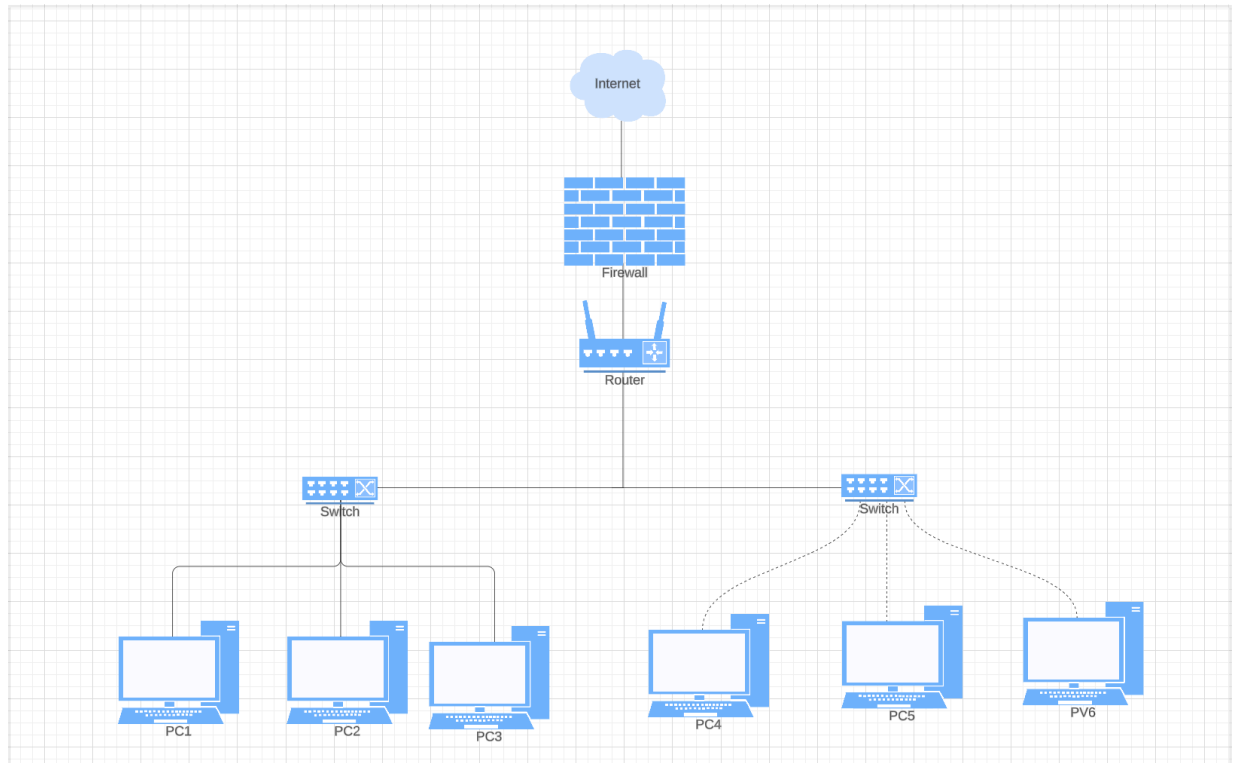# Network Topology

Report on Network Topology: LAN Configuration with Star Topology

Network Topology Diagram

The diagram illustrates a **Local Area Network (LAN)** using a **Star Topology**. Key components include:

- **Firewall**: Positioned between the Internet and the router to provide robust security.
- **Router**: Acts as the central hub, connecting internal devices to the Internet and routing traffic between switches.
- **Switches**: Facilitate the connection of end devices (PC1–PC6) to ensure seamless internal communication.

Characteristics of the Star Topology

This network utilizes a **star topology**, where all devices are connected to a central hub (the router and switches).

1. **Central Connection Point**:
   - Communication between devices or with the Internet is managed centrally through the router or switches.
   - Each device has its own direct link to the network, ensuring efficiency and reduced congestion.
2. **Scalability and Management**:
   - The modular structure allows new devices to be easily added without disrupting existing connections.
   - Centralized hubs simplify network configuration and monitoring.

How the Topology Supports Secure Communication

1. **Firewall Protection**:
   - The firewall serves as a shield between the internal network and external threats, filtering traffic and preventing intrusions.
   - Policies can be configured to block malicious IPs or restrict unnecessary traffic.
2. **Minimized Vulnerabilities**:
   - Devices connect to switches, limiting direct device-to-device communication and minimizing the risk of broadcast storms or data leaks.
   - Isolating devices through this topology ensures that a compromised device has limited impact.
3. **Centralized Monitoring**:
   - All traffic passes through the router and firewall, allowing for centralized logging, traffic analysis, and security policy enforcement.

How the Topology Supports Network Management
1. **Simplified Troubleshooting**:
   - Faults in individual devices or connections are easily isolated without disrupting the rest of the network.
   - The star structure makes it straightforward to identify and resolve issues in specific links.
2. **Scalable Design**:
   - New devices can be connected to switches or additional switches added without extensive reconfiguration.
   - The central router ensures efficient routing for all devices, even as the network grows.
3. **Performance Optimization**:
   - Switches reduce unnecessary broadcast traffic by directing data only to intended recipients.
   - This ensures smooth communication between devices without network congestion.
4. **Future-Proofing**:
   - The modular structure can adapt to future needs, such as adding virtual LANs (VLANs) or implementing Quality of Service (QoS) protocols for priority traffic management.

Advantages of Star Topology
- **Fault Isolation**: A problem in one device or cable does not affect the rest of the network.
- **Ease of Maintenance**: Centralized control simplifies monitoring and repairs.
- **Scalability**: New devices can be added with minimal effort.

Disadvantages of Star Topology
- **Single Point of Failure**: If the router or a switch fails, it can disrupt the

entire network.

- **Cost**: Additional infrastructure (e.g., switches and cabling) may increase setup costs.

Conclusion

This LAN configuration with a **star topology** provides an efficient, secure, and scalable network structure. Its centralized nature ensures enhanced security and simplified management, making it ideal for environments where robust communication and reliable performance are critical. Future upgrades, such as VLAN implementation or redundancy measures, can further improve security and reduce potential risks.