Mini Project Report Cover Sheet

SRM Institute of Science and Technology

College of Engineering and Technology

Department of Electronics and Communication Engineering

18ECC303J COMPUTER COMMUNICATION NETWORKS

Sixth Semester, 2020-21 (Even Semester)

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Title of the project : VLAN Design and Implementation using CISCO Packet Tracer

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Lab Supervisor : Mr. Praveen Kumar

Reg. No →		RA1811004010169	RA1811004010176	RA1811004010188
Mark split up ↓	Maximum Marks	Marks obtained	Marks obtained	Marks obtained
Novelty in the project work / Abstract	**5**			
Level of understanding of the design / Configuration	**10**			
Individual Contribution to the project	**5**			
Report writing	**5**			
Total	**25**			

REPORT VERIFICATION

Lab supervisor Signature with date :

VLAN DESIGN AND IMPLEMENTATION

USING CISCO PACKET TRACER

Abstract:

The project is to understand the advantages of using VLAN in a network, and how broadcasting is controlled. Understand the configuration which is required to setup a vlan based network using Cisco routers and switches.

The main goal of this work is to increase the security level of the LAN, in order to reduce the access to undesirable sites and to avoid the presence of hackers on the internet.

Key-Words: - LAN, VLAN, security, Internet, TCP, switching, RIPv2,Router,Switch.

Software:

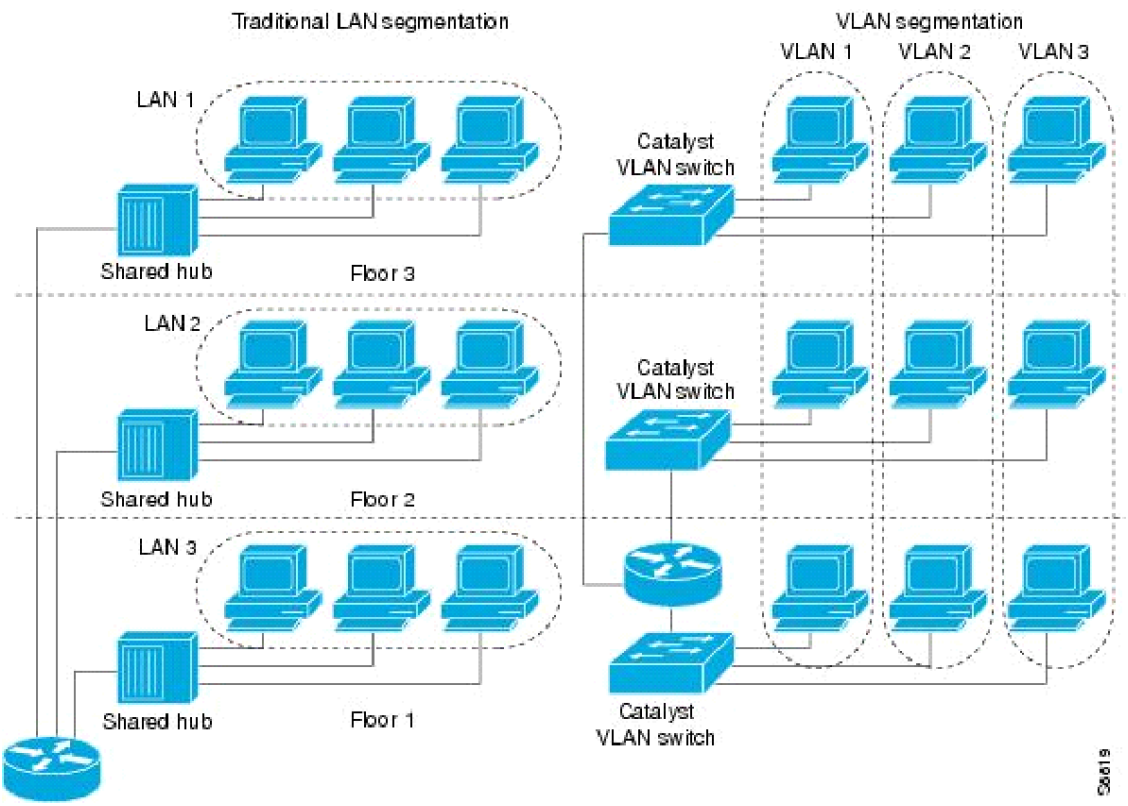
Cisco packet tracer:

Packet Tracer is a cross-platform visual simulation program designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface

Introduction:

The Local Area Network (LAN) is widely used because a large number of applications imply some user in the same broadcast domain. There is kind of LAN named virtual LAN (VLAN), in this sort of network a group of hosts with a set of common requirements provides communication. It is important to emphasize that the group of hosts should be in the same broadcast domain, despite the same place

Other networks like Metropolitan Area Network (MAN) or Wide Area Network (WAN) are not compatible with virtual technologies, because the elements of the VLAN normally share routing and switching.



