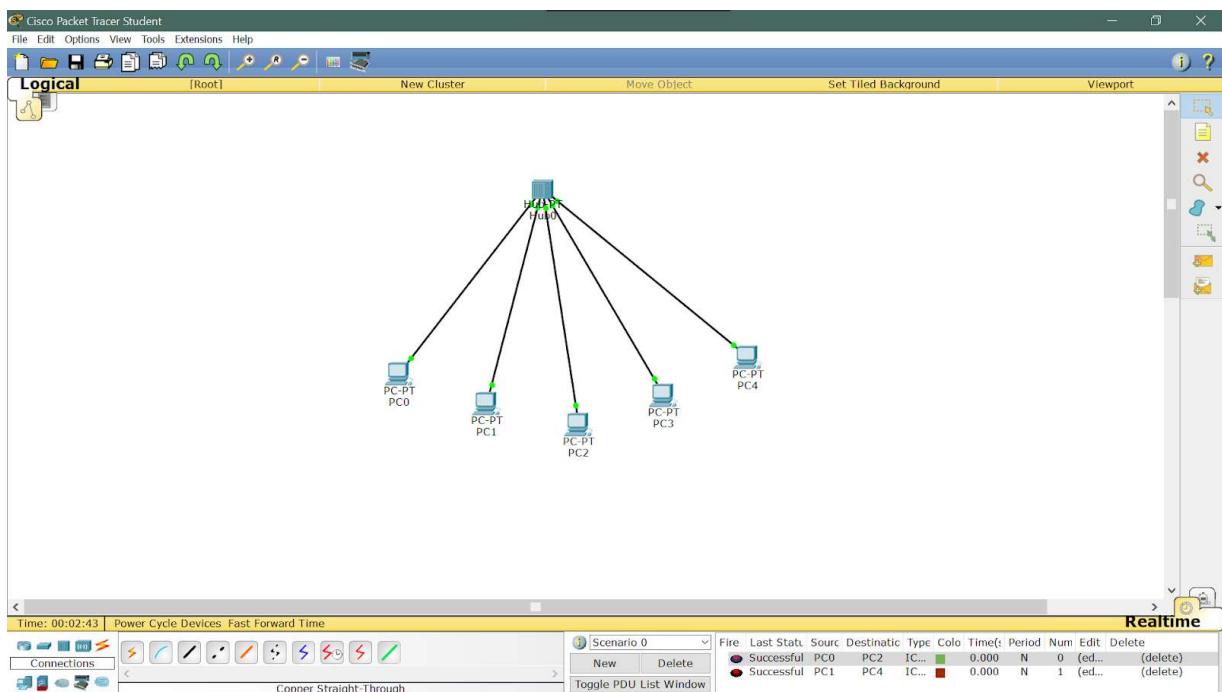
- ★ Open the Cisco Packet installed software.
- ★ Consider the "End Devices" option at the leftmost bottom side of the panel, there we go forward to select a total of 6 PC's , for the sake of symmetrical geometry of 6 PC's we assign them positions accordingly to get the desired required symmetrical regular hexagonal geometric polygon.
- ★ By applying the same procedure of above step 2 select as "End Devices" option from there select "Hub" is assigned at the center of the diagram.
- ★ Continuing the procedure step by step we now connect the Ethernet Straight Through cable by just selecting the one with straight wire appearance from wires for connection option in the bottom same menu

table between one computer to hub and similarly to all the remaining 5 PC's and thus complete the required circuit of the fully connected 6 PC's separately with the required Hub by considering the option of Fast Ethernet 0 to Hub for all the computers in connection or we can also go for first option comes under or appear under the connection wires option to get by default the suitable connection wire, that is for different sources or computers we use Ethernet Straight through cable and for same computer connection we correspondingly use Crossover cable , so here we are using Ethernet straight through cable.

