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ISSN: 2277-9655
[Bhanot * *et al.*, 6(9): September, 2017] Impact Factor: 4.116
IC™ Value: 3.00 CODEN: IJESS7

IJESRT

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY

IMPLEMENTATION OF WIRED AND WIRELESS NETWORK IN ACADEMIC ENVIRONMENT

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DOI: 10.5281/zenodo.995989

ABSTRACT

Formerly, wired network has verified its capabilities but in this day and age wireless communication has emerged as a robust and most intellectual communication technique. Both the types have its own merits and demerits based on its network characteristics. Wired and wireless networking has different hardware necessities, ranges, mobility, reliability and benefits.The aim of the paper is to provide a simulated outlook of Wireless and Wired Network covering whole campus. This simulation has been attempted by using Packet Tracer as a simulating platform. In this paper, analysis helped to guesstimate and optimise the performance of wired and wireless networks using the proposed optimization techniques.

KEYWORDS: Wired Networks, Wireless Networks, Packet Tracer, OSPF.

I. INTRODUCTION

Rapid development in the field of very large scale integration of complex circuits onto a smaller chip has led to the evolution of high speed computer networks. To compete this era, Both Wire oriented and Wireless Networks plays their unique role such as the load-balancing has been analyzed through parameters like analysis of traffic sent and traffic received done by Wired Transmission while in wireless networks the metrics like delay, retransmission attempts and throughput have been estimated with varying physical characteristic and buffer size.Determining the feasibility and performance of computer networks in actual can be very exclusive and painstaking task. To ease and comfort the procedure of estimating and predicting a network design, simulation and modeling techniques are widely used and put into practice. Various aspects are explained one by one in forthcoming data which have used to implement this networking environment:

A. Wired Networks

In computing terminology, the title "wired" is used to distinguish between wirelessconnections and cable oriented connections. Asystem with wires uses physical cables to transmit databetween various devices and computer systems.Majority of wired networks use Ethernet cables to transmit data between linked PCs. Small wired network used single Router to connect all the systems. Biggernetworks frequently involve several routers or switches that connect to oneanother. One of these devices typically links to a cable modem, or other type of Internetconnection whichdelivers Internet access to whole devices linked to the network.

B. Wireless Networks

Wireless network statestheuse of infrared or radio frequency signals to spread information and resources among devices. Various types of wireless devices are available in current time; for instance, mobile terminals, pocket size PCs, handheld PCs, laptops, cellular phone, PDAs, wireless sensors, and satellite receivers, amongst others. The emerging 3rd generation cellular networks have prominentlyenhanced data transmission speed, which empowers a variety of higher speed mobile data services. For the time being, new standards for short range radio such as Bluetooth, 802.11, Hiperlan, and infrared transmission are serving to create a widespreadrange of innovative applications for organisations and home networking, enabling wireless broadband multimedia and data communication in the office and home.

II. WORKING OF PACKET TRACER

Packet Tracer is a protocol simulator designed at Cisco Systems. Packet Tracer (PT) is a prevailing and vibrant tool that displays the various protocols used in networking. This includes 2nd layer protocols, For instance, Ethernet and PPP, 3rd Layer protocols like IP, ICMP, and ARP, and 4th layer protocols Namely TCP and UDP. Routing protocols can also be traced.

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Key Features:

Packet Tracer Workspaces: Mainly two
Workspaces are included in Cisco Packet Tracer - logical and physical. The First one allows users to build logical network topologies by placing, connecting, and clustering virtual network devices. The second one provides a graphical physical dimension of the logical network, giving a sense of scale and placement in what manner network devices such as routers, switches, and hosts would look in a actual environment. Following this, physical view also provides geographic depictions of networks, including multiple cities, buildings, and wiring Closets.

