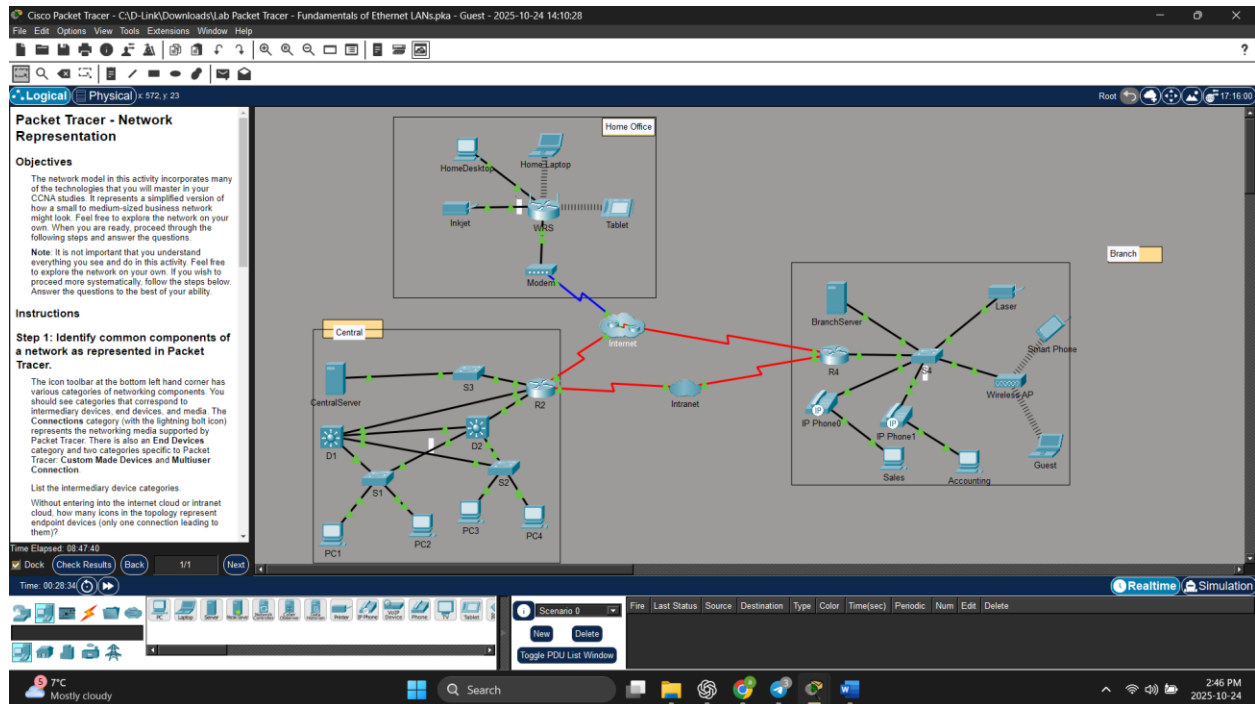Assignment 1:

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Course: Network Security Technology – Routing & Switching

File: Lab Packet Tracer – Fundamentals of Ethernet LANs.pka

Step 1 – Identify Common Components of a Network

⬜ntermediary Device Categories

The intermediary devices include:

- **Routers** – e.g., R2, R4

- **Switches** – e.g., S1, S3, S4

- **Wireless Router (WRS)**

- **Modem**

- **Wireless Access Point (WAP)**

☑ These handle routing, switching, and wireless transmission.

2. Number of Endpoint Devices (only one connection)

Endpoints are PCs, laptops, printers, phones, tablets, etc. that have just one link.

Endpoints identified:

- PC1, PC2, PC3, PC4

- Central Server

- Inkjet

- Home Desktop

- Home Laptop

- Tablet

- Branch Server

- Sales PC

- Accounting PC

- Guest Laptop

- Smart Phone0

- Smart Phone1

- Laser Printer

- IP Phone0, IP Phone1

☑ **Total endpoint devices = 17**

3. Number of Intermediary Devices (multiple connections)

Devices with more than one connection:

- R2, R4, Internet, Intranet

- S1, S2, S3, S4, D1, D2

- Modem, WRS, WirelessAP

☑ **Total intermediary devices = 11**

4Number of End Devices That Are *Not* Desktop PCs

Non-desktop endpoints include:

- Laptops (2)

- Server (2)

- Printers (2 – Inkjet, Laser)

- IP Phones (2)

- Tablet (1)

- Smart Phone (1)

☑ **Total non-desktop end devices = 10**

5Types of Media Connections Used

Visible connection types in your topology:

- **Copper straight-through (green lines)**

- **Serial (red lines)**

- **Wireless (dotted gray lines)**

- **Modem "blue" link (phone/coax to internet cloud)**

☑ **Total media types = 4**

Step 2 – Explain the Purpose of the Devices

Client–Server Model

In a **client–server model**, clients (like PCs, laptops, or phones) send requests for resources or services to a **server**, which processes the request and sends back a response.
Example: The *Central Server* or *Branch Server* hosts shared files or web services, while *PC1* or *Sales* acts as a client requesting those services.

Functions of Intermediary Devices

1. **Routing and forwarding:** Routers and switches direct network traffic efficiently.

2. **Traffic management and security:** Devices like switches and wireless routers control access and prevent collisions.

Criteria for Choosing a Network Media Type

1. **Distance:** Choose media that supports required range (e.g., fiber for long distances).

2. **Bandwidth & speed:** Ensure it supports necessary data rate.

3. **Cost & environment:** Consider budget and interference (EMI, physical conditions).

Step 3 – Compare and Contrast LANs and WANs

Difference Between LAN and WAN:

LAN (Local Area Network):

- **Covers a small area (office, campus)**
- **Uses switches and routers locally.**
- **Example " Central" and "Branch" network.**

WAN (Wide Area Network)

- **Covers large geographic areas.**
- **Connects multiple LANs via service providers.**
- **Example. "Internet" cloud.**

How Many WANs Do You See?

- **Internet cloud**

- **Intranet cloud**

✅ **Total WANs = 2**

3. How Many LANs Do You See?

Each switch or local wireless network represents a LAN:

- **Central LAN (S1, S3)**

- **Home Office LAN (WRS)**

- **Branch LAN (S4)**

☑ Total LANs = 3

4. Briefly Describe the Internet

The Internet is a global system of interconnected networks using TCP/IP that allows communication and data exchange among billions of devices worldwide.

5. Common Home Internet Connection Methods

- **Fiber or Cable broadband**

- **DSL (Digital Subscriber Line)**

- **Cellular hotspot (4G/5G)**

- **Satellite Internet**

- **Wi-Fi through home router**

6. Common Business Internet Connections (in Ottawa area)

- **Dedicated fiber lines (e.g., Bell, Rogers Business)**

- **Leased lines or Metro Ethernet**

- **VPN/MPLS connections for branch offices**

- **High-speed cable broadband for small businesses**