- ★ After successfully done with connection we proceed further for ip configuration part by selecting the specific PC towards the Desktop type proceed to select for " Ip Configuration" one then we have to assign the ip values here we assigned values for all the 6 PC's separately by applying the same procedure to every computer are 10.10.10.1 ; 10.10.10.2 ; 10.10.10.3 ; 10.10.10.4 ; 10.10.10.5 ; 10.10.10.6 and label as well by selecting the note option at the top most side menu bar.
- ★ Successfully assigned ip addresses to all computers now proceed to get the information about how the packet/data transfer between the computers through hub by selecting Computer say labeled with 10.10.10.2 ip address one then proceed to "Desktop" the "Command Prompt" then by proceed with giving the command "ipconfig" press Enter, we will obtain with the ip addresses with many other essential information.
- ★ To enable data transfer between connected PC's in the same command prompt write command (say if we are connecting 10.10.10.2 and 10.10.10.5) "ping 10.10.10.5" we can observe 4 packets transferring successfully between these two computers through the hub ,as hub will transfer a copy to all other computers except the sender one we can easily see this process very effectively in the Stimulation Mode from the Real Time Mode.
- ★ Hence , a packet is successfully transferred between two required computers through a hub with a successfully implemented LAN network between all the 6 computers and hub.
- ★ Hence , the Implementation of LAN network connection using hub in Cisco Packet Tracer Software is successfully performed.

Diagram:-

LAN using a hub in Packet tracer.



Switches

Switches sit in the same place in the network as hubs. Unlike hubs, however, switches examine each frame and process the frame accordingly instead of just repeating the signal to all ports. Switches map the MAC addresses of the nodes residing on each network segment and then allow only the necessary traffic to pass through the switch. A switch performs the same functions as a bridge; so, when the switch receives a frame, it examines the destination and source MAC addresses and compares them to a table of network segments and addresses. If the segments are the same, the frame is dropped, or filtered; if the segments differ, the frame is forwarded to the proper segment. The filtering of frames and regeneration of forwarded frames enables switches to split a network into separate collision domains. Frame regeneration enables greater distances and more network devices, or nodes, to be used in the total network design, and lowers the overall collision rates. In switched networks, each segment is an independent collision domain, whereas in shared networks all nodes reside in one, big, shared collision domain.

Procedure:-

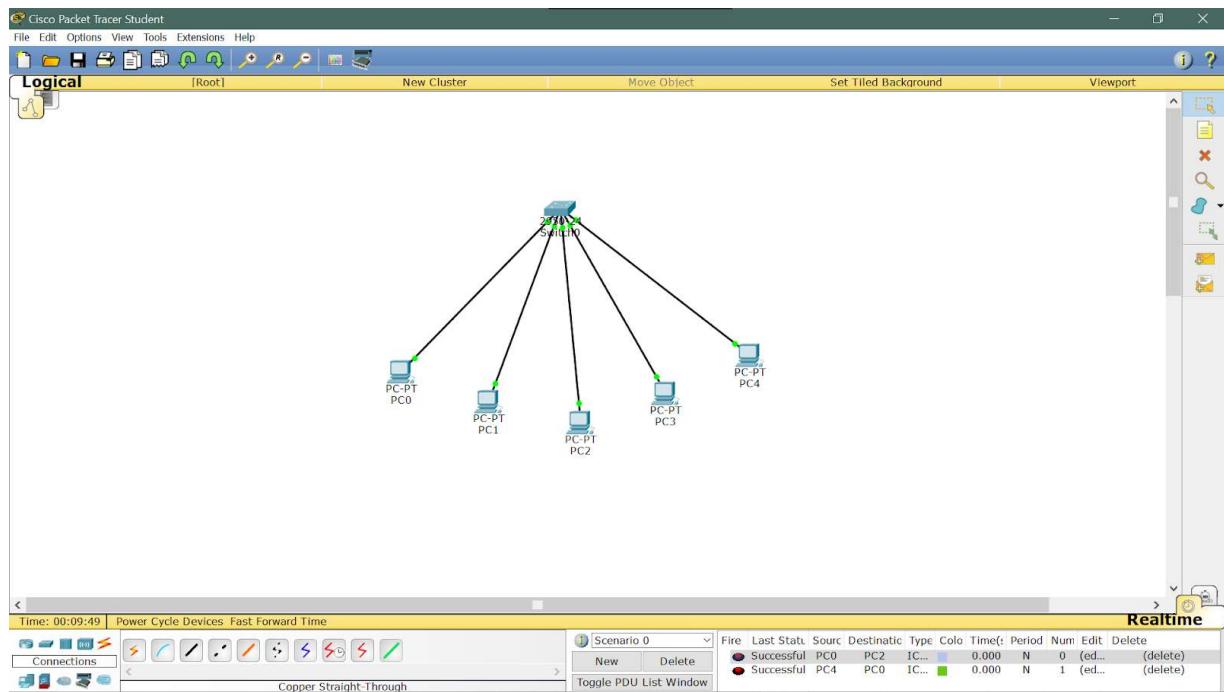
- ★ Open the Cisco Packet installed software.
- ★ Consider the “End Devices” option at the leftmost bottom side of the panel, there we go forward to select a total of 6 PC's , for the sake of symmetrical geometry of 6 PC's we assign them positions accordingly to get the desired required symmetrical regular hexagonal geometric polygon.
- ★ By applying the same procedure of above step 2 select as “End
- ★ Devices” option from there select “Switches” is assigned at the
- ★ center of the diagram.
- ★ Continuing the procedure step by step we now connect the Ethernet Straight Through cable by just selecting the one with straight wire appearance from wires for connection option in the bottom same menu table between one computer to switch and similarly to all the remaining 5 PC's and thus complete the required circuit of the fully connected 6 PC's separately with the required switch by considering the option of Fast Ethernet 0 to switch for all the computers in connection or we can also go for first option comes under or appear under the connection wires option to get by default the suitable connection wire, that is for different sources or computers we use Ethernet Straight through cable and for same computer

