



Designing & Simulation of Topology Network using Packet Tracer

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Abstract- *Today's world is impossible without e-mails, online banking, chats and other important services provided by the internet. In this services computer network play very important role to exchange the information from one point to another .so we can say communication network, along with transportation networks, have become essential infrastructure in every society that allows the flow of people information and goods. For interconnectivity of components, network topology describe the physical and logical appearance and interconnection between arrangement of computers, cables and other component in a data communication network and how to be used for taking a packet from one device and sending it through the network to another device on a different network. . So in this paper, we are designing a network using a network simulator tool i.e. Cisco packet tracer, while keeping focus on bus, star, mesh topology to understand various concepts such as topology design, IP address configuration and how to send information in form of packet in a single network.*

Key Words: Computer network, Ethernet, Network security, Cisco packet tracer simulator software

1. INTRODUCTION

Network topology is the geometric representation of relationship of all the links connecting the devices or nodes. Network topology represent in two ways one is physical topology that define the way in which a network is physically laid out and other one is logical topology that defines how data actually flow through the network. In this paper we have discuss how to design bus, star and mesh topology network and provide interfacing and simulation between end points using packet tracer software.

Cisco Packet Tracer (CPT) [1] [2] is multi-tasking network simulation software to perform and analyze various network activities such as implementation of different topologies, select optimum path based on various routing algorithms, create DNS and DHCP server, sub netting, analyze various network configuration and troubleshooting commands. In order to start communication between end user devices and to design a

network, we need to select appropriate networking devices [3] like routers, switches, hubs and make physical Connection by connection cables to serial and fast Ethernet ports from the component list of packet tracer. Networking devices are costly so it is better to perform first on packet tracer to understand the concept and behavior of networking.

2. DESIGNING OF TOPOLOGY

2.1 Bus Topology

In local area network, it is a single network cable runs in the building or campus and all nodes are connected along with this communication line with two endpoints called the bus or backbone. In other words, it is a multipoint data communication circuit that is easily control data flow between the computers because this configuration allows all stations to receive every transmission over the network [4].

For bus topology we build network using three generic pc which are serially connected with three switches using copper straight through cable and switches are interconnected using copper cross over cable.

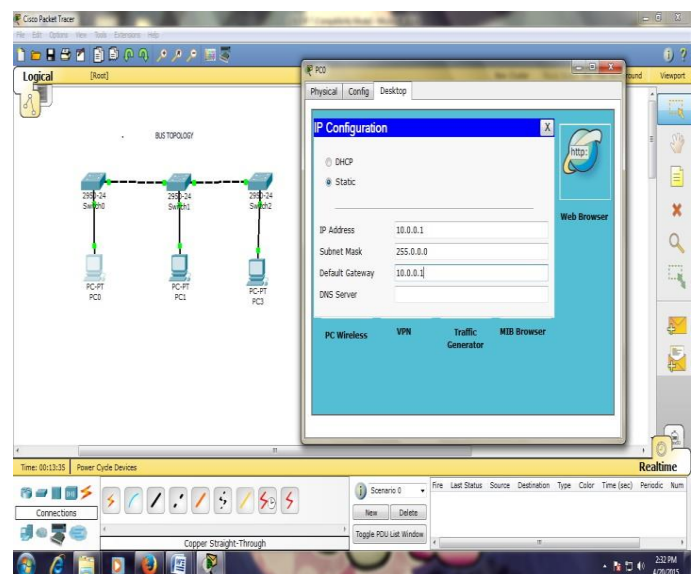


Fig -1: Design of bus topology

2.2 Star Topology

In star topology, all the cables run from the computers to a central location where they are all connected by a device called a hub. It is a concentrated network, where the end

points are directly reachable from a central location when network is expanded. [4]. Ethernet 10 base T is a popular network based on the star topology. For star topology we build network using five generic pc which are centrally connected to single switch 2950-24 using copper straight through cable.

