

COMPUTER NETWORK'S ASSIGNMENT- 4



Apoorv Gupta
AIML A1
21070126018

Aim -

To develop a comprehensive understanding of various network types, enable identification of different networks, and practice building LAN, WAN, and MAN using Cisco Packet Tracer.

Theory -

Computer networks have become an important and integral part of modern day setup with the need of accessing and sharing the resources quickly and efficiently from any part of the world. There are different types of network serving different needs and purposes. The most prominent networks are LAN, WAN and MAN.

Local Area Network (LAN)-

1. LAN infrastructure covers a small geographical area like in college labs etc.
2. Limited to a specific area
3. Provides high speed internet to the internal devices

Wide Area Network (WAN)-

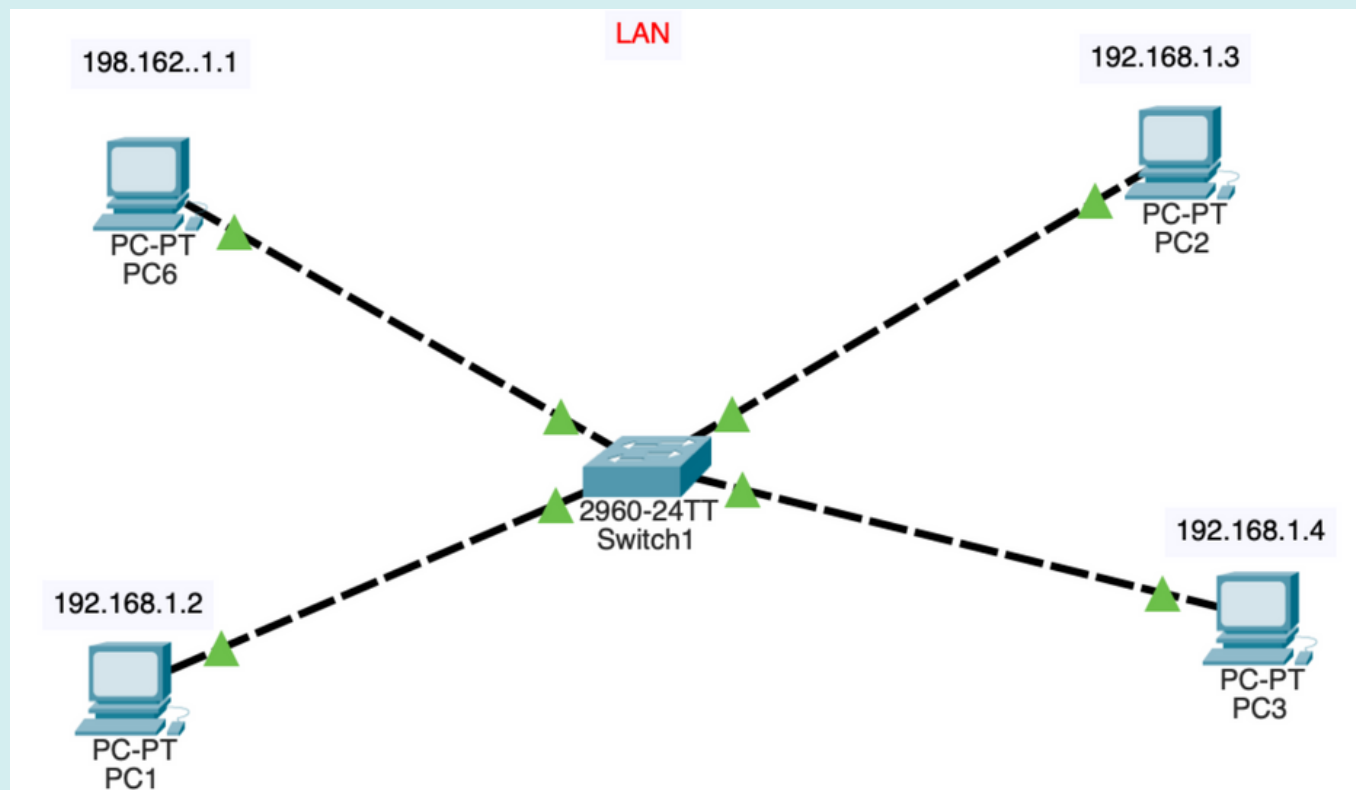
1. WAN infrastructure covers a larger geographical area often covering cities and countries and enabling data sharing over long distances
2. It can be considered as a connection of interconnected LAN's
3. Best example of WAN is the internet, it is the most extensive WAN connecting numerous computers and devices together.

