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WINGS TO YOUR THOUGHTS.....

Network Designing for Reliance Retail based on Packet Tracer

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Abstract— *Reliance Retail is the retail business wing of the Reliance business. With a vision to generate inclusive growth and prosperity for farmers, vendor partners, small shopkeepers and consumers, Reliance Retail Limited (RRL), a subsidiary of RIL, was set up to lead Reliance Group's foray into organized retail. In this paper we will study the network designing for Reliance Retail industry by using technologies such as DHCP, Switching, Routing, FTP, TELNET, and Frame Relay.*
Keywords: *Network, Packet Tracer, Reliance, LAN, WAN, Router, Switch, Sub Office.*

1. INTRODUCTION

Network Architecture is the complete framework of an organization's computer network. The diagram of the network architecture provides a full picture of the established network with detailed view of all the resources accessible. It includes hardware components used for communication, cabling and device types, network layout and topologies, physical and wireless connections, implemented areas and future plans [1]. Modern networks are both extremely complex and critical to business success. As organizational processes continue to increase the requirements for bandwidth, reliability, and functionality from their networks, network designers are challenged to rapidly develop and evolve networks that use new protocols and technologies [2]. The scope of the Indian retail is immense for this sector is poised for the highest growth in the next 5 years. The organized RETAILING SECTOR IN INDIA is only 3% and is expected to rise to 25-30% by the years 2020. There are under construction at present around 325 departmental stores, 300 new malls, and 1500 supermarkets. This proves that there is a tremendous scope for growth in the Indian retail market. The growth of scope in the Indian retail market is mainly due to the change in the consumer's behaviour [3].
We have design a network for Reliance Retail Industry in our project.

2. PACKET TRACER

Packet Tracer is a self-paced, visual, interactive teaching and learning tool. It is designed to increase interaction between students and instructors, promote student learning, and enhance instructor presentations. This technology is a new and fun way to expand teaching and learning experiences beyond the limitations of a traditional lab environment. Packet Tracer is an education simulation technology and has been widely used in many researches including teaching method research. Packet Tracer helps resolve some common challenges that instructors face on a daily basis, while enabling us to explore new frontiers in networking education. It is a powerful network simulator that can be utilized in training for Network certifications by allowing students to create networks with an almost unlimited number of devices and to experience troubleshooting without having to buy real Cisco routers or switches. The tool is created by Cisco Systems. The purpose of Packet Tracer is to offer students a tool to learn the principles of networking as well as develop Cisco technology specific skills. However, it is not be used as a replacement for Routers or Switches. It can be downloaded for free .As Cisco says, the best way to learn about networking is to do it. Hands-on equipment gets students started, but is limited to the number of devices in the lab. Furthermore, Educators use Packet Tracer to demonstrate complex technical concepts and networking systems. Students use Packet Tracer to complete assignments, working on their own or in teams [4].

3. TECHNOLOGIES

3.1 Frame Relay:

Frame relay is a packet-switching telecommunication service designed for cost-efficient data transmission for intermittent traffic between local area networks (LANs) and between endpoints in wide area networks (WANs). Frame relay puts data in a variable-size unit called a frame and leaves any necessary error correction (retransmission of data) up to the endpoints, which speeds up overall data transmission. For most services, the network provides a permanent virtual circuit (PVC), which means that the customer sees a continuous, dedicated connection. The Frame Relay frame is transmitted to its destination by way of virtual circuits (logical paths from an originating point in the network) to a destination point [5].

3.2 Routing:

A router is a device that is used to perform routing. It forwards data packets along networks. A router is connected to at least two networks, commonly two LANs or WANs or a LAN and its ISPs network. Routers are located at gateways, the places where two or more networks connect. Routers use headers and forwarding tables to determine the best path for forwarding the packets, and they use protocols such as ICMP to communicate with each other and configure the best route between any two hosts. Very little filtering of data is done through routers. In packet-switched networks such as the Internet, a router is a device or, in some cases, software in a computer, that determines the next network point to which a packets should be forwarded toward its destination [6].

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The router is connected to at least two networks and decides which way to send each information packet based on its current understanding of the state of the networks it is connected to. A router is located at any gateway (where one network meets another), including each point-of-presence on the Internet.

A router may create or maintain a table of the available routes and their conditions and use this information along with distance and cost algorithms to determine the best route for a given packet. Typically, a packet may travel through a number of network points with routers before arriving at its destination [7].

3.3 Switching:

In large networks there might be multiple paths **linking sender and receiver**. Information may be switched as it travels through various communication channels. There are two main switching techniques:

3.3.1 Circuit Switching:

• Circuit switching is a technique that directly connects the sender and the receiver in an unbroken path.

• Telephone switching equipment, for example, establishes a path that connects the caller's telephone to the receiver's telephone by making a physical connection.

• With this type of switching technique, once a connection is established, a dedicated path exists between both ends until the connection is terminated.

• Routing decisions must be made when the circuit is first established, but there are no decisions made after that time

• Circuit switching in a network operates almost the same way as the telephone system works.

• A complete end-to-end path must exist before communication can take place.

• The computer initiating the data transfer must ask for a connection to the destination.

• Once the connection has been initiated and completed to the destination device, the destination device must acknowledge that it is ready and willing to carry on a transfer.

3.3.2 Packet Switching:

There are two methods of packet switching: Datagram and virtual circuit.

• In both packet switching methods, a message is broken into small parts, called packets.

• Each packet is tagged with appropriate source and destination addresses.

• Since packets have a strictly defined maximum length, they can be stored in main memory instead of disk; therefore access delay and cost are minimized.

• Also the transmission speeds, between nodes, are optimized.

• With current technology, packets are generally accepted onto the network on a first-come, first-served basis. If the network becomes overloaded, packets are delayed or discarded (``dropped") [8].

3.4 File Transfer Protocol (FTP):

FTP stands for the File transfer protocol and is used to transfer files between an FTP server and another computer. In the past, FTP was much more common than it is today and was the dominant file transfer mechanism on the Internet. If you needed to transfer files between two computers, you would use FTP to do so. FTP is still very popular today when a service requires that a lot of files be hosted for other to people to download. FTP also tends to be faster than other contemporary methods of transferring files because it was designed to do so.

Firstly you must obtain an FTP client that is capable of the required functionality:

Configuration - To set up your FTP client to connect to your account requires three things:

» server address - enter your domain name or your server IP address

» login ID - your login ID you received with your account

» password - the password you chose when you ordered your account

Upon logging in, the 'remote' window of the FTP client will show a list of files in your home directory you can upload, download, delete and rename. Using FTP, a client can backup files on a server [9].

4.   CONFIGURATION OF NETWORK

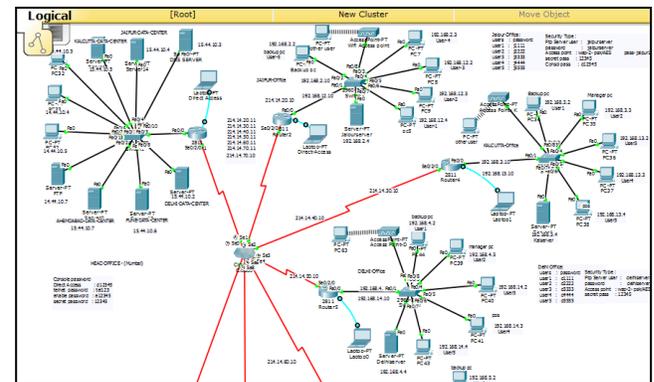[1] In Fig.1 shown is the network designed for the Reliance Retail.

Figure 1: Reliance Retail Network

The network consists of a Head office and sub offices. There is a need for all sub offices to communicate to each other and to the head office to regularly share product information, keep themselves updated and to back up their data.
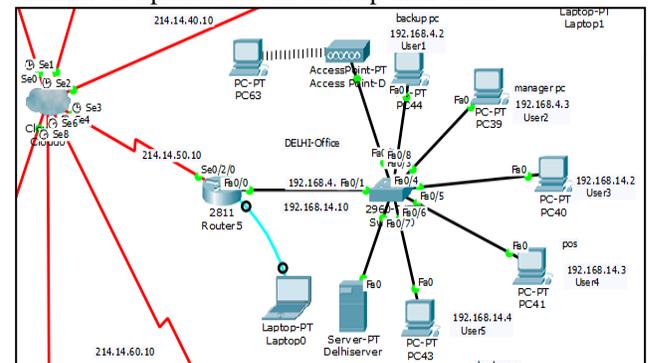

Figure 2: Reliance Office Network

The sub office various devices are connected in a star topology manner to each other via switch, which help them in

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communication within the network. Further we have a router for each sub office which in turn helps it to communicate to other networks as shown in fig. 2.

Each sub office consists of a various users and a server. The users are acting as a client that request for resources which may be on the same network or on other networks.

The servers in turn provide services such as DNS, DHCP, and FTP. The DNS server helps the clients to communicate via their names instead of communication by remembering the ip addresses of each other. The DHCP server provides the ip addresses dynamically to the new clients to help them communicate over a network. The FTP server enables the transmission of files between the clients. FTP further provides security to the clients, to transfer a file client needs to enter the address of the server it wants to communicate. The client further needs to authenticate itself by entering its username and password. The Sub offices are also provided with an Access Point that allows a geographically dispersed user to connect wirelessly to the network. Also Access Point Security is provided to prevent the unauthorized users to connect and access the resources of the network. The Backup Facility is also provided to back up all the data of the server, by providing each sub office with a backup device. The Router helps a sub office communicate to other offices. All the offices routers are connected to each other via help of a cloud using frame relay technology. The router security is also considered by providing each router with a console password, a secret password. The Sub Office Configuration commands of Router2 (Jaipur Office) as per the Table 1 is as following:

Table 1: IP Addresses of Jaipur Sub Office

The IP address of network topology Device	Interface	IP address	Subnet Mask	Default Gateway
User1	NIC	192.168.12.4	255.255.255.0	192.168.12.100
User 2	NIC	192.168.12.3	255.255.255.0	192.168.12.100
User 3	NIC	192.168.12.2	255.255.255.0	192.168.12.100
User4	NIC	192.168.2.3	255.255.255.0	192.168.2.100
User5	NIC	192.168.2.2	255.255.255.0	192.168.2.100
Jaipur Server	NIC	192.168.2.4	255.255.255.0	192.168.2.100
Router 2	Loopback	2.2.2.2	255.0.0.0	N/A
	FastEthernet0/0.1	192.168.2.100	255.255.255.0	N/A
	FastEthernet0/0.2	192.168.12.100	255.255.255.0	N/A
	Serial0/2/0	214.14.20.10	255.255.255.0	N/A

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config)#ip address 2.2.2.2 255.0.0.0
Router(config)#interface FastEthernet0/0.1
Router(config)#ip address 192.168.2.100 255.255.255.0
Router(config)#interface FastEthernet0/0.2
Router(config)#ip address 192.168.12.100 255.255.255.0

Router(config)#interface Serial0/2/0
Router(config)#ip address 214.14.20.10 255.255.255.0
Router(config)#encapsulation frame-relay
Router(config)#router eigrp 10
Router(config)#network 192.168.12.0
Router(config)#network 192.168.2.0
Router(config)#network 214.14.20.0
Router(config)#hostname Jaipur
Router(config)#banner motd ^C
. . . .

This is Jaipur Office.
. . . .^C
Router(config)#line console 0
Router(config-line)#password d12345
Router(config-line)#login
Router(config-line)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#enable secret password 12345
Router(config)#exit

The Head Office Configuration commands of Router1 (Mumbai Office) is as following:

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config)#ip address 1.1.1.1 255.0.0.0
Router(config)#interface FastEthernet0/0.1
Router(config)#ip address 15.44.10.100 255.0.0.0
Router(config)#interface FastEthernet0/0.2
Router(config)#ip address 12.44.10.100 255.0.0.0
Router(config)#interface FastEthernet0/0.3
Router(config)#ip address 13.44.10.100 255.0.0.0
Router(config)#interface FastEthernet0/0.4
Router(config)#ip address 14.44.10.100 255.0.0.0
Router(config)#interface Serial0/2/0.1 point-to-point
Router(config)#ip address 214.14.20.11 255.255.255.0
Router(config)#frame-relay interface-dlci 101
Router(config)#clock rate 2000000
Router(config)#interface Serial0/2/0.2 point-to-point
Router(config)#ip address 214.14.30.11 255.255.255.0
Router(config)#frame-relay interface-dlci 102
Router(config)#clock rate 2000000
Router(config)#interface Serial0/2/0.3 point-to-point
Router(config)#ip address 214.14.40.11 255.255.255.0
Router(config)#frame-relay interface-dlci 103
Router(config)#clock rate 2000000
Router(config)#interface Serial0/2/0.4 point-to-point
Router(config)#ip address 214.14.50.11 255.255.255.0

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Router(config)#frame-relay interface-dlci 104
Router(config)#clock rate 2000000
Router(config)#interface Serial0/2/0.5 point-to-point
Router(config)#ip address 214.14.60.11 255.255.255.0
Router(config)#frame-relay interface-dlci 105
Router(config)#clock rate 2000000
Router(config)#interface Serial0/2/0.6 point-to-point
Router(config)#ip address 214.14.70.11 255.255.255.0
Router(config)#frame-relay interface-dlci 106
Router(config)#clock rate 2000000
Router(config)#router eigrp 10
Router(config)#network 12.0.0.0
Router(config)#network 13.0.0.0
Router(config)#network 14.0.0.0
Router(config)#network 15.0.0.0
Router(config)#network 214.14.20.0
Router(config)#network 214.14.30.0
Router(config)#network 214.14.40.0
Router(config)#network 214.14.50.0
Router(config)#network 214.14.60.0
Router(config)#hostname headoffice
Router(config)#banner motd ^C
. . . .

This is Head Office of Reliance.

. . . .^C
Router(config)#line console 0
Router(config-line)#password d12345
Router(config-line)#login
Router(config-line)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#enable secret password 12345
Router(config)#exit

5. CONCLUSION

With a vision to generate inclusive growth and prosperity for farmers, vendor partners, small shopkeepers and consumers, Reliance Retail Limited (RRL), a subsidiary of RIL, was set up to lead Reliance Group's foray into organized retail. Retail consists of the sale of physical goods or merchandise from a fixed location, such as a department store, boutique or kiosk, or by mail, in small or individual lots for direct consumption by the purchaser. In this paper we studied the network designing for Reliance Retail industry that has a major focus on achieving customer needs and their satisfaction level.

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