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Healthcare Network Simulation

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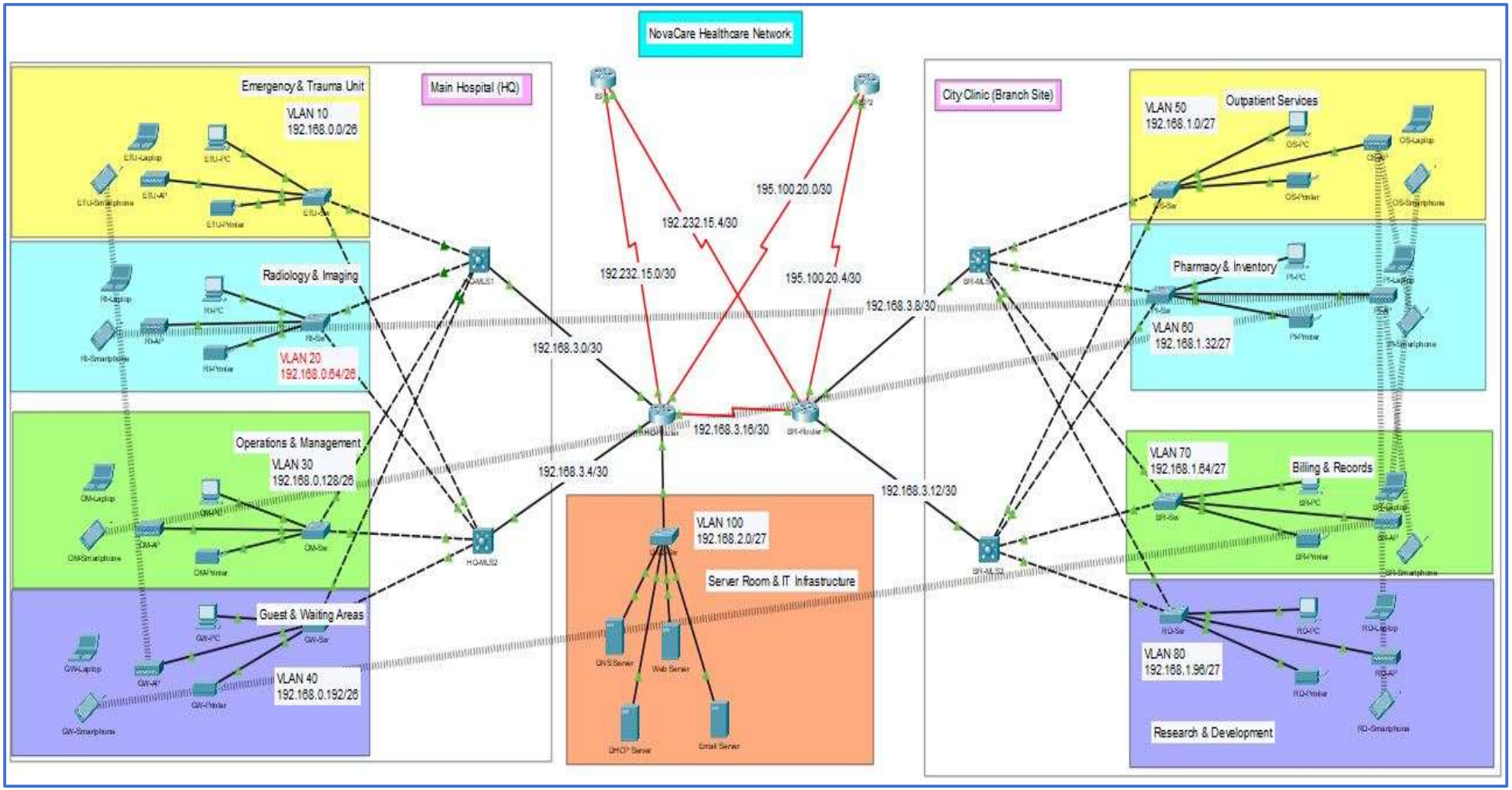
Network Topology Diagram



NovaCare Healthcare Network Infrastructure Project

Client: NovaCare Medical Group

Locations: Main Hospital (HQ) & City Clinic (Branch Site)

Objective: Deploy a new network infrastructure connecting two healthcare facilities, ensuring secure communication, optimized performance, and departmental segmentation.

