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BANKING NETWORK SYSTEM DESIGN AND IMPLEMENTATION USING CISCO PACKET TRACER

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ABSTRACT

In this project we will primarily focus on design and implementation of Bank Network using Cisco Packet Tracer (CPT). Security breach in the sector of banks is one of the most important concerns that needs to be addressed in the first place since loss of information can lead to huge losses to the bank overall. This project will help us curb such concerns by understanding the regulated flow of information/data. We will consider a Abhyudaya bank which has its head offices located in big cities like Mumbai. The other small branches will be present in cities like Nashik, Pune, Nagpur, Kolhapur, Solapur.

Keywords – bank, branch, implementation

I. INTRODUCTION

In today's interconnected world it is irrational to believe a computer network system is immune from an attacks or think of it as too small to be considered as a predator by intruders to gain whatever advantage they need. Sometimes company owners deceived by thinking that company's resource are not highly valued and hence, they are not worth to be targeted. The reality is even at this moment companies are losing a significant amount money and wealth because of negligence or lack of awareness about the security issues. In this paper, we will primarily focus on designing and implementing a Bank Network using Cisco Packet Tracer (CPT). Security breach in the sector of banks is one of the most important concerns that need to be addressed in the first place since the loss of information can lead to huge losses to the bank overall. This paper will help us curb such concerns by understanding the regulated flow of information/data. We will consider a Abhyudaya bank with its head offices in big cities like Mumbai. The other small branches will be present in cities like Pune, Nagpur, Solapur, Kolhapur. These small branches in each state will be connected through LANs. Apart from this, VLANs and WANs will automatically be a part of the project networking since we are working on a Bank Network. Additionally, bank machines will be made available all around each city in specific to ensure better reach and reliable services to the people. Employees use special software to access user accounts. The level of access to advanced resources within the bank varies from employee to employee based on several criteria, including the employee's designation, the criticality and directories will be made available to all the employees to of the information, etc. The typical servers, mail, web, files, understand the flow of work within the bank.

II. BACKGROUND

Implementing a banking network system in Cisco Packet Tracer involves creating a secure and efficient network infrastructure to support the operations of a bank. The main objective of this blog is to design a network for the bank with the given constraints. In this, we have 1 server room, 4 branches, and 1 main branch. This network design of the bank also has a server for online transactions which is used by the customers of all branches.

III. LITERATURE REVIEW

[1] Topic : Implementation of network design do MSS.LTD using cisco packet tracer

Date : 20/06/2020

[2] Networks can also be characterized in terms of spatial distance as local area networks (LANs), metropolitan are networks (MANs), and wide area network (WANs). A given network can also be characterized by the type of data transmission technology in use on it (for example, a TCP/IP or systems Networks Architecture network); by whether it carries voice, data or both kinds of signals; by who can use the network (public or private); by the usual nature of its connections (dial-up swathed dedicated or no switched, or virtual connections); and by the types of physical links (for example, optical fiber, coaxial cable, and Unshielded twisted Pair).

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[3] Topic : Network implementation for bank using cisco packet tracer

Date : 12/03/2023

Limitations : The project is only have simple implementation of bank system. There is a lack of security.

[4] Topic : Enterprise network implementation using cisco packet tracer

Date : 01/01/2021

Limitation : The project had implemented for small enterprise.

IV. OBJECTIVE

- The main objective of this project is to design a network for the bank with the given constraints. In this, we have 1 server room, 5 branches, and 1 main branch. This network design of the bank also has a server for online transactions which is used by the customers of all branches.
- Our project will definitely help to understand internal data flow of bank.
- To simulate a banking network system that will easily manage any banking task.
- To manage the banking network by a central system.
- The IT department consist of a small team that the staffs ae mainly performing operational task instead of planning and implementation.

V. ARCHITECTURE

The architecture of banking system is showing how actual bank data flows.

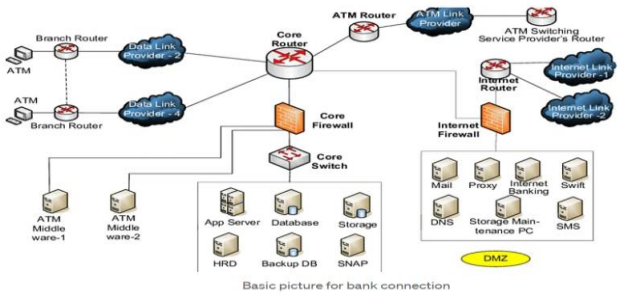

Fig 1. Architecture of Banking network system

VI. MENTHODOLOGY

Network requirements :

- Identify the hardware components required to set up the network for the Bank.
- High availability should be available to the application server, which is accessible using the HTTPS protocol.
- The application server should be set up securely with network and host-level protection.
- All traffic into the application server should be scanned for security attacks.
- IP network design for the branch and main offices.
- IP addressing range for users and hardware components.
- The users at different locations should be able to access each other, including the application server.
- Identify the features and methodology which would be followed to achieve the solution.
- Network Topology diagram.

Hardware and software requirements :

- At the main office, one switch (2960) is connected to department of bank and have one data server (server-PT). The departments like management department, logistic department, IT department, customer department.
- There are 200 users in the main office.
- Nashik sub branch has call centre with having one server (server-PT) and PCs.
- Pune sub branch has only server room (server-PT) which has data of all other branches.
- Nagpur, Solapur and Kolhapur are branch of bank which have departments as ATM department, loan department, cash department, FD department, operation department and one server (server-PT).

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VII. IMPLEMENTATION

Cisco Packet Tracer :

- or implementing this bank prototype, we have used Router-PT which has serial ports, So that it will be easy for us to connect to 5 branches we have also we have switches to connect to connect to all 5 cities with router.
- We can also configure every router and network with the IP address and tested whether the data transfer is successful or not.
- All the serial ports are assigned IP addresses so they can be recognized between the cities without confusion.

IP address :

Branch	IP address	Subnet Mask
Maharashtra	192.168.1.2/192.168.2.1/ 192.168.3.2 192.168.2.2/192.168.5.2/ 192.168.6.1 192.168.6.2/192.168.7.2/ 192.168.8.2	255.255.255.0 255.255.255.0 255.255.255.0
Mumbai	192.168.1.1	255.255.255.0
Nashik	192.168.3.1	255.255.255.0
Pune	1.0.0.1	255.255.255.0
Nagpur	192.168.5.1	255.255.255.0
Kolhapur	192.168.7.1	255.255.255.0
Solapur	192.168.8.1	255.255.255.0

Network topology diagram :

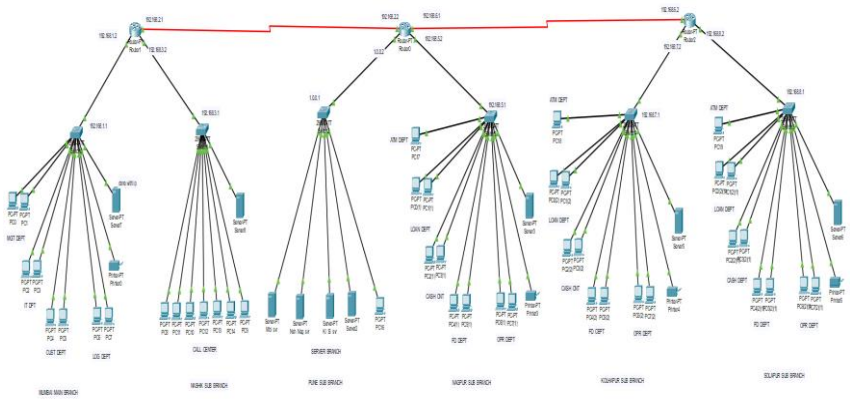

Fig 2. Network topology diagram for Banking network system

ACCESS LAYER :

In this layer, all the end devices are connected to each other to the network and we will be having the layer 1 switch for the further connections.

Distribution layer :

Distribution layer, mostly the layer 3 switches are used to connect the end devices and make the network correspond and this connects to the access and core layers of the network design.

Core layer :

The core layer is the main source of all the layers, where this layer is used to transfer the large amount of traffic very quickly.

There will be 1 server room ,1 main branch and 4 sub-branches for this network topology:

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- Mumbai
- Nashik
- Pune
- Nagpur
- Kolhapur
- Solapur

Each branch is explained separately for better understand in of the network.

Mumbai main branch – Network Topology :

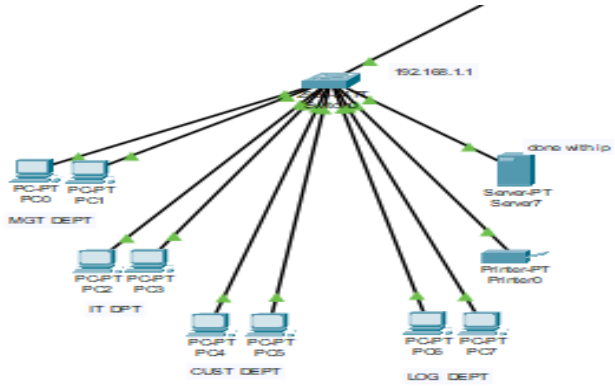

Fig 3. Network topology diagram for Mumbai branch

Nashik call center – Network Topology :