connection we correspondingly use Crossover cable , so here we are using Ethernet straight through cable.

- ★ After successfully done with connection we proceed further for ip configuration part by selecting the specific PC towards the Desktop type proceed to select for “ Ip Configuration” one then we have to assign the ip values here we assigned values for all the 6 PC’s separately by applying the same procedure to every computer are 10.10.10.1 ; 10.10.10.2 ; 10.10.10.3 ; 10.10.10.4 ; 10.10.10.5 ; 10.10.10.6 and label as well by selecting the note option at the top most side menu bar.
- ★ Successfully assigned ip addresses to all computers now proceed to get the information about how the packet/data transfer between the computers through switch by selecting Computer say labeled with 10.10.10.2 ip address one then proceed to “Desktop” the “Command Prompt” then by proceed with giving the command “ipconfig” press Enter, we will obtain with the ip addresses with many other essential information.
- ★ To enable data transfer between connected PC’s in the same command prompt write command (say if we are connecting 10.10.10.2 and 10.10.10.5) “ping 10.10.10.5” we can observe 4 packets transferring successfully between these two computers through the switch ,as switch will not transfer a copy to all other computers except the sender one we can easily see this process very effectively in the Stimulation Mode from the Real Time Mode.
- ★ Hence , a packet is successfully transferred between two required computers through a switch with a successfully implemented LAN network between all the 6 computers and Switch and and we can also obtain MAC address table by going to switch the proceed to CLI option the providing the specific command “Switch>EN” then press Enter then appears “Switch#” We then give the command “show mac-address” to show the MAC address table.
- ★ Hence , the Implementation of LAN network connection using switch in Cisco Packet Tracer Software is successfully performed.

Diagram:-

LAN using a switch in Packet tracer.



Conclusion:-

Thus, LAN using Hub and switch was created successfully.