Difference Between Traditional Lan Segmentation and Vlan Segmentation

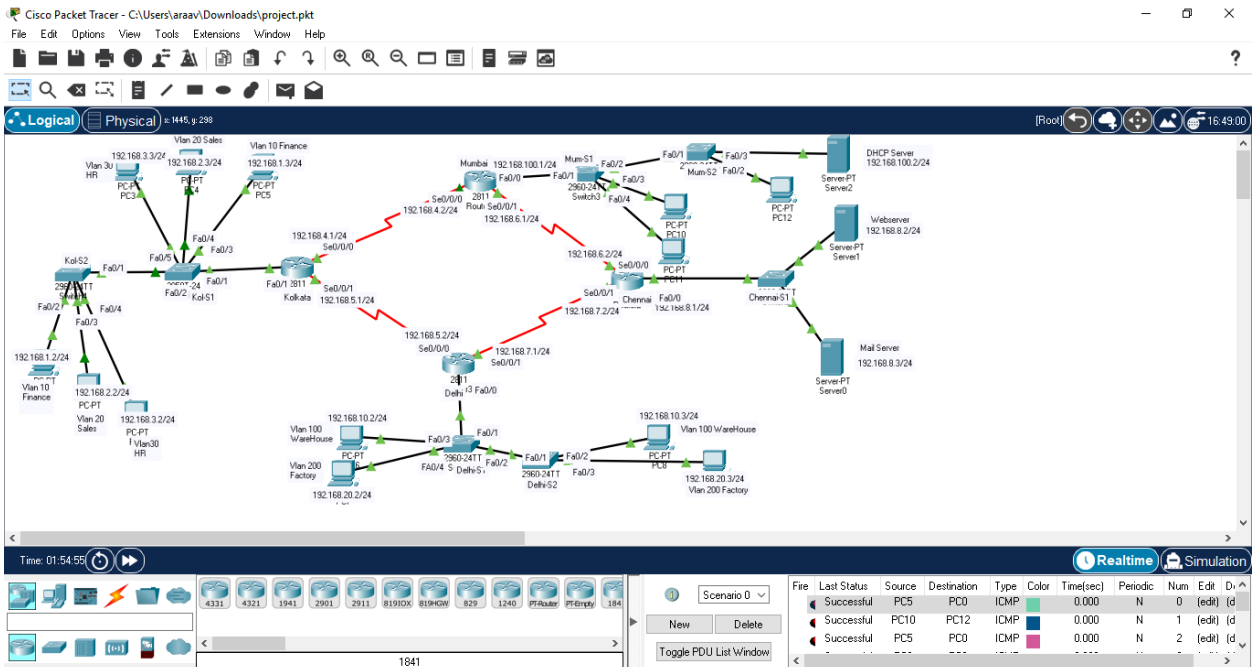
VLAN:

A virtual LAN (VLAN) abstracts the idea of the LAN; A VLAN might comprise a subset of the ports on a single switch or subsets of ports on multiple switches. By default, systems on one VLAN don't see the traffic associated with systems on other VLANs on the same network.

VLANs allow network administrators to partition their networks to match the functional and security requirements of their systems without having to run new cables or make major changes in their current network infrastructure. IEEE 802.1Q is the standard defining VLANs; the VLAN identifier or tag consists of 12 bits in the Ethernet frame, creating an inherent limit of 4,096 VLANs on a LAN.

Use Case:

We are using the Enterprise Network Model to show the use case of Vlan and how Real Scenario works when Different Branches of Enterprises are located in Different Cities.



Cisco Packet Tracer Network Diagram

This is an organisation where we have offices located in four metropolitan cities-:

Network consists of a Four locations,

1. Kolkata
2. New Delhi
3. Mumbai
4. Chennai

Methodology:

1. The Kolkata location has 3 VLANS. They are VLAN 10(Sales), VLAN 20(Finance) and VLAN 30(HR).The kolkata router is configured with proper banner and enable secret as 'kolkata@cisco' and VTY password as 'cisco'.
2. The Delhi location has 2 VLANs. They are VLAN 100(WareHouse) and VLAN 200(Factory). Delhi router is configured with proper banner and enable secret as 'delhi@cisco',VTY password as 'cisco'.
3. The Chennai location contains the Webserver(192.168.8.2/24) and the Mail server(192.168.8.3/24).Chennai router is configured with proper banner and enable secret as 'chennai@cisco' and VTY password as 'cisco'.
4. The mumbai location has only the office LAN in 192.168.100.0/24 subnet and each computer is getting IP address from the DHCP Server 192.168.1002/24. Mumbai router is configured with a proper banner. The enable secret is 'mumbai@cisco and VTY password is 'cisco'.
5. Kolkata.Delhi and Mumbai location is connected via Point-to-Point leased line.
6. Users of all regions except the Factory VLAN will have access to the WebServer and Mail server.
7. Inter VLAN routing has been performed and RIPv2 is used as the routing protocol.

