Network by Design Sample Solution

Explain the need to design a hierarchical network that is scalable.

Suggested Activity Example Solution: (information based on The Cisco Three-Layered Hierarchical Model and LAN Design)

Access Layer	
Definition	This hierarchical layer connects local clients to the network. It is sometimes called the desktop layer.
Facts	At this level: • Network equipment works with the distribution and core layers to send and receive transmissions from clients and users. • Collision domains are created using switches. • Switches can be configured to filter MAC addresses and share bandwidth.
Network Device Features	• Port security • VLANs functionality • Fast Ethernet/Gigabit Ethernet transmissions • Power over Ethernet (PoE) • Link aggregation • Quality of service (QoS)

Distribution Layer	
Definition	This hierarchical layer provides policy-based, decision-making network connectivity to the access layer below it and the core layer above it.
Facts	At this level: • Firewalls and access lists can be placed. • Link aggregation can occur. • Broadcast and multicast domain boundaries are created.
Network Device Features	• Layer 3 support • High forwarding rate • Gigabit Ethernet/10 Gigabit Ethernet • Redundant components • Security policies/access control lists • Link aggregation • Quality of service (QoS)

	Core Layer
Definition	This hierarchical layer is the **backbone** of the network. It includes high-powered routers and switches that use high-speed cabling, such as fiber optics. The main function of this layer is reliable delivery of network packets.
Facts	At this level: • All other layers of the hierarchical design model are supported. • Load balancing is desired as an integral service. • Efficient, fast, reliable data paths ensure fast network transmissions.
Network Device Features	• Layer 3 support • Very high forwarding rate • Gigabit Ethernet/10 Gigabit Ethernet • Redundant components • Link aggregation • Quality of service (QoS)
Three-Layer Hierarchical Design Graphic	