EXPERIMENT-04

Objective :-

configure a router in packet tracer

Resource :-

1. Laptop or desktop &
2. Cisco packet tracer

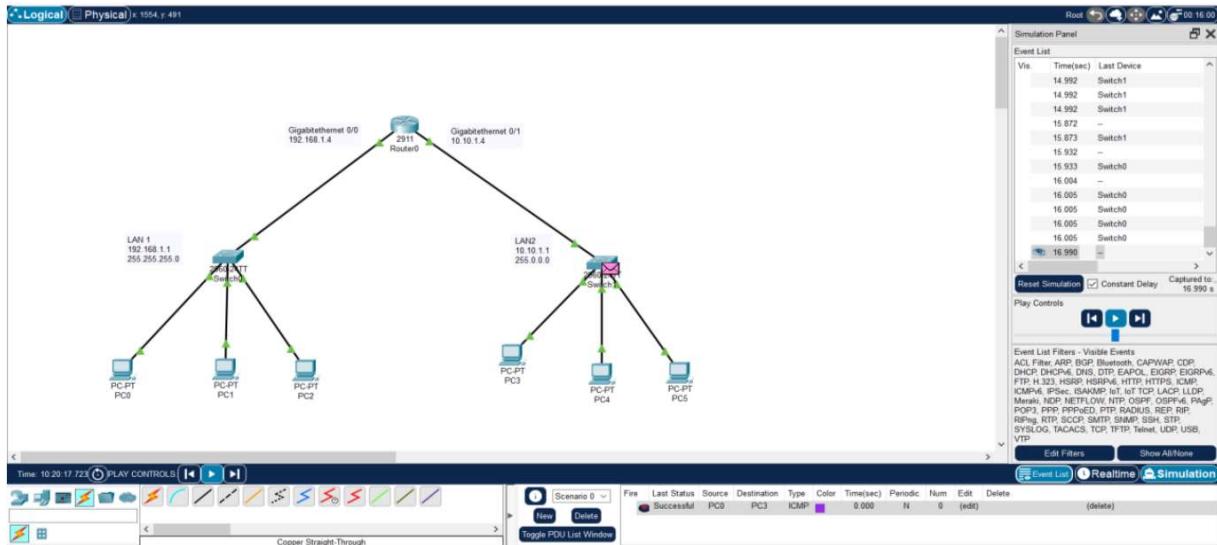
Theory :-

A router and PCs are used. Computers are connected with routers using a copper straight-through cable. After forming the network, to check network connectivity a simple PDU is transferred from PC0 to PC1. The network simulation status is successful. From this network, it can be observed that the router handles data transfers between multiple devices

Procedure :-

- ★ Select the router and Open CLI.
- ★ Press ENTER to start configuring Router1.
- ★ Type enable to activate the privileged mode.
- ★ Type config t(configure terminal) to access the configuration menu.
- ★ Configure interfaces of Routers:

Diagram :-



Conclusion :-

Thus, configuration of router in cisco packet tracer was successfully implemented.

EXPERIMENT-05

Objective :-

Create a local area network using three routers in CISCO packet tracer using RIP.

