**SUPERIOR UNIVERSITY LAHORE**



**COMPUTER NETWORKS LAB**

**NAME:**

**AAMINA QASIM**

**ROLL NO.:**

**SU92-BSDSM-F22-027**

**PROGRAM:**

**BS DATA SCIENCE**

**SECTION:**

**5-A**

**COURSE:**

**COMPUTER NETWORKS LAB**

**SUBMITTED TO:**

**SIR RASIKH ALI**

**Documentation for Government Agency Network Infrastructure**

* **Project Title**: Government Agency Network Infrastructure
* **Tool Used**: Cisco Packet Tracer
* **Prepared By**: Aamina Qasim
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**Abstract:**

This project focuses on designing and implementing a secure and efficient network for a government agency using Cisco Packet Tracer. The network is designed to support multiple departments with VLANs for segmentation, inter-VLAN routing for communication, and robust security measures to protect sensitive data.

**Introduction:**

Government agencies require networks that are:

* Highly secure to prevent unauthorized access.
* Scalable to accommodate future growth.
* Reliable for seamless communication between departments.

This project implements a network that fulfills these requirements by utilizing Cisco Packet Tracer to simulate a real-world scenario.

**Objectives:**

* Design a hierarchical network topology for the agency.
* Implement VLANs to separate departments.
* Configure inter-VLAN routing for communication between departments.
* Apply security measures like ACLs (Access Control Lists) and port security.
* Test network performance and connectivity.

**Network Design:**

**Topology Overview**:

* **Core Layer**: A router connecting all department switches.
* **Distribution Layer**: Layer 3 switches for VLAN configurations.
* **Access Layer**: Layer 2 switches connecting end devices.

**Departments and VLANs**:

* Administration
* Finance
* IT
* HR

**Components Used:**

**Hardware:**

* Routers
* Layer 3 Switches
* Layer 2 Switches
* PCs: (for each department).
* Servers: (Centralized for data).

**Protocols:** VLAN, Static Routing, Inter-VLAN Routing, DHCP.

**Implementation Steps:**

* **Create VLANs**:

Assign each department a VLAN on Layer 3 switches.

* **Configure Inter-VLAN Routing**:

Use a router or Layer 3 switch for routing between VLANs.

* **IP Address Assignment**:

Assign IPs to each device within the subnet.

* **Apply Security**:

Configure ACLs to restrict unauthorized access.

Enable port security on switches to prevent MAC spoofing.

**Testing and Validation:**

* **Ping Tests:**

Test connectivity within and between VLANs.

* **Traceroute:**

Verify routing paths between devices.

* **Access Restrictions:**

Test ACLs by attempting unauthorized access.

**Conclusion and Future Scope:**

This network infrastructure provides secure and efficient communication for the government agency. Future improvements could include wireless integration, enhanced redundancy with HSRP/VRRP, and cloud integration for centralized management.

**References:**

* Cisco Networking Academy Materials.
* Official Cisco Packet Tracer Tutorials.
* Networking books and resources.