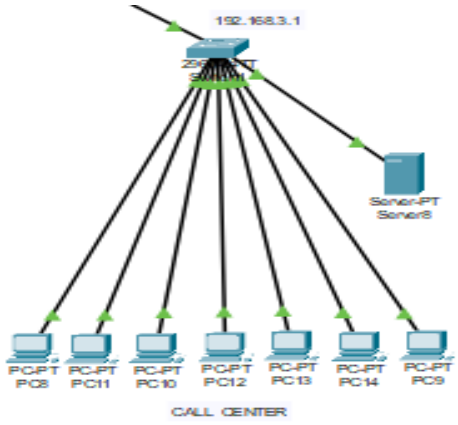

Fig 4. Network topology diagram for Nashik branch (call centre)

Pune server room – Network Topology

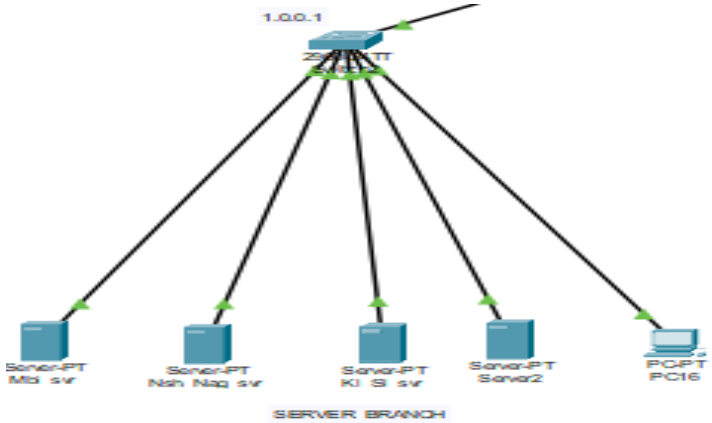

Fig 5. Network topology diagram Pune branch (server room)

Nagpur sub branch - Network topology

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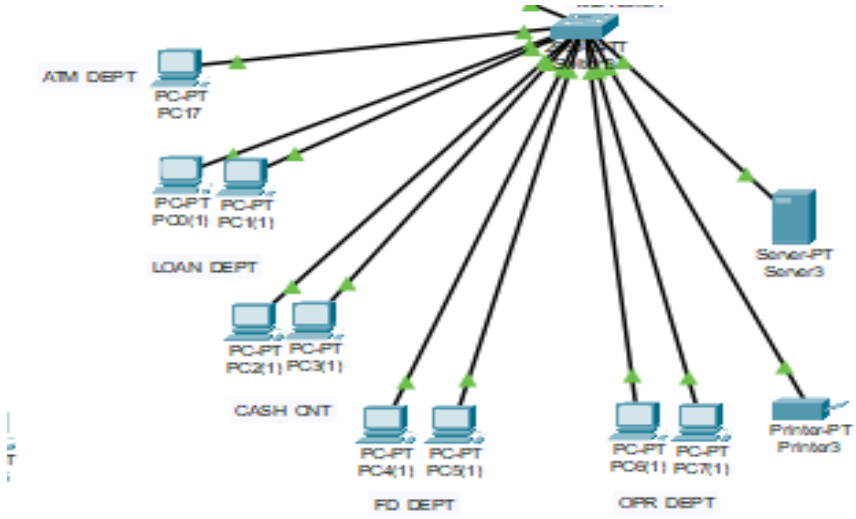