Vlan Ip :

VLAN 10 (Finance) -- 192.168.1.0/24 **VLAN 20(Sales)-- 192.168.2.0/24**

VLAN 30 (HR) -- 192.168.3.0/24 **VLAN 100 (WareHouse) - 192.168.10.0/24**

VLAN 200 (Factory) -- 192.168.20.0/24

Lan Ip :

Chennai LAN - 192.168.8.0/24

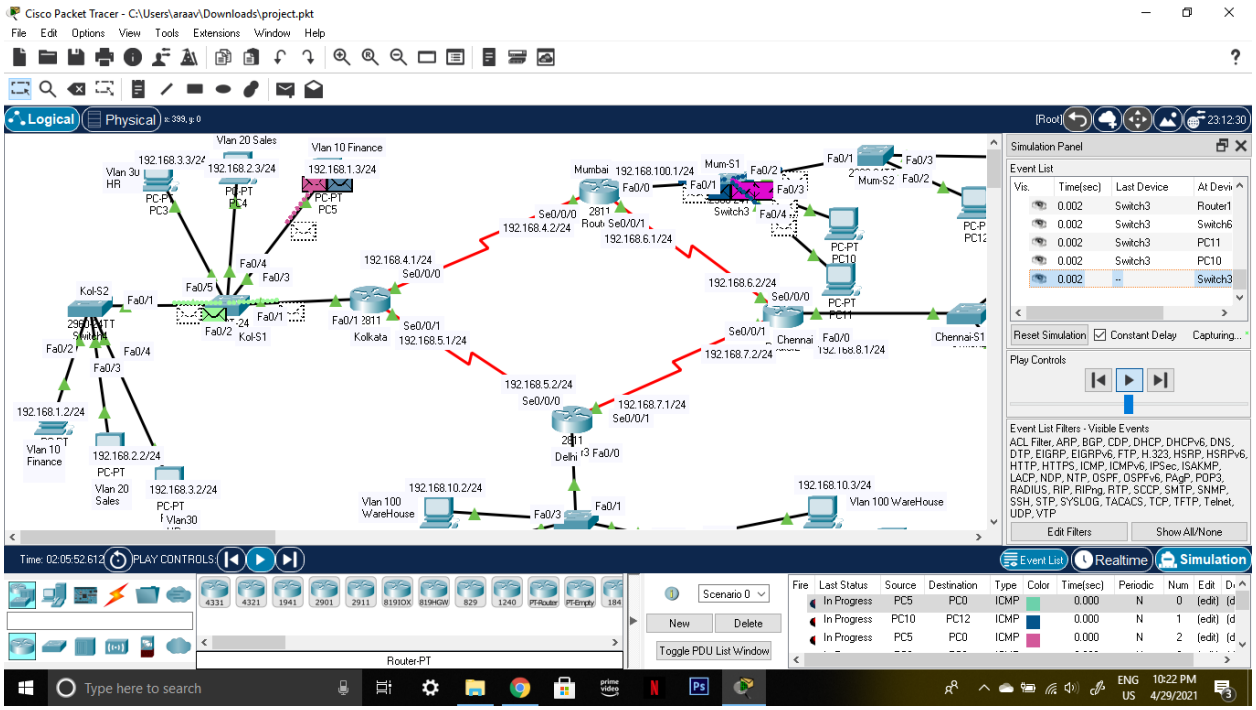
Mumbai LAN - 192.168.100.0/24

Wan Ip :

