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Q1) Compare between Vlan and subnet:

What is a VLAN and Subnet?

VLANs are used to **segment a physical network** into multiple, logically separate networks. This helps in isolating traffic within specific groups while Subnet is a **logical subdivision of an IP network**. It divides a larger IP address range into smaller, more manageable segments.

- **Purpose:**
  VLANs are used for **logical traffic isolation** within a Layer 2 network, while Subnets manage **IP address allocation** and routing in Layer 3.
- **Layer of Operation:**
  VLANs operate at **Layer 2 (Data Link Layer)**, focusing on broadcast domain segmentation. Subnets function at **Layer 3 (Network Layer)**, handling IP-level communication.
- **Traffic Control:**
  VLANs reduce broadcast traffic within a single physical network. Subnets control traffic at the IP level, often using routing and firewall policies.
- **Flexibility:**
  VLANs allow grouping of devices logically across **physical locations**, such as grouping all printers in one VLAN. Subnets are effective for managing traffic across **geographically distributed networks**.
- **Security:**
  VLANs isolate traffic logically, while Subnets provide **enhanced security** through access controls and firewalls at the IP level.
- **Routing Dependency:**
  VLANs do not need routing within the same VLAN but require Layer 3 devices for inter-VLAN communication. Subnets **always require routing** for communication between them.
- Cost Efficiency:
  VLANs are more cost-effective as they rely on existing switches. Subnets may require additional Layer 3 devices like routers.

Key Difference:

- Use VLANs for logical isolation and efficient Layer 2 traffic management.
- Use Subnets for routing, IP efficiency, and scalable designs in Layer 3 networks.

Combining both ensures optimal performance, scalability, and security in modern networks.