**LAN Project Document for Small Office Network**

**Project Overview**

This document outlines the design and implementation of a Local Area Network (LAN) for a small office environment. The network is designed with multiple Virtual LANs (VLANs) to enhance security and manageability. The setup includes a router, a managed switch, and multiple PCs segmented into VLANs. The network will facilitate secure and efficient communication between different departments.

**Objectives**

* Design a scalable, secure, and efficient LAN for a small office.
* Implement VLANs to separate network traffic for different departments.
* Assign IP addresses for all connected devices.
* Ensure reliable communication between devices while maintaining security.

**Network Requirements**

1. **Number of PCs:** 6
2. **Switch:** 1 Layer 2 managed switch
3. **Router:** 1 for VLAN routing and Internet access
4. **VLANs:** 3 VLANs for different departments
5. **Network Topology:** Star topology
6. **IP Addressing Scheme:** Class C private addressing (192.168.x.x)

**VLAN Configuration**

* **VLAN 10:** IT Department (192.168.1.0/24)
* **VLAN 20:** HR Department (192.168.2.0/24)
* **VLAN 30:** Finance Department (192.168.3.0/24)

**Network Diagram**

The network consists of a router, a managed switch, and six PCs divided into three VLANs.

[Internet]

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[Router]

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[Managed Switch]

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VLAN10 VLAN20 VLAN30

IT HR Finance

**IP Addressing Scheme**

| **Device** | **IP Address** | **Subnet Mask** | **Gateway** |
| --- | --- | --- | --- |
| Router | 192.168.1.1 | 255.255.255.0 | N/A |
| PC1 (IT) | 192.168.1.10 | 255.255.255.0 | 192.168.1.1 |
| PC2 (IT) | 192.168.1.20 | 255.255.255.0 | 192.168.1.1 |
| PC3 (HR) | 192.168.2.10 | 255.255.255.0 | 192.168.2.1 |
| PC4 (HR) | 192.168.2.20 | 255.255.255.0 | 192.168.2.1 |
| PC5 (Finance) | 192.168.3.10 | 255.255.255.0 | 192.168.3.1 |
| PC6 (Finance) | 192.168.3.20 | 255.255.255.0 | 192.168.3.1 |

**Device Configuration**

**Router Configuration:**

* Create sub-interfaces for VLANs
* Assign IP addresses to each VLAN interface
* Enable inter-VLAN routing

**Switch Configuration:**

* Create VLANs
* Assign ports to respective VLANs
* Configure trunk port to router

**Security Considerations**

* Enable port security on the switch to prevent unauthorized access.
* Configure basic firewall rules on the router.
* Use VLANs for traffic segmentation and isolation.

**Testing and Validation**

* **Ping Test:** Ensure all PCs within the same VLAN can communicate.
* **VLAN Test:** Verify VLAN segmentation by preventing inter-VLAN traffic.
* **Gateway Test:** Confirm that PCs can reach their respective gateways.

**Conclusion**

This document outlines a structured approach to implementing a small office network with VLAN segmentation. The design ensures secure communication, scalability, and efficient traffic management within the organization.