Metropolitan Area Network (MAN) -

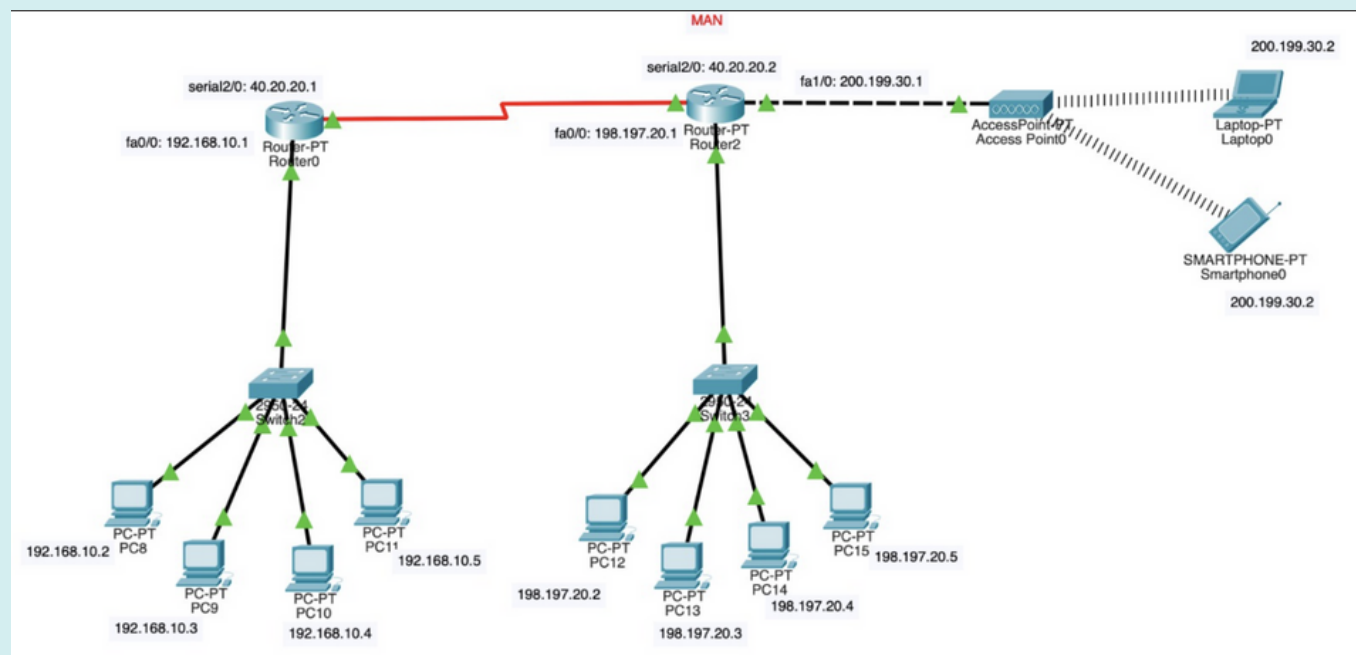
1. Has a greater area coverage than LAN but less than WAN, typically covering a city or a large campus
2. They offer higher data speed transfer than WAN due to their localized nature.
3. Example could be a network connecting various campuses of university in a city