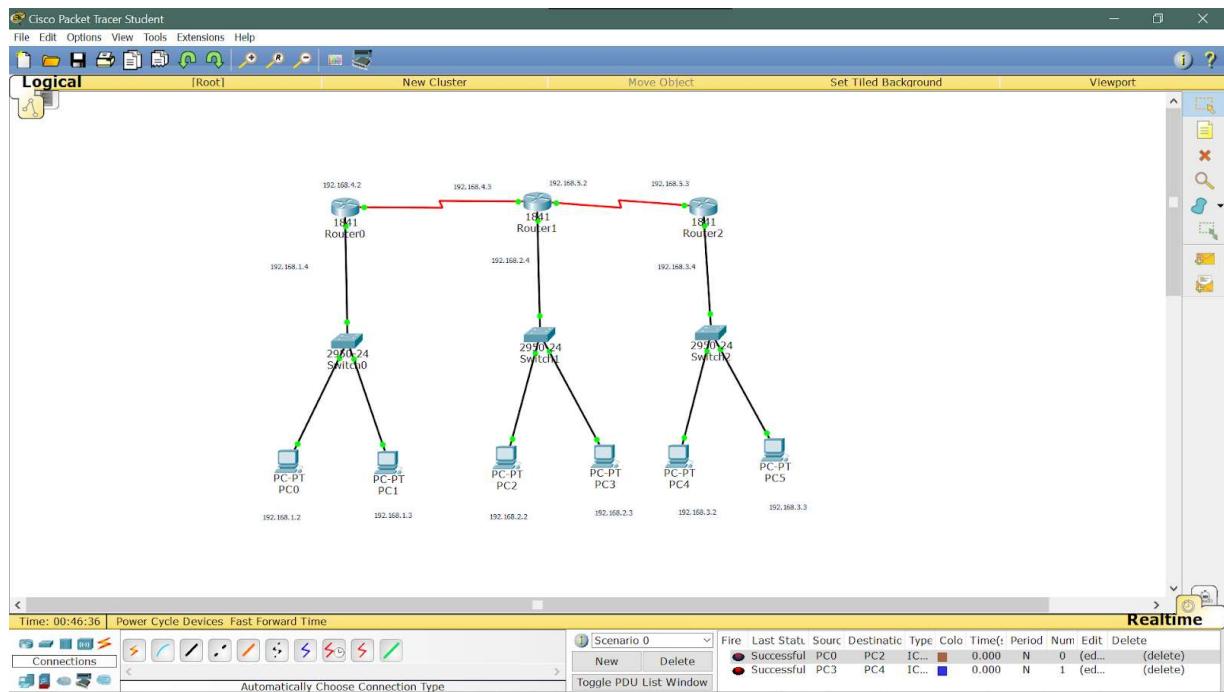
Resource :-

Laptop or desktop & Cisco packet tracer

Procedure:-

- ★ Assign IP Address on Router0:
- ★ Assign IP Address on Router1:
- ★ Assign IP Address on Router2:
- ★ Configure RIP routing on Router R0:
- ★ Configure RIP routing on Router R1:
- ★ Configure RIP routing on Router R2:

Diagram :-



Conclusion: -

Thus, LAN using three routers in CISCO packet tracer using RIP was successfully created and tested .

EXPERIMENT-06

Objective :-

Implementation of DHCP server configuration in Cisco Packet Tracer.

