



وزارة الاتصالات  
وتكنولوجيا المعلومات



## **Proposal for the graduation project**

**DEPI**

### **Building an International School Network**

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# International School Network

## Scenario :

International school, with two branches located 20 miles apart, needs a network to support students and staff across four Buildings A, B, C, D. The main branch houses three buildings:

- **Building A:** Administrative departments including management, Admin, finance, student affairs.
- **Building B:** IT department and labs
- **Building C:** Middle school and high school

The smaller branch hosts the Primary school and Kg. Each department will be on a separate IP network, and VLANs will be configured to ensure network segmentation. RIPv2 will be used for internal routing, with static routing for external servers. Building A will use a router-based DHCP for dynamic IP assignment.

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## Amera - Network Design (First Week)

Amera is responsible for designing the network's overall structure, which involves:

- **Topology Design**

A hierarchical topology is implemented where the buildings on each campus are connected via a core switch. Fiber optic cables will connect distribution switches in each building to the core switch for fast communication.

- **IP Addressing and Subnetting**

IP addresses are assigned using a private IP, with each department on a separate subnet.

- **VLAN Configuration**

VLANs are configured to segment traffic between departments, improving security and network management.

- **VLAN 10: Manager**
- **VLAN 20: Admin**
- **VLAN 30: Finance**
- **VLAN 40: Student-Affairs**
- **VLAN 50: IT Department**
- **VLAN 60: Labs**
- **VLAN 70: Middle School**
- **VLAN 80: High School**

- **VLAN 90: Primary School**
- **VLAN 100: KG School**

This VLAN separation improves security by limiting access between departments and allows easier network management.

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## **Saif - Network Implementation (Second Week)**

Saif will manage the physical and logical setup of the network:

- **Hardware Setup**

**Routers and Switches:** He will install and interconnect the routers, core switch, and distribution switches in each building (A, B, C, and D).

**End Devices:** Connect end devices like computers, printers, and servers to the corresponding building switches.

**Fiber Connections:** Set up fiber optic connections between the core switch and each building's switch to ensure high-speed communication.

- **Device Configuration**

**Router Configuration:** Set up routing between different VLANs using inter-VLAN routing, ensuring communication between departments while maintaining separation.

**Switch Configuration:** Configure the switches with the VLANs designed by Amera.

**Port Assignments:** Assign specific ports to switches for VLAN traffic (e.g., VLAN 10 traffic on certain ports for admin devices).

- **Testing**

**Connectivity Tests:** Saif will use tools like ping and traceroute to ensure all devices can communicate within their respective VLANs and with the core network.

**End-to-End Testing:** He will verify network functionality by testing communication between classrooms, labs, the library, and admin offices.

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## Ahmed - Network Services (Third Week)

Ahmed will set up essential network services and security measures:

- **DHCP Configuration**

**Automatic IP Assignment:** He will configure the DHCP server to assign IP addresses automatically to devices in each VLAN/subnet.

**IP Range Allocation:** Define specific IP ranges for each department.

- **DNS Setup**

**Hostname Resolution:** Set up DNS services to resolve internal hostnames to IP addresses.

**External DNS:** Configure the DNS server to forward unknown queries to an external DNS (for internet access).

### **Wireless Network Setup:**

**Wi-Fi Access Points:** Configure Wi-Fi for staff and students with separate SSIDs for different groups.

**Security Protocols:** Implement WPA2/3 encryption for wireless networks to protect access.

### **Security Implementation:**

**Firewalls and ACLs:** Configured to control access between VLANs, ensuring sensitive areas like administration remain secure. ACLs restrict inter-VLAN traffic where necessary, such as preventing student access to admin networks.

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## Nour - Network Management (Fourth Week)

Nour will oversee ensuring the network is properly managed and monitored:

- **Network Monitoring**

**Monitoring Tools:** Set up network monitoring tools like SNMP (Simple Network Management Protocol) or NetFlow to track network performance (e.g., bandwidth usage, device health).

**Alert System:** Create automated alerts for critical issues (e.g., device failure, high traffic, downtime).

- **Troubleshooting**

**Diagnosis of Network Issues:** Nour will handle troubleshooting of common problems like connectivity issues, IP conflicts, or slow performance.

**Tools:** She will use tools such as ping, traceroute, and packet capture (e.g., Wireshark) to investigate issues.

- **Documentation**

**Network Diagrams:** Create detailed network diagrams that map out all components, IP address allocations, VLANs, and device connections.

**Troubleshooting Guide:** Document troubleshooting procedures for common issues (e.g., slow performance, connection drops, IP conflicts) to help the team resolve future issues efficiently.

**Configuration Backup:** Backup all network configurations (router, switch, DHCP, DNS, and firewall settings) for easy recovery in case of failure.

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## **Collaboration and Handoffs**

Each team member will hand off key information to the next person:

Amera → Saif: Handoff network design and topology details to Saif for physical implementation.

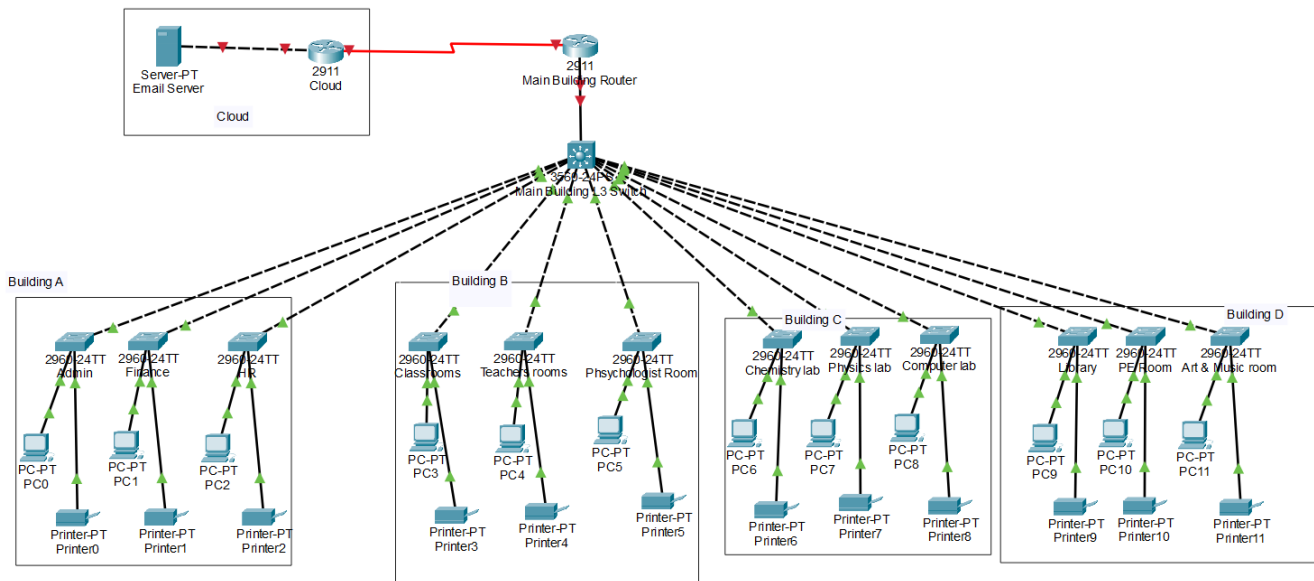
Saif → Ahmed: Handoff hardware setup and configuration to Ahmed for network services configuration.

Ahmed → Nour: Handoff network services details to Nour for monitoring, management, and documentation.

This way, the project can be efficiently implemented and managed over four weeks.

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## Photo of the project (Initial form)



## Photo of the project (Final form)