Observations :-

LAN

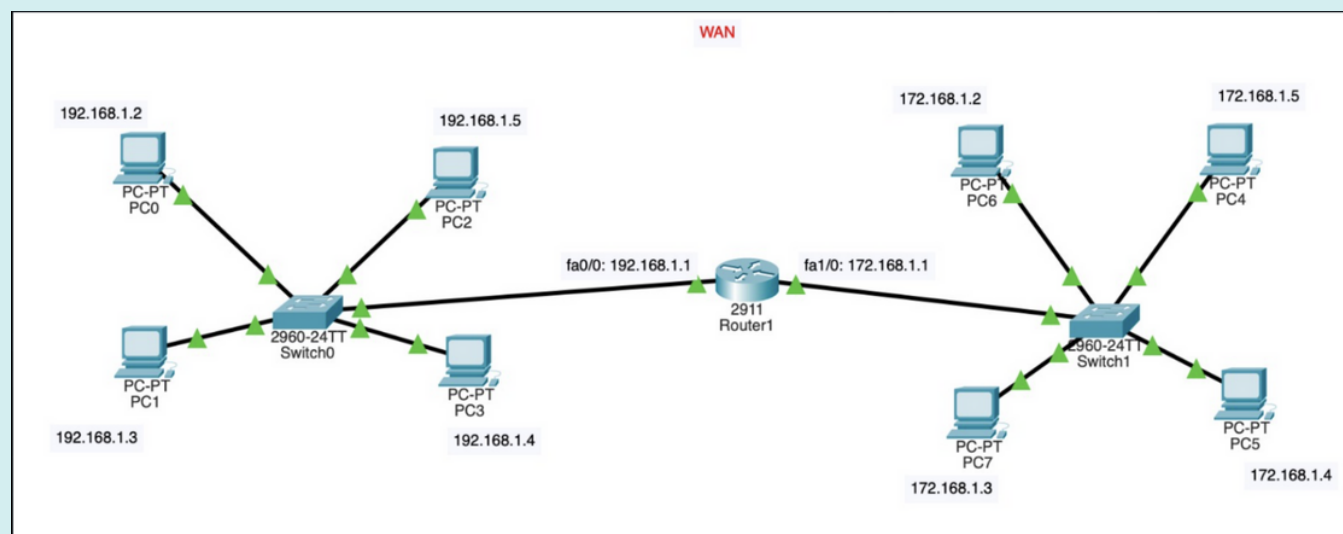


MAN