Fig 6. Network topology diagram for Nagpur sub branch

Kolhapur sub branch – Network Topology

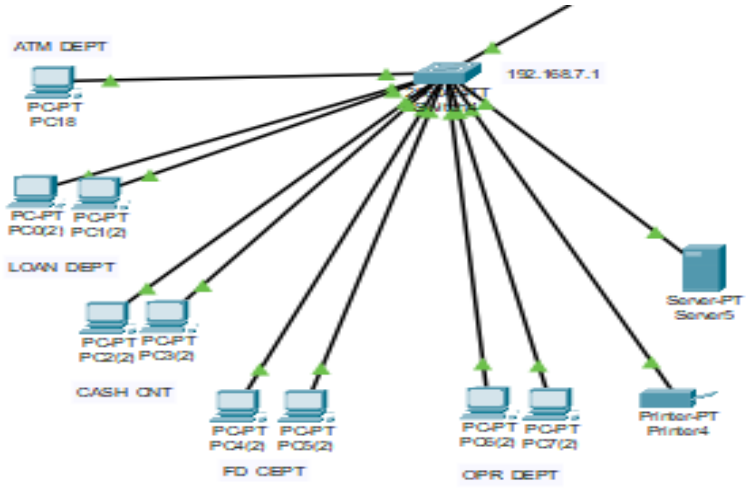

Fig 7. Network topology diagram for Kolhapur sub branch

Solapur sub branch – Network Topology

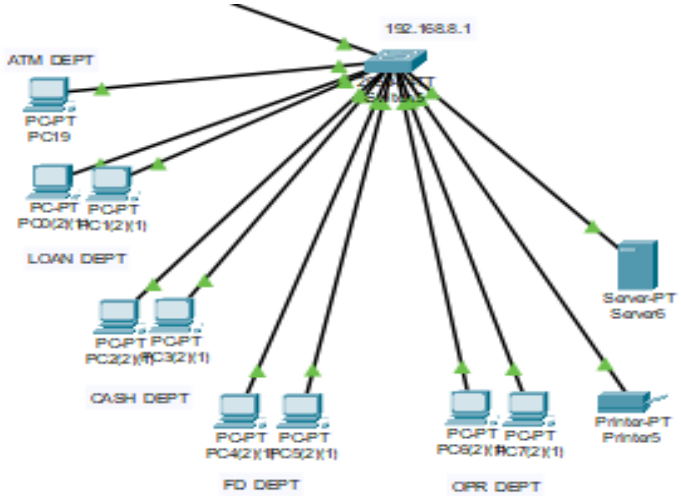

Fig 8. Network topology diagram for Solapur sub branch

Network design and configuration strategy :

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Fig 9. We have manually checked if the network between each user in the branch is connected to one other.

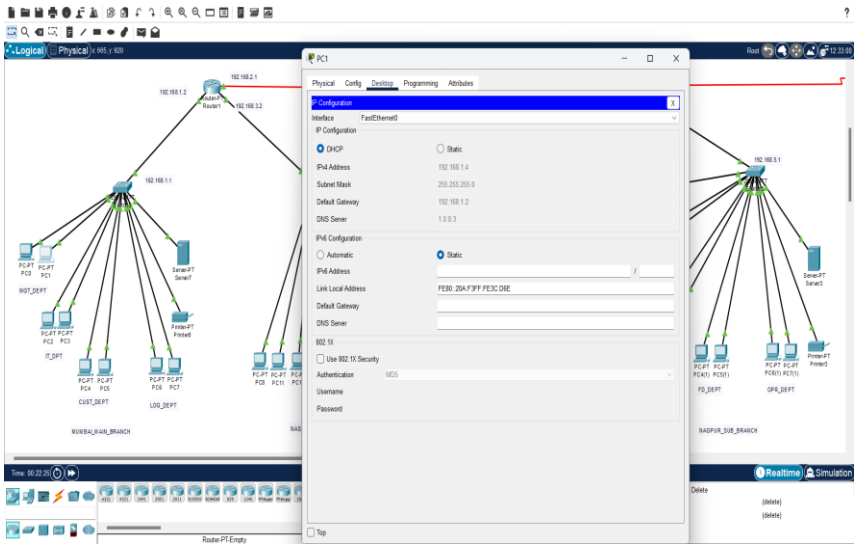

Fig 10. We have assigned the IP address to PC's.