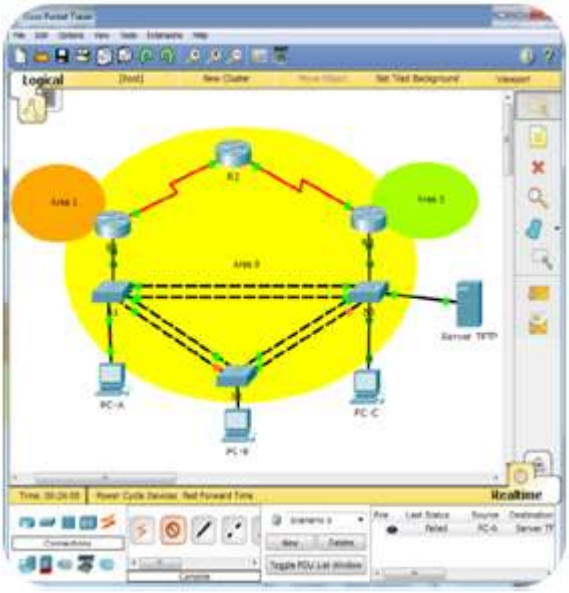

Figure1.The Physical workspace provides a graphical view of the logical network

Packet Tracer Modes: For Visualizing the
Behaviorof a network Cisco Packet Tracer provides two operating modes- Real-time mode and Simulation mode. Real-time mode network behaves as real devices act, with immediate real-time reaction for all network activities. The real-time mode provides user a viable substitute to real equipment and permits them to gain configuration practice prior to working with real environment.

III. INTRODUCTION TO OSPF

OSPF (Open Shortest Path First)is a router protocol used to find the optimal path for packets as they pass through a set of linked networks. OSPF is deputed by the Internet Engineering Task Force (IETF) as one of numerous Interior Gateway Protocols (IGPs) -- implies, protocols focused at traffic moving around within a larger autonomous system network like a single enterprise's network, which may in turn be made up of countless separate local area networks connected via. Routers .The OSPF routing protocol has principally substituted the older Routing Information Protocol (RIP).

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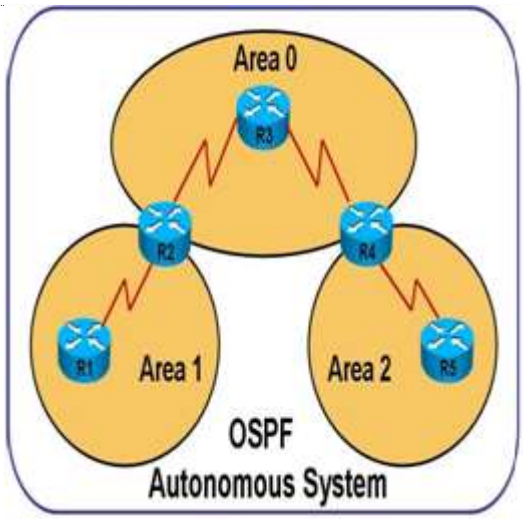

Figure2.OSPF in Autonomous Environment

IV. IMPLEMENTATION

1. Establish a Server room to command various departments and surrounding areas to which connections should be given

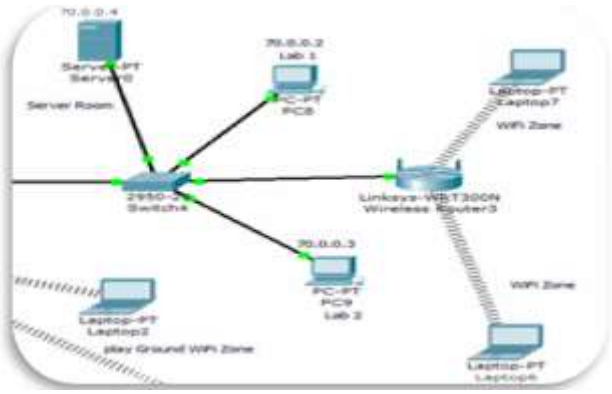

Figure3.View of server room

2. With the help of required number of routers connect numerous departments as demonstrate below:

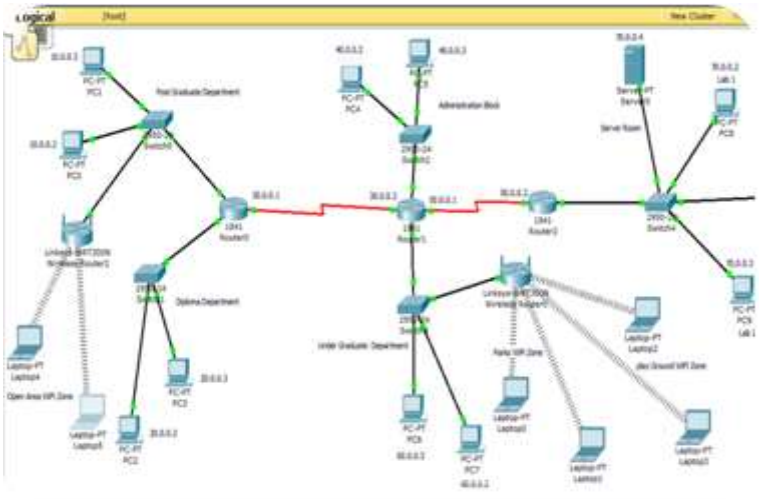

Figure 4.Communication b/w various depts.