Resource :-

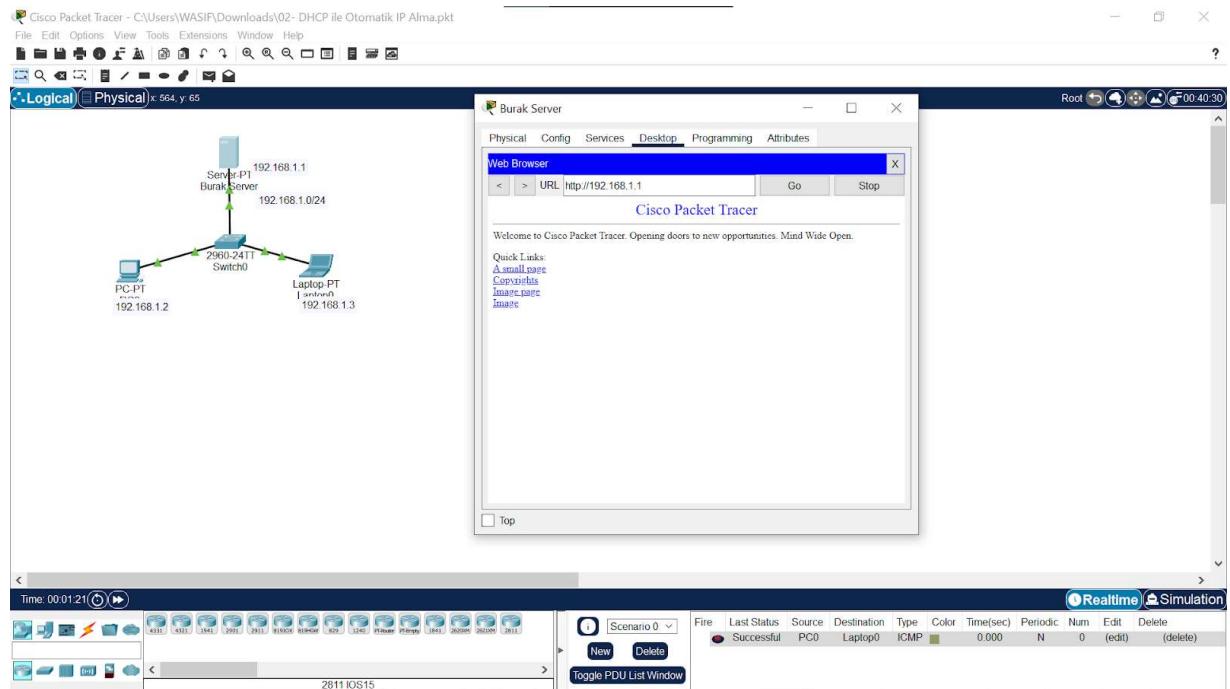
Laptop or desktop

Cisco packet tracer

Procedure:-

- ★ Build the network topology
- ★ On the router, configure interface fa0/0 to act as the default gateway for our LAN.
- ★ Configure DHCP server on the Router. In the server we will define a DHCP pool of IP addresses to be assigned to hosts, a Default gateway for the LAN and a DNS Server.
- ★ Now go to every PC and on their IP configuration tabs, enable DHCP. Every PC should be able to obtain an IP address, default gateway and DNS server, as defined in step 2.

DIAGRAM:-



CONCLUSION:-

Implementation of DHCP server configuration in Cisco Packet Tracer Software successfully performed.

EXPERIMENT-07

Objective :-

Configuration of the VLAN TRUNK using the software cisco packet tracer.

