# Eastern University

# Project Report
# Hospital Network Design
# Course Title - Computer Network Lab
# Course Code - CSE 416

| Submitted by | Submitted to |
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**Introduction**

This project focuses on designing a structured and scalable **Hospital Network System** using **Cisco Packet Tracer**. The goal is to ensure **reliable communication**, **secure data sharing**, and **efficient resource access** across different hospital departments including IT, Clinical, General and Private Wards, and Reception.

**Network Zones**

The hospital network is logically divided into several subnet-based departments:

| Department | Subnet |
|---|---|
| IT Department | 192.168.1.0/24 |
| Clinical Area | 192.168.2.0/24 |
| Entrance Reception | 192.168.3.0/24 |
| General Ward | 192.168.4.0/24 |
| Private Ward | 192.168.5.0/24 |
| Guest Wi-Fi Zone | DHCP-based (Wi-Fi) |

**Devices Used**

- **Routers:** 5 (Router0 to Router4)
- **Switches:** 6 (2960-24TT switches)
- **End Devices:** PCs, Laptops, Smartphones, Tablets
- **Servers:** DNS, HTTP, SMTP, FTP
- **Wireless Router:** WRT300N (for Guests)

**Network Topology Overview**

- **Router0 (IT Department)** connects the IT PCs, servers, and links with Clinical & Reception routers via serial links.
- **Router1 (Clinical)** connects Ultrasound, OT, Rooms, etc.
- **Router2 (General Ward)** connects ward PCs and doctors.
- **Router3 (Private Ward)** connects private ward PCs.
- **Router4 (Entrance)** connects Reception, Info Counter, Billing.
- **WRT300N Router** serves Guest Wi-Fi, isolated from the core hospital LAN.

## IP Addressing

Each subnet is assigned a unique Class C private network with subnet mask **255.255.255.0**. IPs are statically assigned to routers and PCs.

## Routing Configuration:

Routing between subnets is achieved using either:

- **Static routing**: Simple for small networks
- or **OSPF dynamic routing**: Recommended for scalability (if implemented)

Each router includes proper routes to reach all subnets.

## Services Configured

- **DNS Server**: Resolves domain names
- **HTTP Server**: Web-based access
- **SMTP/FTP Server**: Mail and file sharing
- **DHCP**: Likely used for Wi-Fi guest zone

## Connectivity & Testing

### Successful Communication:

- IT Dept ↔ Clinical Area
- Clinical ↔ General ↔ Private
- Entrance ↔ IT ↔ Clinical
- Servers accessible within hospital LAN

### Restricted Communication

- Guest Wi-Fi devices **cannot access** hospital PCs or servers, maintaining **security**.

All connections were tested via **ping**, and each zone communicates successfully if routing is configured properly.

## Limitations & Recommendations

- **Wi-Fi zone** should be NAT-enabled if internet access is required.
- Add **Access Control Lists (ACLs)** to secure sensitive subnets.
- Consider **VLANs** in future to segment traffic further.

## Network Diagram
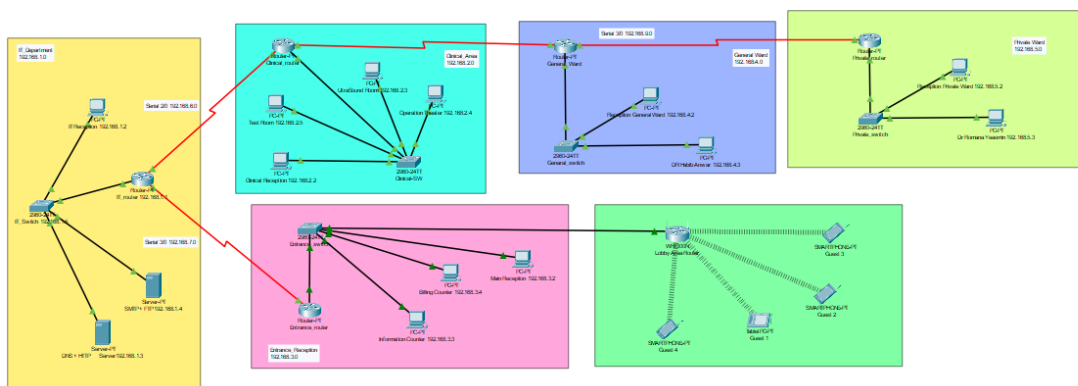


## Conclusion

This hospital network design demonstrates how a medium-sized organization like a hospital can implement a robust and secure LAN infrastructure using routers, switches, and basic services. Proper segmentation and routing ensure data isolation, internal communication, and service availability.