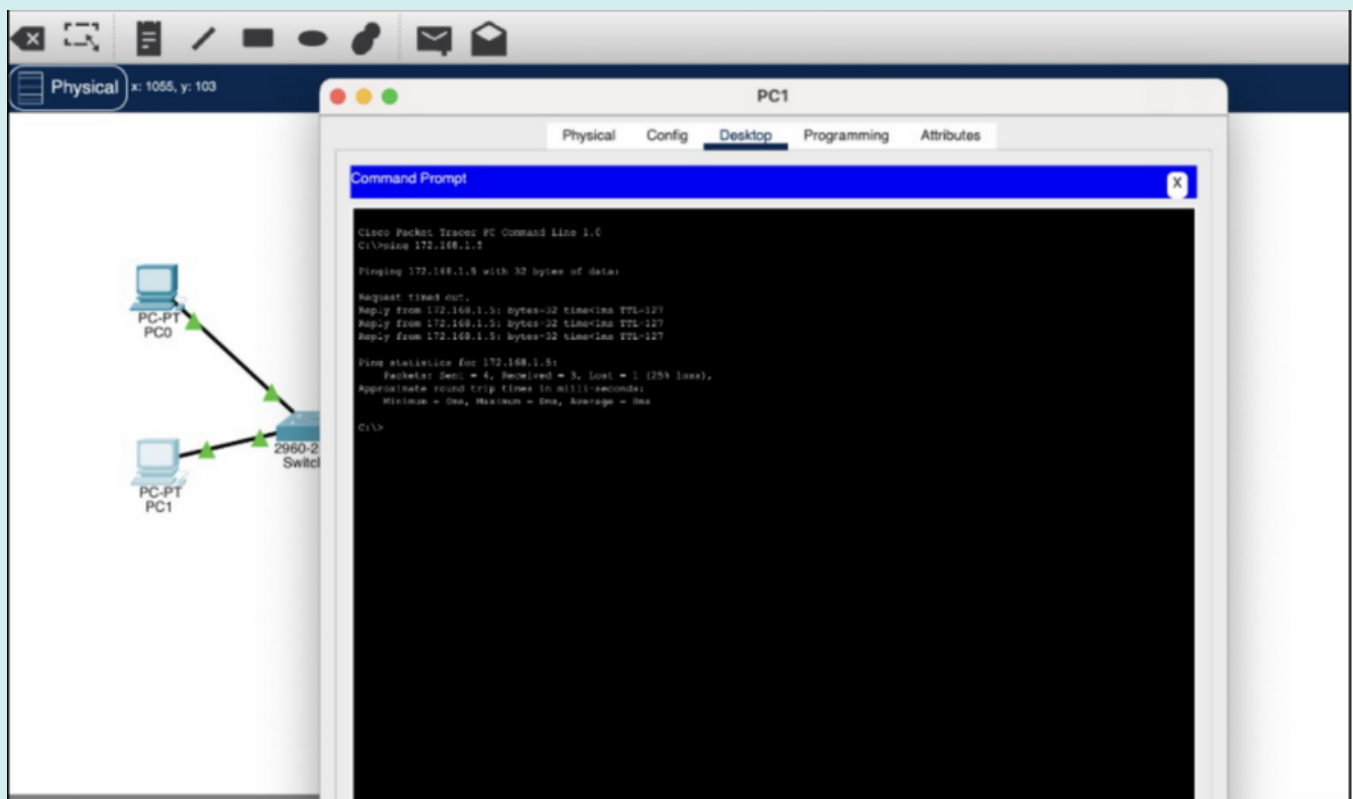
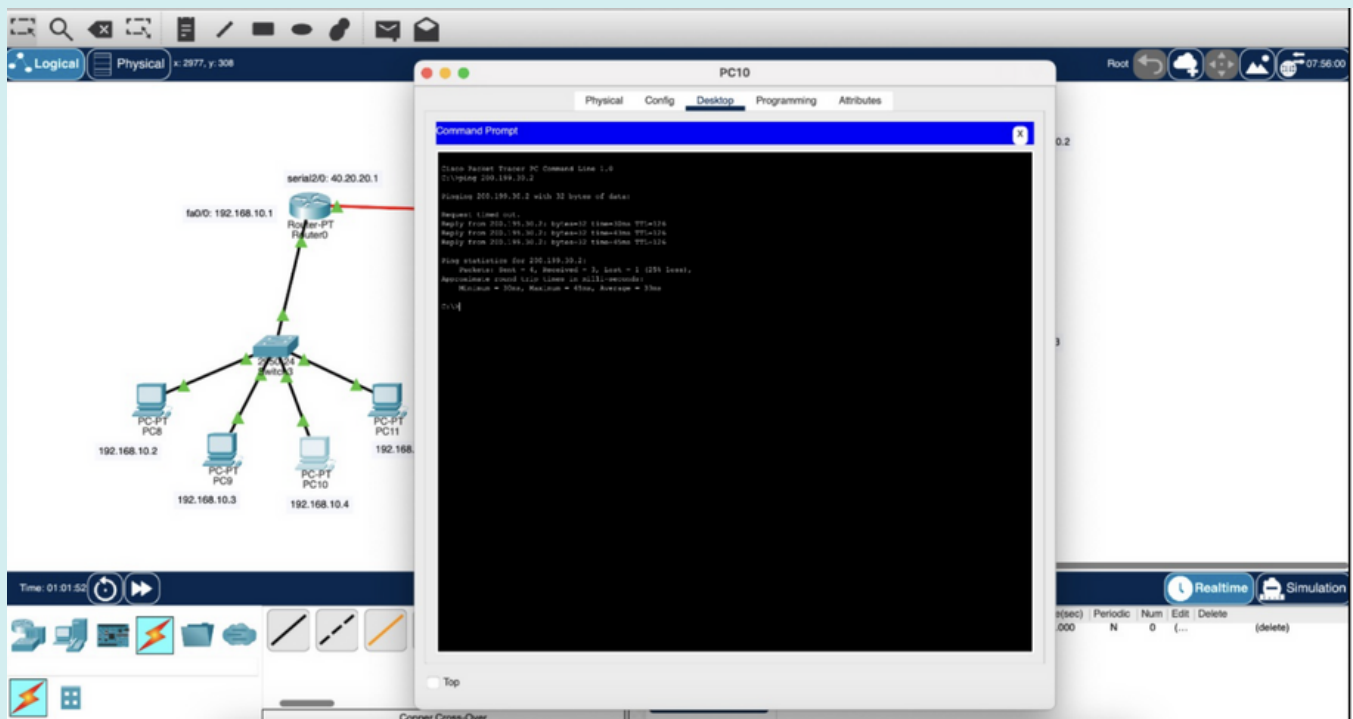
Observations :-

