CN LAB

Experiment – 4

STUDY DIFFERENT TYPES OF NETWORKS AND BUILD LAN, WAN AND MAN USING CISCO PACKET TRACER

Submitted To

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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

LAN (Local Area Network): A LAN refers to a network that establishes connections among devices within a confined geographical zone, such as a residence, workplace, or educational institution. Its purpose is to foster interaction and the exchange of resources between interconnected devices, such as computers and printers.

MAN (Metropolitan Area Network): A MAN encompasses a more expansive geographic area

linking numerous LANs together, thereby streamlining communication across a broader local region.

WAN (Wide Area Network): A WAN designates a network that spans an extensive geographical expanse, often extending across countries or even continents. Its role entails interconnecting facilitating communication over substantial distances.

OSERVATION

Configurations of all the devices are mentioned in the screenshots. When establishing a connection between two routers, there are several factors that one should consider.

1. The cable must be crossed as we are linking two identical devices.
2. Router-3 is associated with a network bearing the IP address 192.168.0.0, while Router-4 is linked to a network with IP address 10.10.0.0.
3. Both Router-3 and Router-4 need distinct IP addresses separate from other networks yet matching each other. For instance, Router-3 and 4 have IP addresses of 192.168.10.2 and 192.168.10.3 respectively.
4. The IP address of a router's port connected to a specific network should align with the gateway IP of the PCs within that network.
5. The IP address of a router's port connected to another router must match the IP address of the other connected router.

6. The routing details within a router should mirror the IP address of the target network where data is intended to be transmitted, and the Next Hop should indicate the IP address of the next router.

RESULT

Connections were successful and it was tested using PDU simulation and ping commands from different system in the networks. Screenshots of the ping commands are attached below.

SELF-ASSESSMENT

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

Some challenges associated with managing and securing a WAN compared to a LAN are:

a) WANs cover and connect larger areas than LANs, which increases the risk of data loss, theft, or interception.
b) WANs are more expensive and complex to set up and maintain than LANs.
c) WANs may rely on public or shared networks, which can expose them to more threats and vulnerabilities than LANs.
d) WANs have lower transfer rates and higher latency issues than LANs, which can affect the performance and reliability of applications.

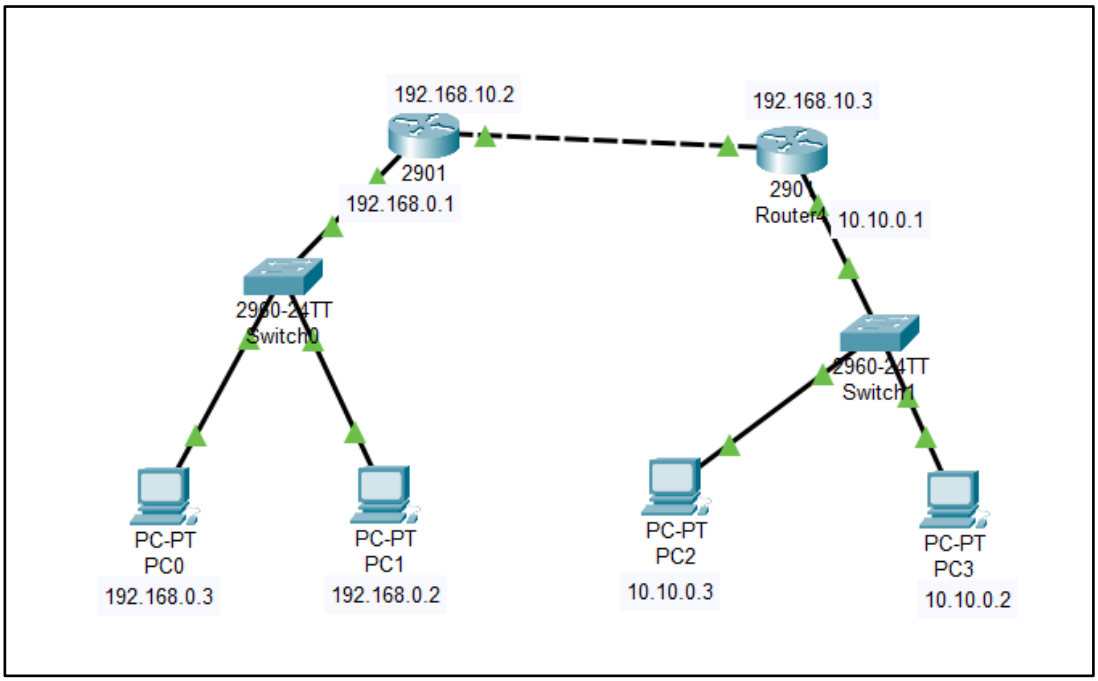
2. List the limitations or constraints that you faced of simulating WAN networks in Packet Tracer.