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Here in this case, Router 0, 1, 2 are used to do so. Departments that are included are Administration Dept., UG and PG Dept. as well as Diploma Dept. respectively.

3. Inspite of this, surrounding areas like Playground and Parks are getting access to network using OSPF (Open shortest path first).
4. Following is the complete scenario of whole project

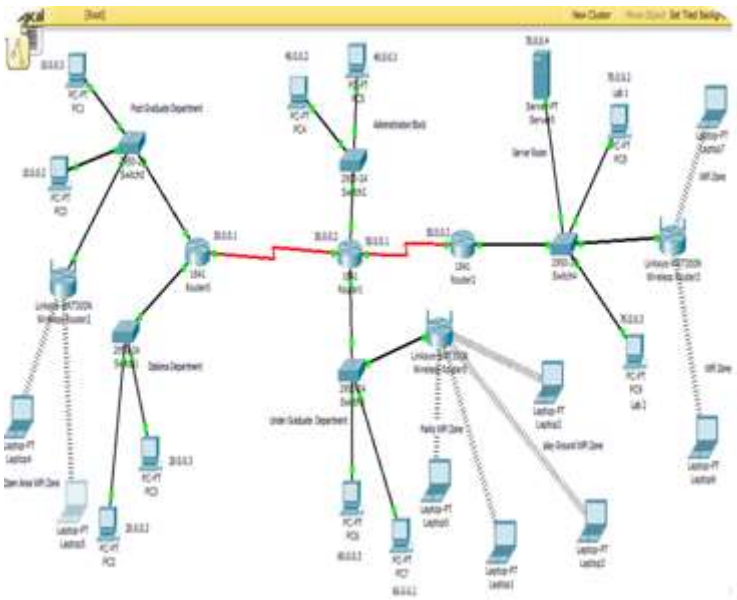

Figure5.Entire Panorama of project

5. Internal working of Server can be seen just by clicking on Server0 shown here.

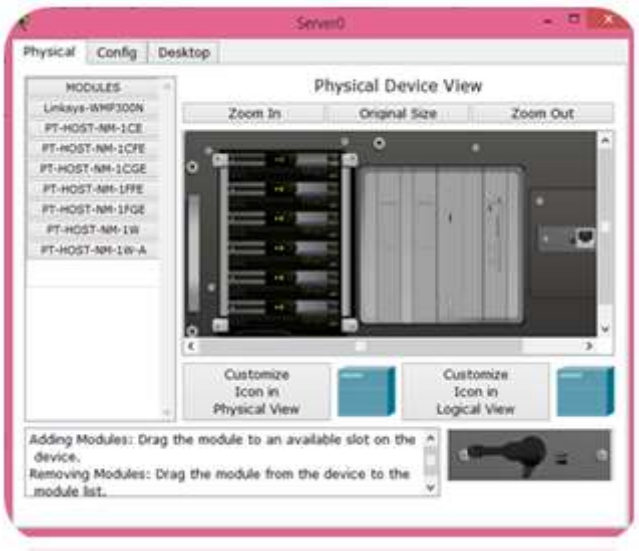

Figure 6.Physical Device view of Server0

6. View of assigning SSID and password to the Wireless Router. As an example, one is shown below:

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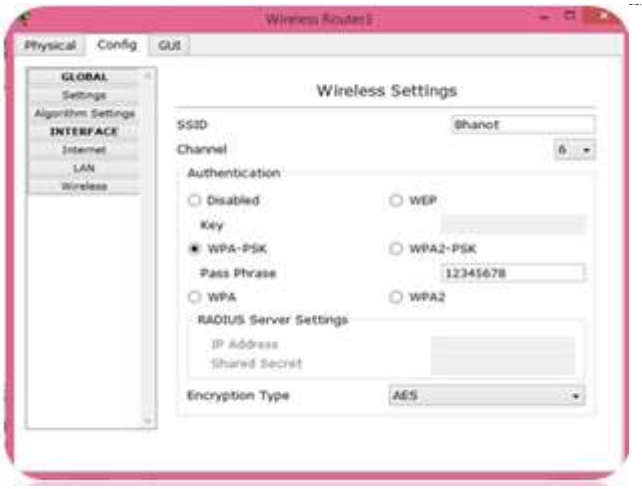