WAN



Aspect	LAN (Local Area Network)	MAN (Metropolitan Area Network)	WAN (Wide Area Network)
Scope	Limited geographical area (typically a single building or campus)	Larger geographical area within a city or town	Extends across cities, countries, or continents
Distance Coverage	Short distance coverage	Medium distance coverage	Long distance coverage
Topology	Various topologies (star, bus, ring)	Often follows a ring topology	Mesh or point-to-point topology
Latency	Low latency	Moderate latency	Higher latency due to distance
Cost	Relatively low cost	Moderate cost	Higher cost due to infrastructure
Technology	Ethernet, Wi-Fi, Bluetooth, etc.	Fiber optics, Ethernet, Wireless	Fiber optics, Satellite, MPLS, etc.
Examples	Home networks, small offices	City-wide networks, university campuses	Internet, global enterprise networks
Speed	High data transfer speeds	Moderate data transfer speeds	Variable data transfer speeds

Observations :-



Self Assessment:-

What are some challenges associated with managing and securing a WAN compared to a LAN?

Managing and securing a WAN presents distinct challenges compared to a LAN due to its broader scope and diverse connections:

- **Scale and Complexity:** WANs span large geographic areas, making their management and monitoring more complex than the confined nature of LANs.
- **Diverse Infrastructure:** WANs encompass various technologies like leased lines, satellites, and public internet, demanding expertise in multiple systems.
- **Higher Latency and Reliability:** WANs' extended distances often result in higher latency and potential reliability issues, necessitating optimized routing and redundancy.
- **Security Concerns:** WANs involve data transmission across public networks, exposing information to more security threats, necessitating advanced encryption and authentication measures.
- **Resource Allocation:** Managing bandwidth across distributed locations is challenging, requiring efficient allocation to ensure consistent performance.

List the limitations or constraints that you faced of simulating WAN networks in Packet Tracer?

Simulating WAN networks in Packet Tracer has the following limitations:

- **Scale:** Packet Tracer is designed for smaller-scale simulations, making it less suitable for accurately replicating the complexity of large WAN environments.
- **Realism:** It may not fully capture real-world WAN behaviors, such as varying latency and congestion, which are crucial for accurate testing.
- **Limited Protocol Support:** Some advanced WAN protocols and features might not be supported or accurately represented in Packet Tracer.
- **Hardware Emulation:** Emulating WAN hardware may not fully replicate the performance and intricacies of actual networking equipment found in WAN setups.

Conclusion:-

This assignment helped me to understand the various types of networks LAN, MAN and WAN, their specifications and the different types of challenges implementing and managing them. Using Cisco Packet tracer I was able to get hands -on experience making these networks and knowing how to configure various networking devices.

End of Report