Network Protocols and Architectures

Internet

Network and Transport Layers (Layer 3 & 4)

Firewall

Star Topology

Layer 3 (Network)

Router

Application, Presentation, Session,
Transport, Network, Data Link, Physical.

PC 1

PC 2

Application (Layer 7)

Server 1

Layer 2 (Data Link)

Switch 1

Physical Layer (Layer 1)

printer 1

PC 3

PC 4
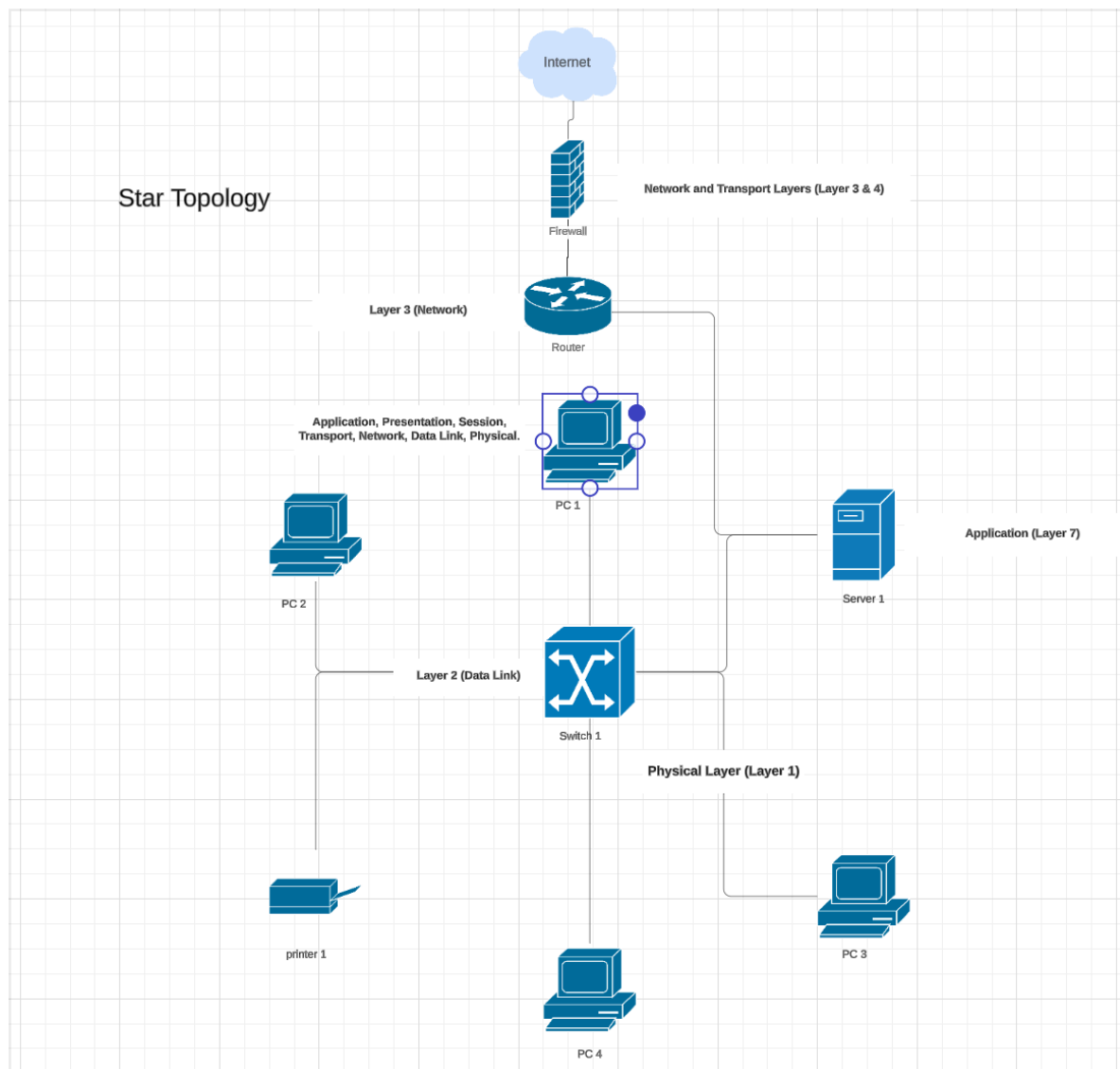
OSI Model	TCP/IP Model	Functions in Your Network
Application (Layer 7)	Application	Provides services like HTTP for web browsing, SMTP for email, and file sharing protocols (e.g., FTP).
Presentation (Layer 6)	Application	Ensures data formatting and encryption (e.g., SSL/TLS for secure web communication).

Session (Layer 5)	Application	Manages sessions for communication, such as maintaining a remote desktop or web session.
Transport (Layer 4)	Transport	Ensures reliable data transfer through TCP or UDP. For instance, TCP handles PC 1's connection to a remote server.
Network (Layer 3)	Internet	IP addressing and routing to ensure PC 1 communicates with other devices, managed via the router and firewall.
Data Link (Layer 2)	Network Access	MAC addressing and error detection; Switch 1 facilitates communication between PC 1 and other connected devices.
Physical (Layer 1)	Network Access	Transmits raw data over cables or wireless media between PC 1 and the switch.

Subnetting Plan

Assume the following IP address range for your network: 192.168.1.0/24.
- Subnet for devices (PCs, Server, Printer):
- Subnet: 192.168.1.0/26
- Range: 192.168.1.1 – 192.168.1.62
- Subnet Mask: 255.255.255.192
- Example Assignments:
- Router: 192.168.1.1
- PC 1: 192.168.1.2
- Server 1: 192.168.1.3
- Printer 1: 192.168.1.4

Security Protocols
1. Firewall:
- Configure the firewall between the router and the switch to

monitor and filter incoming and outgoing traffic.

2.   VPN (Virtual Private Network):

•   Use a VPN server to securely encrypt traffic from remote users.

3.   WPA2 Encryption for Wireless Devices (if applicable):

•   Ensure secure communication for any wireless devices in the network.

4.   TLS/SSL:

•   Implement secure web protocols for accessing the server.