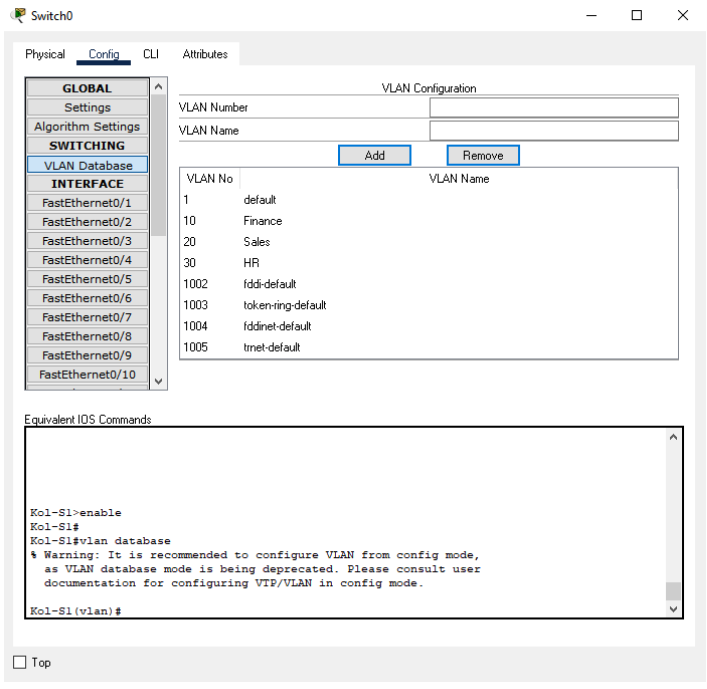
Kolkata to Delhi WAN - 192.168.5.0/24 **Chennai to Mumbai WAN- 192.168.6.0/24**

Chennai to Delhi WAN --192.168.7.0/24 **Kolkata to Mumbai WAN - 192.168.4.0/24**

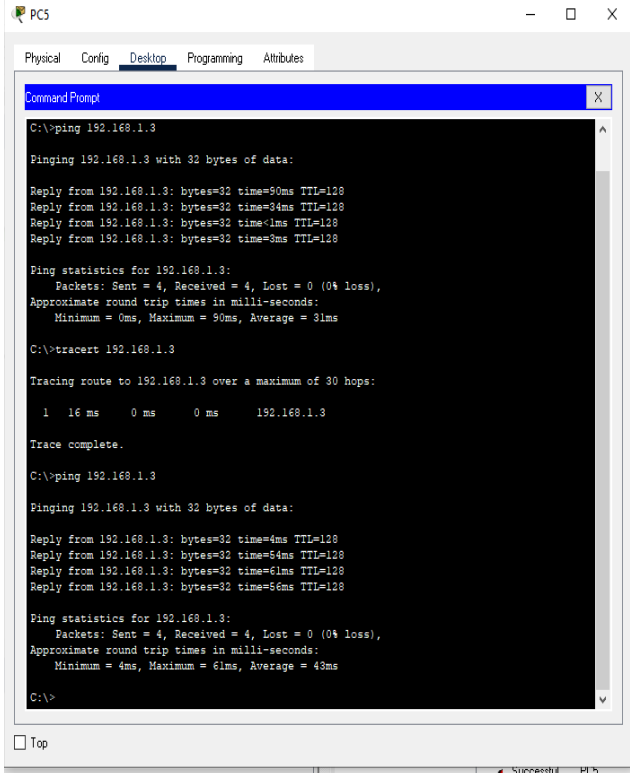
RESULT / SIMULATION:



VLAN Configuration Database:



Pinging and Trace Router:



Advantages of VLAN:

Here are the important pros/benefits of VLAN:

- It solves a broadcast problem.
- VLAN reduces the size of broadcast domains.
- VLAN allows you to add an additional layer of security.
- It can make device management simple and easier.
- You can make a logical grouping of devices by function rather than location.
- It allows you to create groups of logically connected devices that act like they are on their own network.
- You can logically segment networks based on departments, project teams, or functions.
- VLAN helps you to geographically structure your network to support the growing companies.
- Higher performance and reduced latency.
- VLANs provide increased performance.
- Users may work on sensitive information that must not be viewed by other users.

Disadvantages of VLAN:

Here are the important cons/ drawbacks of VLAN:

- An injected packet may lead to a cyber-attack.
- Threat in a single system may spread a virus through a whole logical network.
- You require an additional router to control the workload in large networks.
- You can face problems in interoperability.
- A VLAN cannot forward network traffic to other VLANs.

Application/Purpose of VLAN:

Here are the important uses of VLAN:

- VLAN is used when you have 200+ devices on your LAN.
- It is helpful when you have a lot of traffic on a LAN.
- VLAN is ideal when a group of users need more security or being slow down by many broadcasts.
- It is used when users are not on one broadcast domain.
- Make a single switch into multiple switches.

Conclusion:

In this Project, the design and implementation of a VLAN is carried out. The main goals are: to optimize the network resources, to give security and to provide real-time users monitoring, in order to avoid time wasting. As a result of this work, the solution implemented can be changed according to current organization requirements. This is especially useful, because the workstations can be easily relocated if necessary.

References:

1. Andrew S. Tanenbaum, Computer Networks, Prentice Hall, Fourth Edition, 2002.

2. https://en.wikipedia.org/wiki/Virtual_LAN

3. http://searchnetworking.techtarget.com/tutorial/VLAN-guide-for-networking-professionals