

C O L L I S I O N D O M A I N S

Collision Domain—The collection of devices and wiring within which two devices talking at the same time would electrically interfere with each other.

CSMA/CD (Carrier Sense Multiple Access / Collision Detection)—The logic to recognize and recover from collisions. Basically, listen before talking and if you still collide, then stop, jam the line, wait, and try again.

Hub—A physical (Layer 1) repeater that creates a star wiring topology. It doesn't analyze or buffer the frame, it just repeats it out the other ports. It doesn't even attempt to obey CSMA/CD, leaving that to the actual originators of the traffic. Everything is one collision domain.

Bridge—(AKA transparent bridge) Divides a collision domain by not repeating frames out its other port(s) if it knows that the destination is located out the same port the signal came in (i.e. the destination already heard it).

Switch—Essentially, a multiport bridge built using custom chips for speed (bridges used software). Each port on a switch is a separate collision domain.

B R O A D C A S T D O M A I N S

Broadcast domain—the collection of devices that will hear an Ethernet broadcast. Routers divide broadcast domains from each other by not passing broadcasts.

VLANs (Virtual LANs)—allow you to divide the ports of a switch between different broadcast domains, so you don't need a separate switch for each broadcast domain. A router is required to forward traffic between the VLANs at L3.

L A N C A M P U S T O P O L O G I E S

Access Switches—hosts attach to these.

Distribution Switches—connect access switches to each other.

Core Switches—connect distribution switches in larger designs with very high-speed links

Topology Terms

- Star
- Full Mesh—Every node has a direct connection to every other
- Partial Mesh—Redundancy, but not full mesh
- Hybrid—Combination of the above three to make a complete design.

Two-tier campus (collapsed core)—just access and distribution switches, no core. The access layer is star, the distribution layer is partial mesh.

Three-tier campus—core switches connect distribution switches. In larger designs, this reduces inter-switch connections and the number of ports they use, while keeping redundancy.

L A N T E C H N O L O G I E S

802.3—The family of IEEE standards that describe all Ethernet technologies.

IEEE	NAME	SPEED	MAX LENGTH & CABLE
802.3i	10BASE-T Ethernet	10 Mbps	100 m (328 feet) CAT3, 2 pairs
802.3u	100BASE-T Fast Ethernet	100 Mbps	100 m CAT5, 2 pairs
802.3z	1000BASE-X Gigabit Ethernet	1 Gbps	fiber
	1000BASE-SX		550 m (1800 feet) Multimode fiber
	1000BASE-LX		550 m (1800 feet) Multimode fiber
	1000BASE-LX		5 km (3.1 miles) 9-micron single-mode fiber
802.3ab	1000BASE-T Gigabit Ethernet	1 Gbps	100 m CAT5e
802.3ae	10GBASE-X	10 Gbps	fiber
802.3an	10GBASE-T	10 Gbps	38-55 m (127-180 feet) CAT6, 100 m CAT6a
802.3ba	40GBASE-X	40 Gbps	fiber
802.3ba	100GBASE-X	100 Gbps	fiber

TIA (Telecommunications Industry Association)—defines Ethernet cabling quality standards.

Fiber gives longer distance at higher cost. Multimode fiber covers middle distances using an LED (Light Emitting Diode) instead of a LASER (Light Amplification by Stimulated Emission of Radiation).

W I R E L E S S L A N S

802.11—The series of standards devoted to Wi-Fi.

LWAP (LightWeight Access Point)—Wi-Fi radio station that connects to Ethernet and translates frames between wired and wireless, but with none of the intelligence of a full AP, like defining WLANs and controlling authentication.

WLC (Wireless LAN Controller)—Controls APs, defining WLANs, and controlling roaming and authentication.