Background

NovaCare Medical Group is expanding its operations by establishing City Clinic, which requires a complete network infrastructure while securely connecting to Main Hospital using an **IPsec VPN**. The goal is to ensure secure inter-site communication, allowing medical professionals to share records, access essential systems, and collaborate efficiently.

Project Scope

1. Network Setup & Departmental Segmentation

Main Hospital (HQ) Departments:

- Emergency & Trauma Unit – High-priority network access.
- Radiology & Imaging – Secure storage and transfer of medical scans.
- Operations & Management – Administrative network segment.
- Guest & Waiting Areas – Public Wi-Fi segment.
- Server Room & IT Infrastructure – Hosts critical services.

City Clinic (Branch Site) Departments:

- Outpatient Services – Consultation and treatment areas.
- Pharmacy & Inventory – Medication management system access.
- Billing & Records – Financial transactions and patient records.
- Research & Development – Medical data analytics and studies.

2. Server Infrastructure at Main Hospital

- DNS Server – Manages domain resolution for both sites.
- DHCP Server – Handles dynamic IP allocation across departments.

- Web Server – Hosts internal applications like scheduling and reports.
- Email Server – Manages hospital-wide staff communication.

3. Secure Inter-Site Connectivity

- IPsec VPN tunnel between Main Hospital and City Clinic for encrypted data transmission.
- Routing and VLAN segmentation to separate departments efficiently.
- Wireless Access Points (APs) deployed for seamless connectivity.

Outcome

After deployment, NovaCare Medical Group will have a **fully secure and optimized multi-site hospital network**. Doctors, nurses, and administrators will be able to access critical data, collaborate across locations, and improve patient care without compromising security.

Key Features of This Scenario

- ✓ Uses **IPsec VPN** for secure site-to-site connectivity.
- ✓ Separate departments for each site based on functionality.
- ✓ Dedicated **server infrastructure** hosted at the main hospital.
- ✓ Reliable, scalable **network supporting medical applications and services**.

IP Addressing and Subnetting

VLAN ID	Department	Subnet
10	Emergency & Trauma Unit	
20	Radiology & Imaging	
30	Operations & Management	
40	Guest & Waiting Area	192.168.0.192/26
50	Outpatient Services	192.168.1.0/27
60	Pharmacy & Inventory	192.168.1.32/27
70	Billing & Records	192.168.1.64/27
80	Research & Development	192.168.1.96/27
100	DMZ	192.168.2.0/27

Inter-Site & ISP Networks

Link	Subnet
ISP1 ↔ HQ-Router	192.168.15.0/30
ISP1 ↔ BR-Router	192.168.15.4/30
ISP2 ↔ HQ-Router	195.100.20.0/30
ISP2 ↔ BR-Router	195.100.20.4/30
HQ-Router ↔ BR-Router	192.168.3.16/30

Topology Overview

- Each **department** has an **access layer switch**, which connects to:
  - A **PC**, **printer**, and **Access Point (AP)**.
  - A **laptop and smartphone** connected to each AP.
- Devices naming convention follows:
  - **ETU-SW**, **ETU-PC**, **ETU-Printer**, **ETU-AP**, **ETU-Laptop**, **ETU-Smartphone** (for Emergency & Trauma Unit).
  - Similar naming for all other departments.
- **HQ Infrastructure**:
  - **HQ-MLS1 & HQ-MLS2** → Multilayer switches connected to **HQ-Router** and Layer 2 switches.
- **City Clinic Infrastructure**:
  - **BR-MLS1 & BR-MLS2** → Layer 3 switches connected to **BR-Router** and Layer 2 switches.

Final Notes

This network **enhances security, scalability, and efficiency** for NovaCare Medical Group, ensuring optimal **inter-site communication, data integrity, and departmental segmentation**.