LAN Architectures

Star topology: many devices connect to one central device.
Full MESH: each device is connecting to one other device.
Partial MESH: some devices are connected to each other but not all.
Campus LAN: a LAN of devices in a network or perhaps multiple buildings that are close to each other.
Two tier/Collapsed Core LAN design: has two hierarchical layers:
1- Access Layer: connects to endhosts with lots of ports, QoS markings are typically done here, security services are typically performed here, seitchports might be PoE enabled for wireless Access points, IP phones.
2- Distribution Layer: aggregates connections from the Access Layer Switched, typically border between layer 2 and 3, run layer 2 and 3 protocols, usually access layer switched are connected to distribution layer switches via layer 2 connections, endhosts use SVIs on the distribution layer switches as their default gateway, distribution layer is used to connect to services as internet, WAN ,...etc, usually 2 redundant switches, each distribution layer switch is connected to each other distribution layer switch, with no spanning tree running.
Distribution/Aggregation layer is sometimes called the core distribution layer, if there are more than 3 distribution layers in a single location a core layer is added.
A core layer: each distribution switch is connected to a pair of very fast and powerful core layer switches.
Core layer in 3 tier campus LAN design: connects distribution layers together in large LAN nets, the focus is speed, so CPU intensive operations as security, QoS marking and classification should be avoided, connections are all layer 3, should maintain connectivity through the LAN even if device fail, etherChannel is used between core layer switches.

Spine Leaf Clos Architectures deigned for data centers.
Data Centres: spaces to store computer systems as servers and network devices, using a three tier architecture works well when traffic is North-South: from and to core and access layers, but with precedence of virtual servers,apps are often deployed in a distributed server manner across multiple physical servers increasing (East-West traffic), leading to bottlenecks in bandwidth as well as variability in server to server latency depending on the path the traffic takes so Clos is used.
Every leaf switch is connected to every spine switch, leaf switches don’t connect to each other, spine switched don’t connect to each other, end hosts only connect to leaf switches,the path taken by traffic is randomly chosen to balance traffic in spine leaf arch explain, each server is separated by the same number of hops except those connected to the same switch providing consistent latency for East West traffic.

Small Office/ Home Office (SOHO): refers to the office of a small company or a home network with few devices.
All networking functions are typically provided by a single device called a home router or a wireless router that serves as a router, switch, firewall, wireless access point, modem (cable internet).
STP-FHRP synchronization: HSRP active is root bridge and HSRP standby is secondary root bridge, so that traffic from endhosts follow the most direct path to the default gateway.