Resource :-

Laptop or desktop

Cisco packet tracer

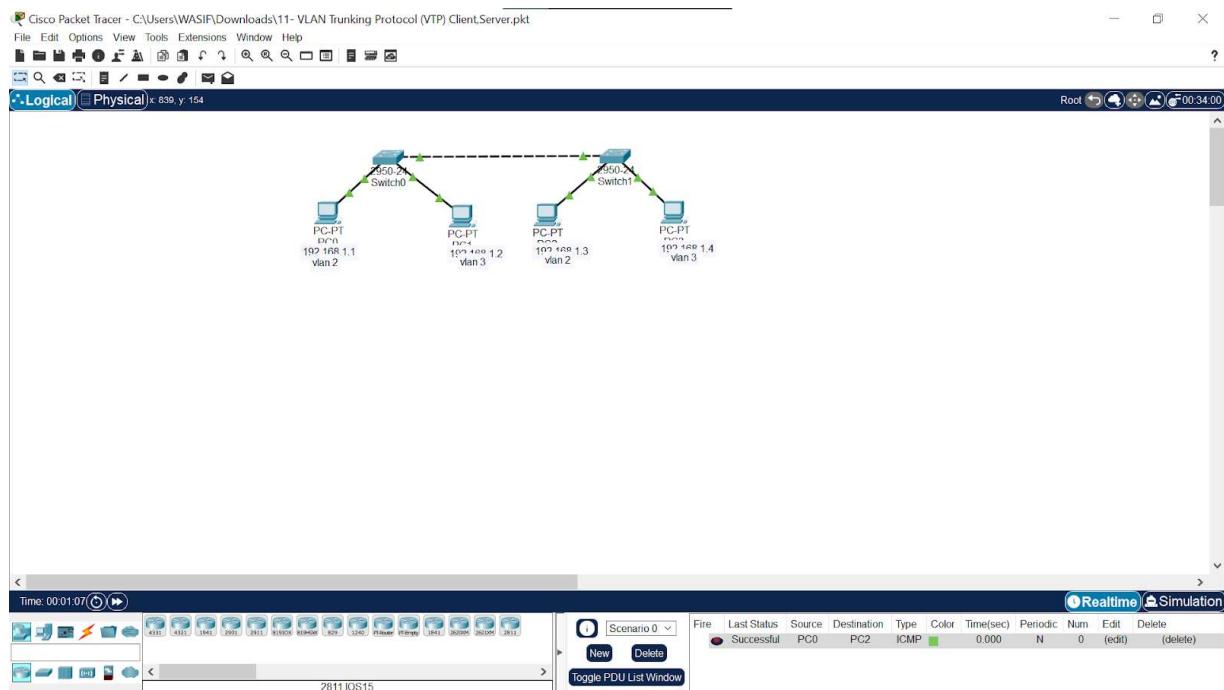
Procedure:-

- ★ Open the Cisco Packet installed software.
- ★ Consider the End Devices option in the menu bar situated at the left most corner of the Cisco panel or screen and select the PC. Here we required 3 PC's for every required connection with a switch for each 2 LAN.
- ★ Then the same as above selection goes for 2 switches to make a symmetrical 2 LAN networks as per required.
- ★ Go for Ethernet Straight Through Cable for connection between different devices. So connect 3 PC0, PC1, PC2 with Switch 0 mark it as LAN 1 and similar to this next connect another 3 PC's PC3, PC4, PC5 to corresponding Switch 1, by selection for FastEthernet cables option step by step.
- ★ Now assign ip address to all the 6 PC's given them labeled as 10.0.0.2, 10.0.0.3, 10.0.0.1 to PC0, PC1, PC2 and 10.0.0.12, 10.0.0.13, 10.0.0.11 to PC3, PC4, PC5 and then we can observe at each step the Subnet Mask has already allotted to each PC.
- ★ Then go to switch 0 , then click on CLI from the above menu bar
- ★ Then just write the required configuration for enabling the functioning of the switches we write the “switch>en” ,then press enter , write “switch conf t” then with the corresponding configuration we proceed for the next commands then vlan 2-> #name production->#exit->vlan 3->#name sales->#exit->vlan 4->#name marketing->#exit->#exit->show vlan, next write the following steps of expressions as required: conf t->#int f 0/1 ->#switchport access vlan 2->#exit->#int f 0/2->#switchport access vlan 3->#exit->#int f 0/3->#switchport access vlan 3->#exit->#exit->show

vlan, as same as the mentioned steps accordingly we have to follow for switch 1 next to the switch 0 also so we can cover this entire configuration to attain a successful VLAN Trunking configuration networking system.

- ★ After done with the above required specific configuration successfully and switching the every ports of the required both the switches we proceed to ping the devices to get the packets transfer successfully to the network connected data transfer from one to another , say from 10.0.0.1 we ping 10.0.0.11 we get the packets delivered successfully through the entire network in the system.
- ★ Hence, the implementation of the configuration of the VLAN trunking Network is performed successfully using software cisco packet tracer.

Diagram:-



Conclusion:-

Implementation of the configuration of the VLAN trunking Network is performed successfully using software cisco packet tracer

EXPERIMENT-08

Objective :-

Implementation of DNS server configuration in Cisco Packet Tracer.

Resource :-

Laptop or desktop

Cisco packet tracer

Procedure:-

- ★ Build the network topology
- ★ Configure static IP addresses on the PCs and the server.

Server

IP address: 192.168.1.2 Subnet mask: 255.255.255.0 Default gateway:
192.168.1.1 DNS Server: 192.168.1.2

PC0

IP add: 192.168.1.3 Subnet mask: 255.255.255.0 Default gateway: 192.168.1.1
DNS server: 192.168.1.2

PC1

IP address: 192.168.1.4 Subnet mask: 255.255.255.0 Default gateway:
192.168.1.1 DNS Server: 192.168.1.2

- ★ Configure DNS service on the generic server.

To do this, click on the server, then Click on Services tab. Click on the DNS server from the menu. First turn ON the DNS service, then define names of the hosts and their corresponding IP addresses.

