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Title of the Assignment: Smart office network design

Computer Networks – Enterprise Level Network Design and Transmission Media Simulation using Cisco Packet Tracer

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Objective:

The goal of this assignment is to design and simulate a comprehensive enterprise-level network in **Cisco Packet Tracer**. This network incorporates various components such as **wired and wireless devices**, **servers**, **printers**, **routers**, **core and access switches**, and **multiple PCs**, showcasing a realistic IT infrastructure setup used in offices or institutional networks.

Tools Used Inside Cisco Packet Tracer:

- Devices simulated:
    - 1 Wireless Access Point (WRTOON)
    - 1 Router (1941)
    - 2 Switches:
        - Core Switch (2960-24TT)
        - Access Switch (2960-24TT)
    - 2 Servers:
        - File Server
        - Mail Server

    - 3 Network Printers
    - 50+ PCs
- Connection Media:
    - **Copper Straight-through Cable**
    - **Wireless Connectivity**

Types of Transmission Media Used:

- **Copper Straight-through Cable**
  Used to connect:
    - PCs to switches
    - Switches to servers
    - Switches to printers
    - Switches to router and wireless access point
- **Wireless Media**
  Used to simulate Wi-Fi connectivity via a **wireless access point (WRTOON)**.

Procedure Followed:

1. **Setting Up Core Infrastructure**:
    - Placed **Core Switch** and **Access Switch** to divide the internal and external segments of the network.
    - Added **Wireless Access Point**, **1941 Router**, and both servers to the core network segment.
2. **Device Deployment**:
    - Added over **50 PCs**, organized in multiple logical groups representing departments or rooms.

- Added **3 Printers** and connected them to the **Access Switch**.
- Added a **File Server** and **Mail Server** to the **Core Switch**.

3. **Wiring**:
    - Used **Copper Straight-through Cable** to connect:
        - All PCs to Access Switch
        - Access Switch to Core Switch
        - Core Switch to Servers
        - Core Switch to Wireless Access Point and Router
        - Printers to Access Switch
4. **IP Address Assignment**:
    - Assigned static IP addresses in appropriate subnets for all devices (PCs, servers, printers, router).
    - Ensured no IP conflicts and proper subnetting.
5. **Connectivity Testing**:
    - Performed `ping` tests across devices (PC to PC, PC to server, server to router, PC to printer).
    - Observed data flow through switches and verified LED link indicators turned **green**.

Observations:

- The **Core and Access Switch architecture** allowed proper hierarchical segmentation.
- Devices successfully communicated with servers and printers.
- All wired links showed active **green** status, indicating proper connections.
- **Wireless Access Point** enabled additional mobile or virtual clients to be added later.

📸 Screenshot Proof: