**Final Lab Project**

# Enterprise Network Design Implementation

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# Project Idea

connecting three company branches through a secure and segmented network using **Routing, Switching, VLANs, WAN, Security, and Network Services**.

**Branches:**

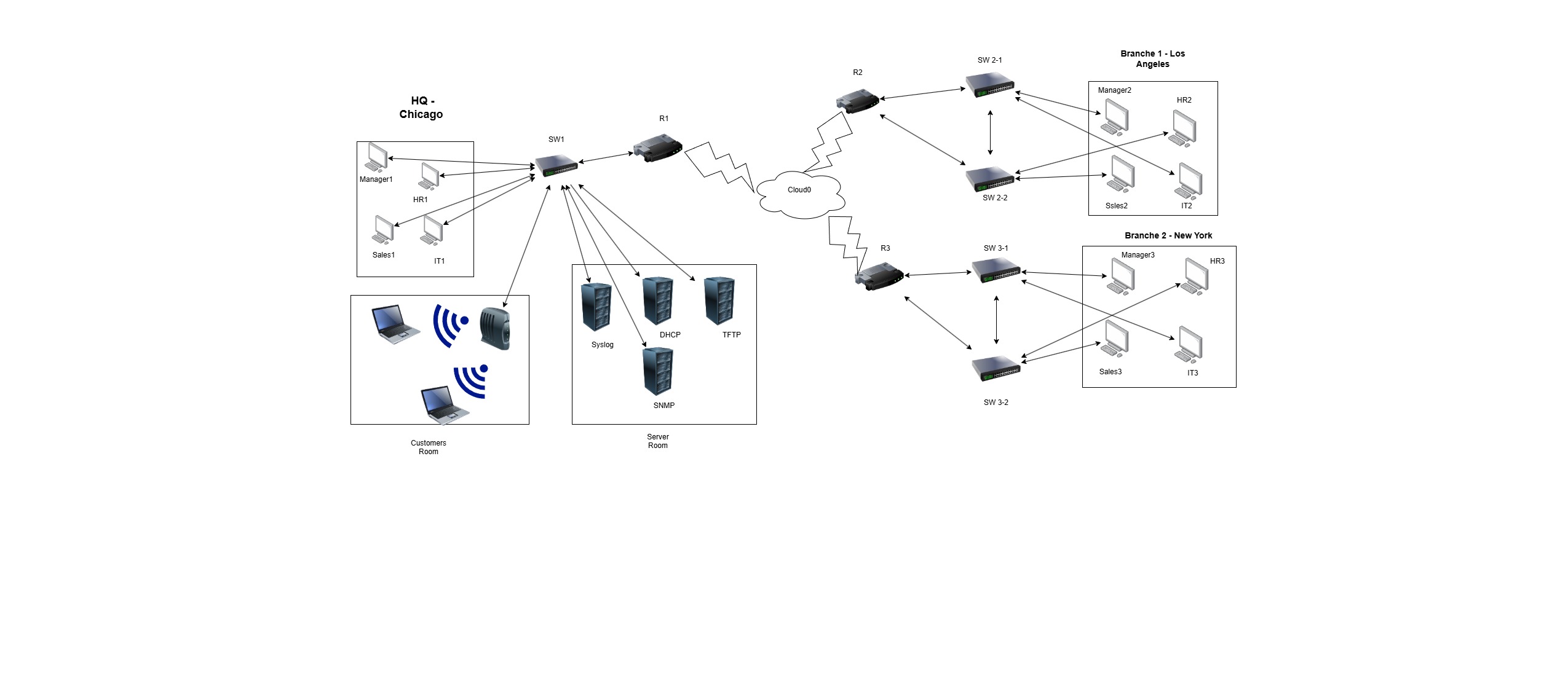
* **Headquarters (HQ):** Chicago, USA
  + **Branch 1:** Los Angelos, USA
  + **Branch 2:** New York, USA

**Topology:**

**Network Design and Planning**

**At the beginning, I used draw.io to design and plan the network topology for my final lab. This step was very important for several reasons:**

1. **Simplifying the design process: Having a clear topology diagram helped me visualize the entire network (HQ, branches, routers, and switches).**
2. **Interface mapping: The diagram allowed me to easily identify which interfaces should be connected to specific devices, reducing configuration errors.**
3. **Subnetting and VLAN planning: It made it easier to allocate IP addresses and assign VLANs to different departments.**
4. **Clear overall view: By drawing the complete network before implementing it on Cisco Packet Tracer, I saved time and effort during the configuration phase.**



**What Has Been Implemented**

 **Configuration of Switches and Routers**

** Creating VLANs and Inter-VLAN Routing**

** DHCP for IP distribution**

** Routing using RIP v2**

** WAN Connection via Frame Relay to link the branches**

** Security using Access Lists, Port Security, and SSH**

** Running servers (DHCP, TFTP, Syslog, SNMP)**

** Backup of configurations for each router on a TFTP Server**

## 🔹 Network Summary

|  |  |  |  |
| --- | --- | --- | --- |
| **Device** | **Hostname** | **Role** | **Main Configurations / Services** |
| **Router 1** | R1 | HQ Router (Chicago) | Sub-Interfaces (VLAN 2,3,4,5,10,15) – DHCP – ACLs – SSH – RIP – SNMP –  Syslog – TFTP Backup – Frame Relay |
| **Router 2** | R2 | Branch Router  (LA) | Sub-Interfaces – DHCP – SSH – RIP – SNMP – Syslog – TFTP Backup – Frame  Relay |
| **Router 3** | R3 | Branch Router  (NYC) | Sub-Interfaces – DHCP – SSH – RIP – SNMP – Syslog – TFTP Backup – Frame  Relay |
| **Switch 1** | SW-1 | HQ Switch | VLANs (2,3,4,5,10,15) – Port Security – Trunk |
| **Switch 2** | SW-2 | Branch Switch | VLANs + Access Ports – Port Security – Trunk |
| **Switch 3** | SW-3 | Branch Switch | VLANs + Access Ports – Port Security – Trunk |
| **Server 1** | TFTP | Backup Server | Stores router configurations |
| **Server 2** | Syslog | Logging Server | Receives and stores logs from routers |
| **Server 3** | SNMP | Monitoring Server | Network monitoring via SNMP |
| **Frame**  **Relay** | CLOUD | WAN Connectivity | Provides inter-branch connection (Chicago ↔ LA ↔ NYC) |

**Configuration Steps**

🔹 **SW-1 Configuration**

**Changing Hostname**

Switch> enable

Switch# configure terminal

Switch(config)# hostname SW-1

**Creating VLANs**

SW-1(config)# vlan 2

SW-1(config-vlan)# vlan 3

SW-1(config-vlan)# vlan 4

SW-1(config-vlan)# vlan 5

SW-1(config-vlan)# vlan 10

SW-1(config-vlan)# vlan 15