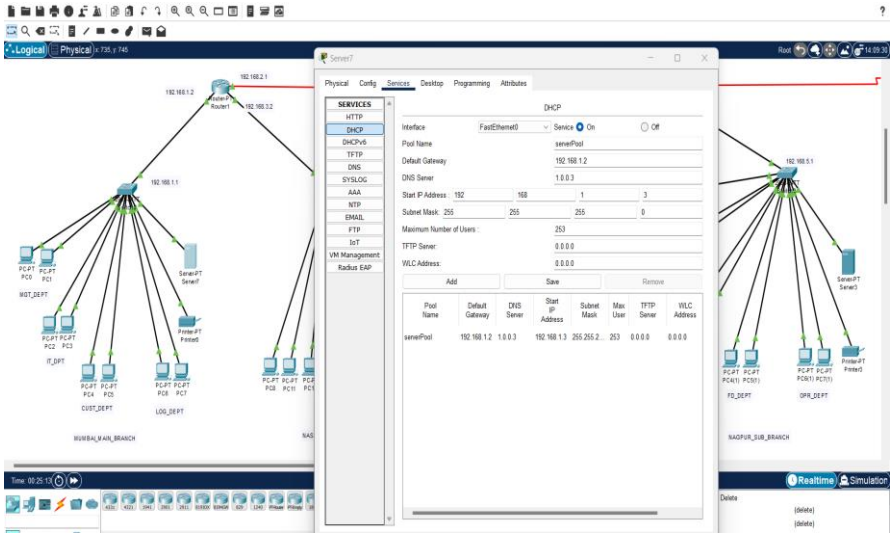

Fig 11. DHCP configuration for server

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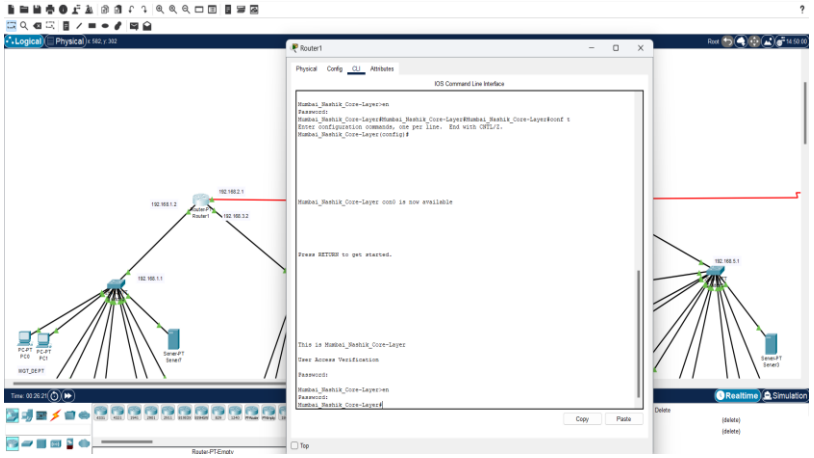

Fig 12. Security configuration for Router

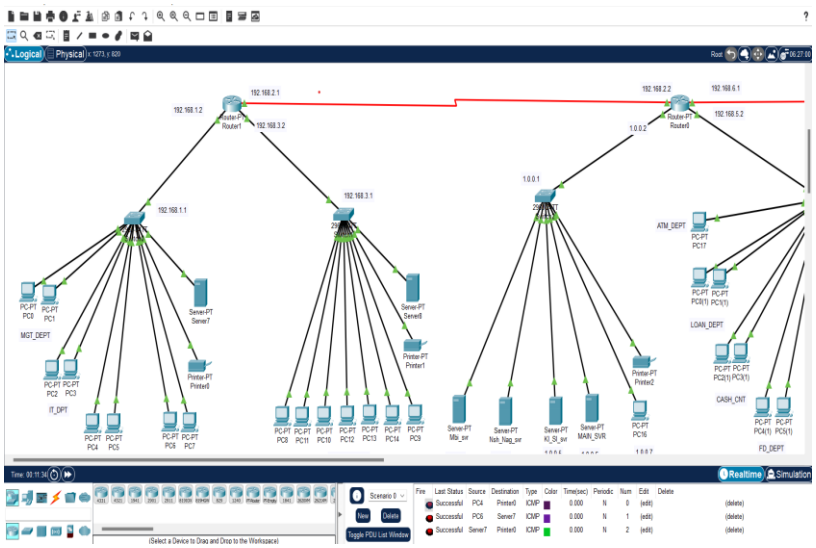

Fig 13. The final conclusion of obtained output is we are successful to share the data from one PC to another.

Server limit :

- Mumbai server : 253
- Nashik server : 253
- Pune server : Each sever has capacity of 256 users
- Nagpur server : 253
- Solapur server : 253
- Kolhapur server : 253

VIII. CONCLUSION AND FUTURE SCOPE

Now a days, technological development, and automated system development is more essential and crying need for the expansion of banking services because They will need less employers by using automated system. On top of that Security is a major issue regarding banking issues. With this system network will be easier to handle and it will route the data in a shortest path in a vast distributed system. In future we will try to implement it in real life so that banks can use it and get benefited from this project.

- Design and configure a hierarchical network topology consisting of core, distribution, and access layers. Implement VLANs to segregate network traffic and enhance security.
- Configure routing protocols such as OSPF or EIGRP for dynamic routing and optimal path selection. Deploy security measures including firewall, access control lists (ACLs), VPNs, and encryption protocols to safeguard sensitive data
- Integrate redundant links and devices to ensure high availability and fault tolerance.

- Implement Quality of Service (QoS) to prioritize critical banking applications and services. Test and validate the network design to ensure compliance with industry standards and regulatory requirements.
- Provide documentation including network diagrams, configurations, and security policies.
- Online based day to day transmission.
- Save time and cost because of day to day transmission.
- Established relation between one branch to another.
- Connect all branches to head branch in same network.
- Online based update and maintain everyday work.

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