**COMPUTER NETWORK**



**PROJECT**

**Session: Fall ’25**

**Instructor: HAFIZ Muhammad Rizwan**

**Student Name:**

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**Section: v-15**

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**Smart Office Network Simulation**

**Objective:**  
Design and configure a secure smart office network with isolated departments, central services, and wireless access. This project simulates a real-world organizational structure where internal resources must be segmented and protected. Different routers within the network may operate using distinct routing protocols (e.g., RIP, OSPF) to simulate a heterogeneous routing environment.

**Theoretical Concepts:**

* VLANs for traffic isolation
* Subnetting for structured IP management
* 802.1X for LAN authentication
* Port security and MAC filtering for endpoint control
* NAT for secure outbound communication
* Stateful firewall with ACLs for service protection
* WPA2 encryption for wireless integrity

**Practical Setup:**

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| --- | --- | --- |
| **Block** | **Description** | **Devices** |
| A | Admin Dept (802.1X-secured) | 3 PCs |
| B | HR Dept (VLAN 20, Port Security) | 3 PCs |
| C | R&D Dept (VLAN 30, MAC Filtering) | 3 PCs |
| D | Server Room (DNS, Web, Mail, Firewall) | 3 Servers |
| E | Wi-Fi Zone (WPA2-Secured) | 2 Laptops |

**Total Devices:**

9 PCs, 2 Laptops, 2 Switches, 1 Router, 1 Wireless Router, 3 Servers, 1 ISP

**Security Protocol Summary:**

|  |  |
| --- | --- |
| Section | Protocol Applied |
| Admin | 802.1X Authentication |
| HR | Port Security |
| R&D | MAC Address Filtering |
| Servers | Stateful Firewall + ACLs |
| Wi-Fi | WPA2 with AES |

**Expected Outcomes:**

* Secure wired and wireless connectivity
* Proper VLAN-based communication restriction
* Validated authentication for internal devices