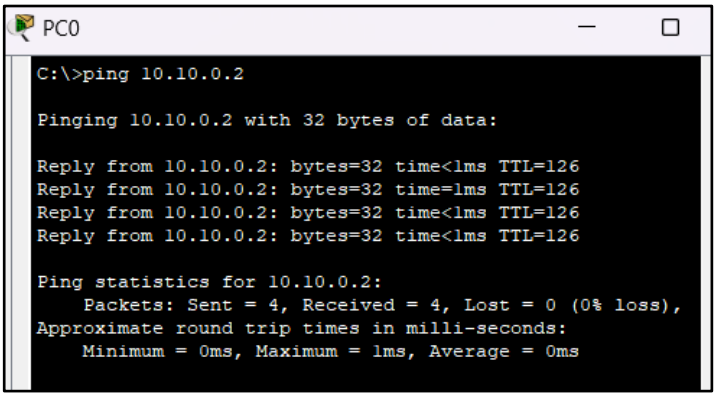
Some limitations or constraints that you faced of simulating WAN networks in Packet Tracer are:

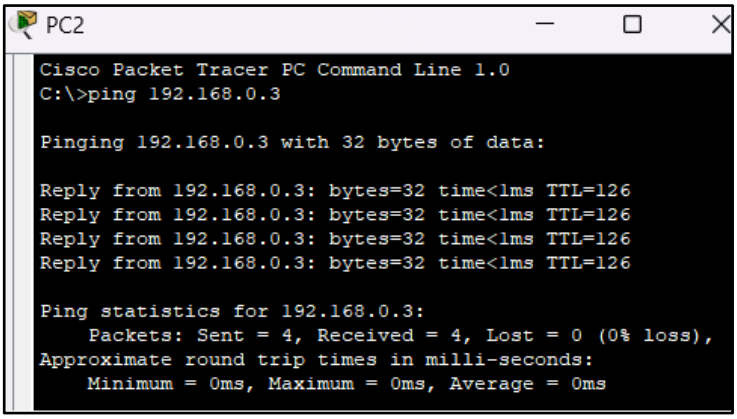
a) Packet Tracer does not support some features and commands that are available in real devices, such as IPv6, L2 protocols, and packet duplication.
b) Packet Tracer may not accurately reflect the latency, jitter, and packet loss that are associated with the WAN.
c) Packet Tracer may not provide sufficient visibility and security for the WAN traffic.