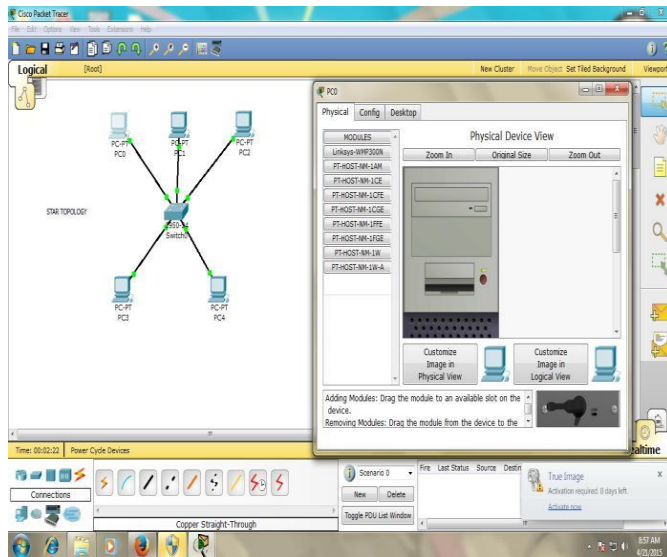


Fig -2: Design of star topology

2.3 Mesh Topology

In mesh topology every device has a dedicated point to point link to every other device. The term dedicated stand for link carries traffic only between two devices it connects. It is a well-connected topology; in this every node has a connection to every other node in the network. The cable requirements are high and it can include multiple topologies. Failure in one of the computers does not cause the network to break down, as they have alternative paths to other computers star topology, all the cables run from the computers to a central location [4].

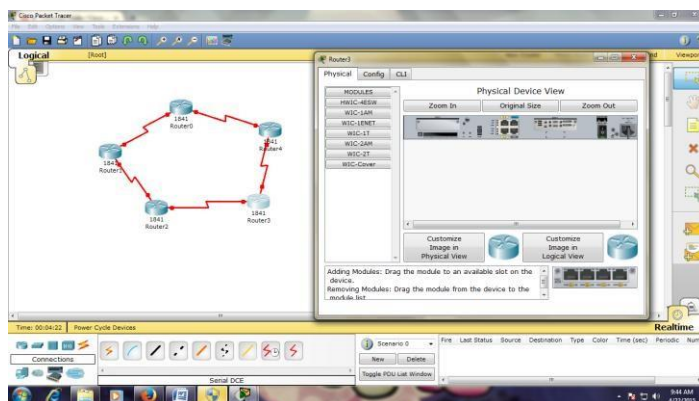


Fig -3: Design of mesh topology

For mesh topology we build network using five 1841 router. To design four serial port router click on router->turn off->drag the WIC2T module two times.->power on.

To establish connection between router to router using DCE cables.

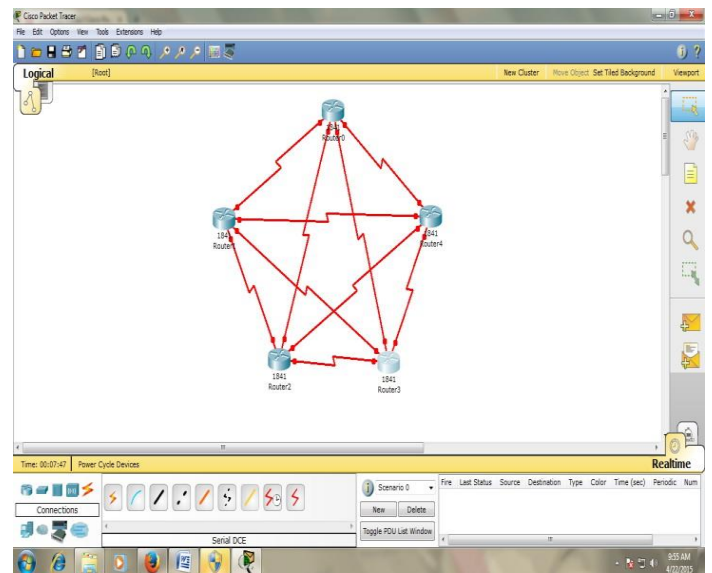


Fig -4: Connection of mesh topology

3. CONFIGURATION OF COMPONENT

3.1 Bus topology: To configure the IP address of an interface, we configure all PC one by one click on pc, open DESKTOP window, fill IP Address, Fill subnet mask and default gateway. After that, simulate the network using simulation

3.2 Star topology: To configure the IP address of an interface, we configure all PC one by one click on pc, open DESKTOP window, fill IP Address, Fill subnet mask and default gateway. After that, simulate the network using simulation

3.3 Mesh topology: To configure the IP address of an interface, we configure all routers one by one. Click on router, open config window, fill IP Address of serial port which are connected to router, Fill subnet mask, set clock rate and port status is ON. After that, simulate the network using simulation mode

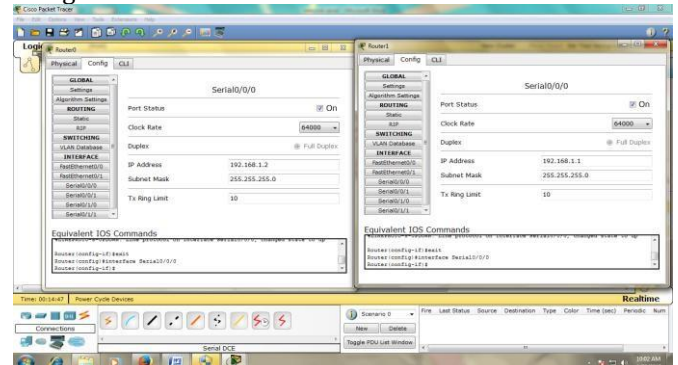


Fig -5: Router configuration of mesh topology

4. SIMULATION OF NETWORK TOPOLOGY

4.1 Simulation modal of bus topology

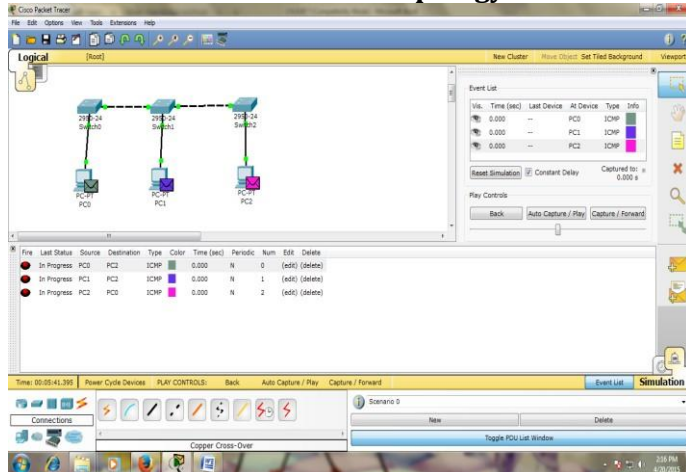


Fig -6: Simulation of bus topology

4.2 Simulation modal of star topology

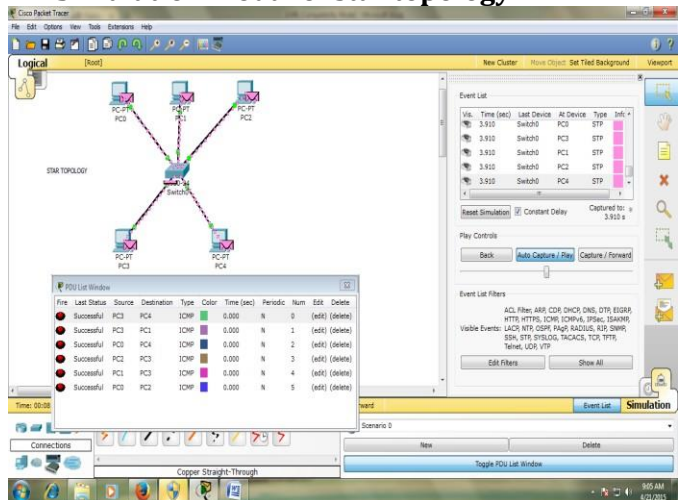


Fig -7: Simulation of star topology

4.1 Simulation modal of mesh topology

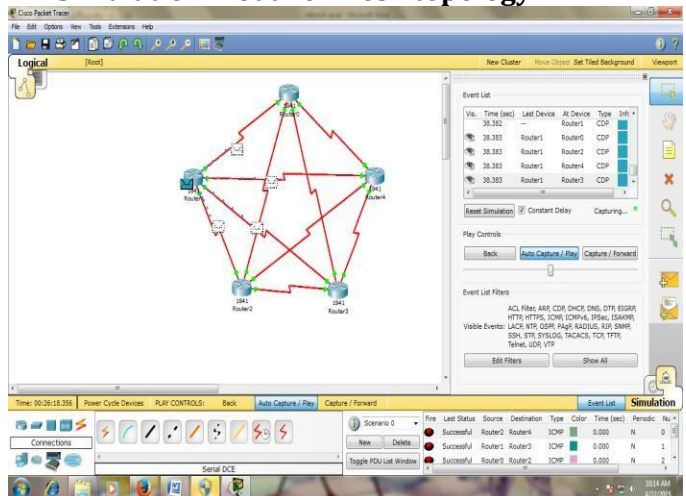


Fig -8: Simulation of mesh topology

5. CONCLUSIONS

In this paper, we have implemented various topologies with some important concepts like DHCP, DNS in a single network using Cisco Packet Tracer. We have used simple network with router, switch configuration and send packet data from one device to another.