Figure7.*Configuration of Wireless Router*

7. Providing access to Wi-Fi to various PCs and Laptops. To exemplify, one is exhibit here:

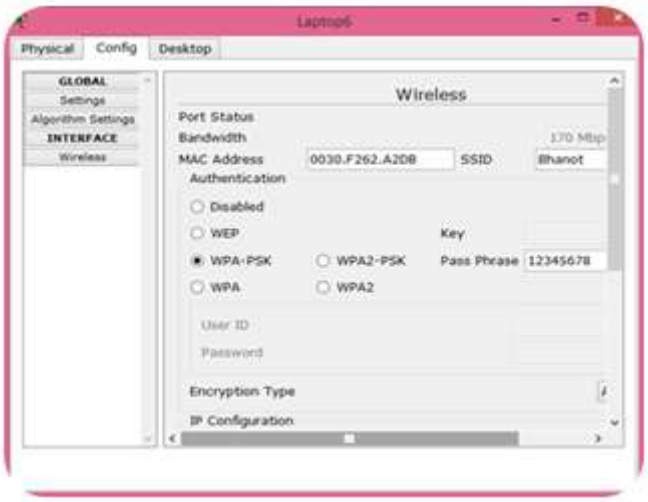

Figure 8.Configuration of laptop6

8. Providing various interfaces for communication.

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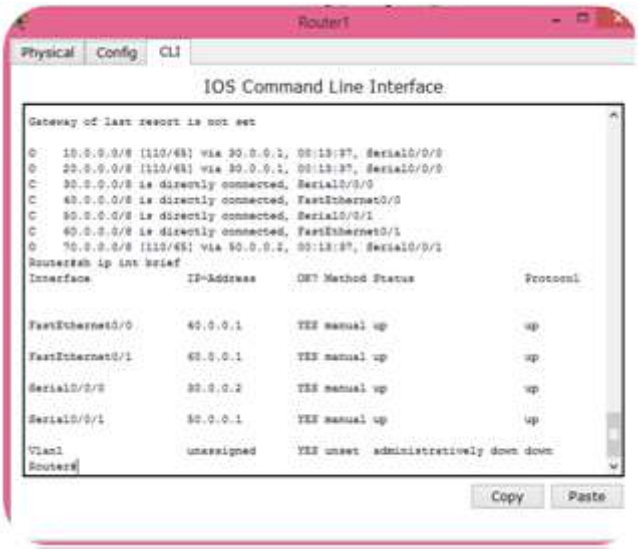
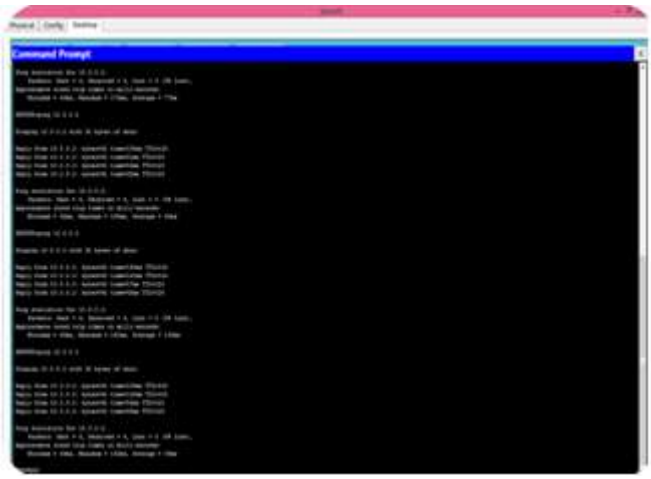


Figure 9.Interfaces along with IP addresses

9. Pinging one network to another to check the connectivity.



V. RESULTS

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CITE AN ARTICLE

Bhanot, R. (2017). IMPLEMENTATION OF WIRED AND WIRELESS NETWORK IN ACADEMIC ENVIRONMENT. *INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY, 6*(9), 548-554.