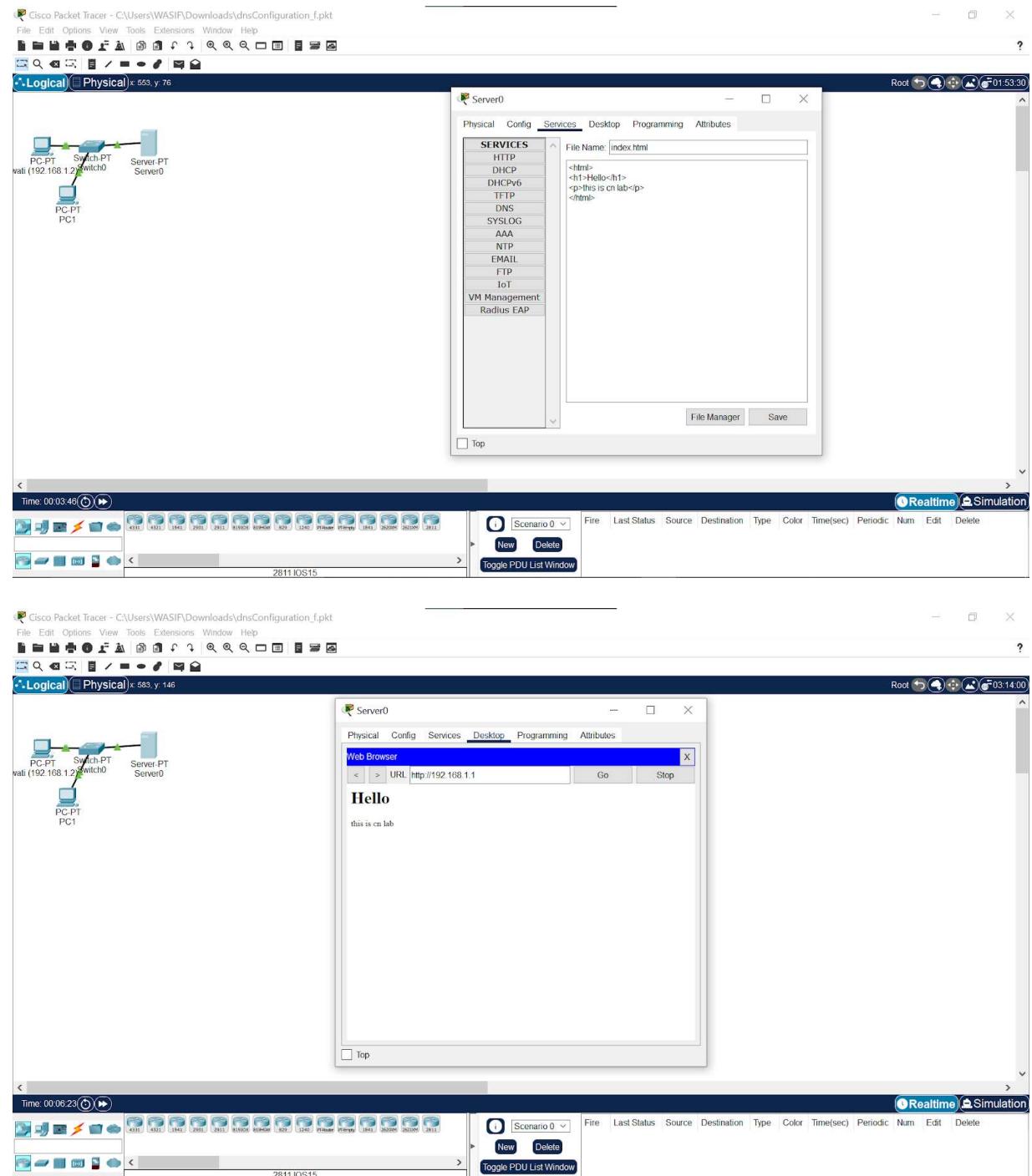
For example, to specify the DNS entry for PC0: In the name and address fields, type:

Name: PC0 Address: 192.168.1.3

Click on add then save. Repeat this for the PC1 and the server.

Test domain name – IP resolution. Ping the hosts from one another using their names instead of their IP addresses. If the DNS service is turned on and all IP configurations are okay, then ping should work.

Diagram: -



CONCLUSION:-

Implementation of DNS server configuration in Cisco Packet Tracer Software is successfully performed.

