Business Scenario: Network Setup and Configuration for Sample Tech Corp

Background

Sample Tech Corp, a growing tech company, has established a new office and requires a robust Local Area Network (LAN) to support its daily operations. The network will integrate key services such as DHCP, DNS, Email, FTP, and Wireless Access Points (WAP) to ensure seamless connectivity, communication, and secure access for its devices and users.

Objective:
To design and implement a robust, scalable, and secure network infrastructure for Sample Tech Corp, integrating key services such as DHCP, DNS, Email, FTP, and Wireless Access to ensure seamless connectivity, efficient communication, and secure data management for 235 users across wired and wireless devices.

Network Objectives

1. Establish a **gateway** for internet connectivity through the **Cable Modem (172.168.1.1)** connected to a **Router (192.168.1.1)**.
2. Utilize a **Cisco Switch (2960 Series)** to interconnect all devices and manage network traffic.
3. Configure essential network services:
    - **DHCP Server (192.168.1.5)** for dynamic IP address allocation.
    - **DNS Server (192.168.1.7)** for domain name resolution, hosting internal (`abcinternal.ca`) and external (`www.abctechcorp.com`) website entries.
    - **FTP Server (192.168.1.15)** for secure file transfers with user-based access.
    - **Email Server (192.168.1.9)** for internal communication, configured for two users.
    - **Wireless Access Points (WAP)** secured with **WPA2-PSK (Pre-Shared Key)** encryption for wireless devices.

Setup and Configuration Tasks

1. Physical Setup

- Connect all devices (servers, workstations, laptops, smartphones, printers, and WAP) to the **central switch** using Ethernet cables.
- Organize and label cables for better management and reduced risks of misconfigurations.

---

2. DHCP Server Configuration

- Configure the **DHCP Server (192.168.1.5)** to:
  - Set the **default gateway** as **192.168.1.1**.
  - Allocate IP addresses dynamically to devices starting from **192.168.1.21** for a total of **235 users** (up to 192.168.2.255).
  - Provide **DNS Server information (192.168.1.7)** to all clients during IP assignment.

---

3. DNS Server Setup

- Configure the **DNS Server (192.168.1.7)** to:
  - Create an **A Record for the internal domain `abcinternal.ca`** pointing to the internal website server IP **192.168.1.11**.
  - Create an **A Record for the external domain `www.abctechcorp.com`** pointing to the external website server IP **192.168.1.13**.
  - Ensure all devices on the network can resolve these domain names efficiently.

---

4. FTP Server Configuration

- Set up the **FTP Server (192.168.1.15)** to:
  - Provide secure access for file sharing with user-based authentication.
  - Create at least two FTP user accounts with distinct permissions:
    - **ftp_user1:** General file access.
    - **ftp_user2:** Limited file upload/download access.

---

5. Email Server Configuration

- Configure the **Email Server (192.168.1.9)** to:
  - Enable **SMTP** and **POP3** services.
  - Set up email domain `abctech.ca` and create user accounts:
    - **User 1:** John Doe (`john.doe@abctech.ca`) with secure password.
    - **User 2:** Jane Doe (`jane.doe@abctech.ca`) with secure password.
  - Update email client configurations on PCs/laptops:
    - Incoming Mail Server: **192.168.1.9**.
    - Outgoing Mail Server: **192.168.1.9**.
    - Logon Credentials: Usernames and passwords for each account.
  - Test email functionality by:

    - Sending and receiving test emails between accounts.
    - Ensuring replies and attachments work as expected.

---

6. Wireless Access Point (WAP) Setup

- Configure the **WAP** for wireless connectivity:
    - Use **WPA2-PSK encryption** with a strong pre-shared key.
    - Integrate with the DHCP server for dynamic IP assignment to wireless devices.

---

7. Testing and Troubleshooting

- Verify network connectivity using **ping** and **traceroute**.
- Test DHCP and DNS functionality:
    - Confirm dynamic IP assignments are within the specified range (192.168.1.21 to 192.168.2.255).
    - Validate domain name resolutions for `abcinternal.ca` and `www.abctechcorp.com`.
- Confirm email functionality by testing account configurations and communication.
- Verify FTP access and permissions for all configured user accounts.
- Test WAP connectivity and security by connecting a smartphone or laptop.

Outcome

The network setup provides:

1. **Centralized IP management** via the DHCP Server.
2. **Efficient domain name resolution** for internal and external websites through the DNS Server.
3. **Reliable email communication** tested and validated with user accounts.
4. **Secure file sharing capabilities** through the FTP Server.
5. **Seamless and secure wireless access** via the WPA2-PSK-enabled WAP.

This setup ensures scalability, operational efficiency, and security for Sample Tech Corp’s growing team and network requirements.