SCREENSHOTS

LAN







PC3

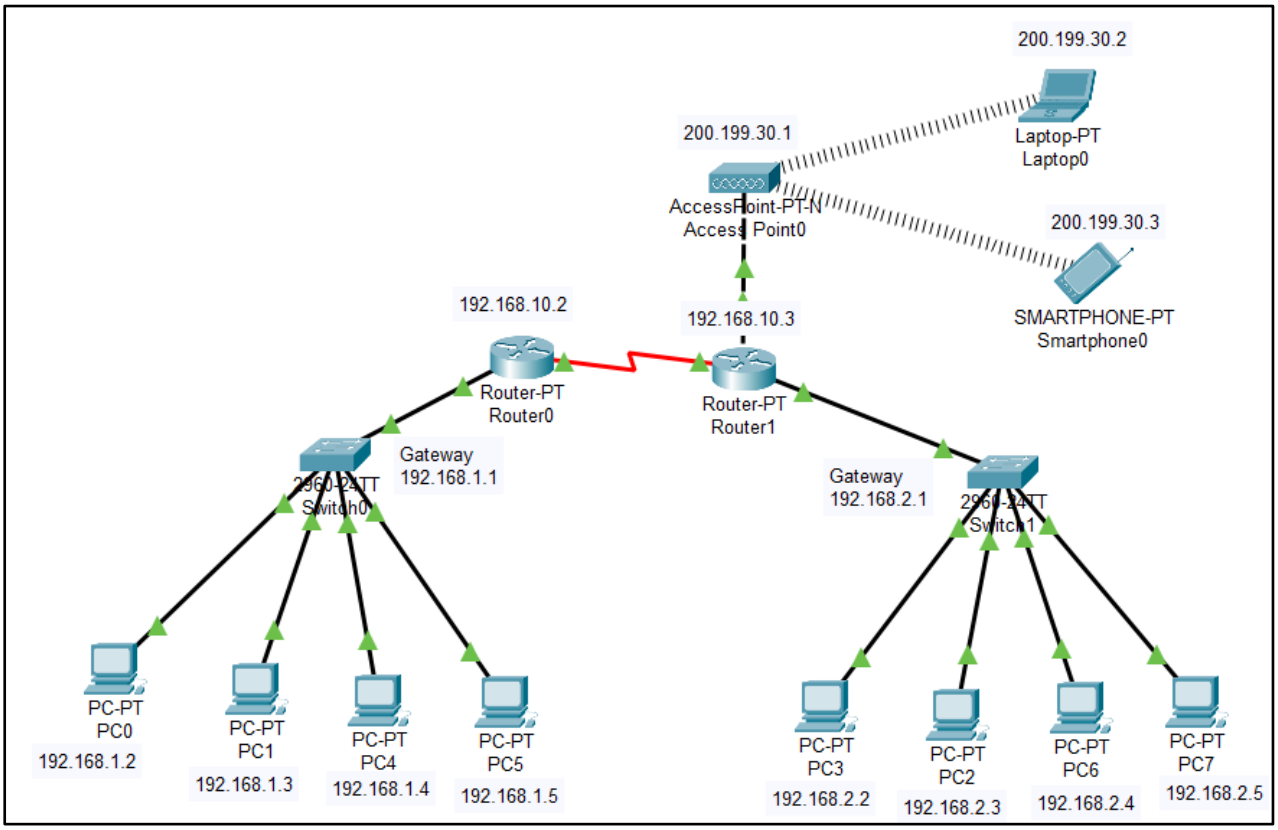
```
C:\>ping 192.168.0.2

Pinging 192.168.0.2 with 32 bytes of data:

Reply from 192.168.0.2: bytes=32 time<1ms TTL=126
Reply from 192.168.0.2: bytes=32 time=1ms TTL=126
Reply from 192.168.0.2: bytes=32 time<1ms TTL=126
Reply from 192.168.0.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

PC1

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.10.0.3

Pinging 10.10.0.3 with 32 bytes of data:

Reply from 10.10.0.3: bytes=32 time<1ms TTL=126
Reply from 10.10.0.3: bytes=32 time<1ms TTL=126
Reply from 10.10.0.3: bytes=32 time<1ms TTL=126
Reply from 10.10.0.3: bytes=32 time<1ms TTL=126

Ping statistics for 10.10.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Verification Through Ping

MAN



Verification Through Ping

PC0

```
C:\>ping 192.168.2.4

Pinging 192.168.2.4 with 32 bytes of data:

Reply from 192.168.2.4: bytes=32 time=31ms TTL=126
Reply from 192.168.2.4: bytes=32 time=19ms TTL=126
Reply from 192.168.2.4: bytes=32 time=16ms TTL=126
Reply from 192.168.2.4: bytes=32 time=16ms TTL=126

Ping statistics for 192.168.2.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 16ms, Maximum = 31ms, Average = 20ms
```

PC0

```
C:\>ping 200.199.30.2

Pinging 200.199.30.2 with 32 bytes of data:

Reply from 200.199.30.2: bytes=32 time=29ms TTL=126
Reply from 200.199.30.2: bytes=32 time=32ms TTL=126
Reply from 200.199.30.2: bytes=32 time=33ms TTL=126
Reply from 200.199.30.2: bytes=32 time=28ms TTL=126

Ping statistics for 200.199.30.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 28ms, Maximum = 33ms, Average = 30ms
```

PC6

```
C:\>ping 200.199.30.3

Pinging 200.199.30.3 with 32 bytes of data:

Reply from 200.199.30.3: bytes=32 time=20ms TTL=127
Reply from 200.199.30.3: bytes=32 time=17ms TTL=127
Reply from 200.199.30.3: bytes=32 time=18ms TTL=127
Reply from 200.199.30.3: bytes=32 time=16ms TTL=127

Ping statistics for 200.199.30.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 16ms, Maximum = 20ms, Average = 17ms
```

Laptop0

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time=28ms TTL=126
Reply from 192.168.1.3: bytes=32 time=43ms TTL=126
Reply from 192.168.1.3: bytes=32 time=37ms TTL=126
Reply from 192.168.1.3: bytes=32 time=24ms TTL=126

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 24ms, Maximum = 43ms, Average = 33ms
```