

Ethernet, FDDI, ARCNET

	<u>Ethernet (10base2, 5)</u>	<u>Ethernet (10baseT)</u>	<u>FDDI</u>	<u>ARCNET</u>
Data rate	10 Mbps (shared)	10 Mbps (shared)	100 Mbps (shared)	2.5 Mbps (shared)
Topology	Bus	Star-wired bus	Star ring and/or dual ring	Tree/Bus
Media (most common)	Coax (2 = thin, 5 = thick)	UTP-3, 5	UTP-5 / STP / Fiber	Coax / UTP
Access method	CSMA/CD	CSMA/CD	Token-passing	Token-passing
Standard supported	IEEE 802.3	IEEE 802.3	ANSI X3T12	None
Maximum transmission distance	185 m - 10base2 (no repeaters) 500 m - 10base5 (no repeaters) 925 m - 10base2 (max of 4 rep) 2.5 km - 10base5 (max of 4 rep) Maximum of 4 repeaters	100 meters (PC to repeater) 500 m (end-to-end on UTP) 2.2 km (end-to-end UTP/fiber) Maximum of 4 repeaters	100 m (node-to-node UTP/STP) 50 km (end-to-end on fiber) 2 km (node-node; mmfiber) 15 km (node-node; smfiber)	2000 ft per active hub 100 ft for passive hub (PC to hub - tree)
Max nodes (collision domain)	No repeaters: 100(thick), 30(thin) With repeaters: 1024(thick & thin)	1024	500 (shared domain)	255 (shared domain)
Max nodes (with bridges)	Typical: up to about 2500	Typical: up to about 2500	Unlimited	Typical: up to 1000
Maximum frame size	1,518 bytes	1,518 bytes	4,500 bytes	508 bytes
Adapter price range	\$75 - \$400	\$75 - \$400	\$700 - \$1700	\$150 - \$500
IBM products	Adapter: ISA, EISA, MCA, PCMCIA 10base2 Hub: 8250, 8260	Adapter: ISA, EISA, MCA, PCMCIA Repeater: 8222, 8224 Hub: 8250, 8260	Adapter: ISA, EISA, MCA Hub: 8240, 8244, 8250/60	None

EMERGING HIGH SPEED ETHERNET:

	<u>Switched Ethernet</u>	<u>Full-Duplex Ethernet</u>	<u>Fast Ethernet</u>	
			<u>100base-TX</u>	<u>100base-T4</u>
Data Rate	10 Mbps (dedicated per port)	20 Mbps (dedicated)	100 Mbps (shared)	100 Mbps (shared)
Topology	Star	Star	Star	Star
Media (most common)	UTP-3, 5 / STP	UTP-3, 5 / STP	UTP-5 / STP (2 pair)	UTP-3, 5 (4 pair)
Equipment needed	Switch only	Full duplex adapter; Switch w/ full duplex support	100base-TX adapter; Repeater or switch	100base-T4 adapter; Repeater or switch
Access method	CSMA/CD	CSMA/CD (no collisions on link)	CSMA/CD	CSMA/CD
Standard supported	IEEE 802.3	IEEE 802.3 Standard work in progress	IEEE 802.3 Std work in progress	IEEE 802.3 Std work in progress
Maximum transmission distance	100 meters (PC to repeater) 500 m (end-to-end on UTP) 2 km (end-to-end UTP/fiber)	100 meters (PC to switch)	100 m (PC to hub) 205 m (end-to-end)	100 m (PC to hub) 205 m (end-to-end)
Max nodes (collisn domain)	1024 per port	One node on one FDX port	1024	1024
Max nodes	Typical: up to about 2500 per switch	See note 1 below	See note 1 below	See note 1 below
Maximum frame size	1,518 bytes	1,518 bytes	1,518 bytes	1,518 bytes
Adapter price range	\$75 - \$400	\$500 - \$550	\$250 - \$500	\$250 - \$500
IBM products	Adapter: existing ethernet Switch: 8271 EtherStreamer	Adapter: EtherStreamer (MCA) Switch: 8271 EtherStreamer	None	None

ETHERNET SWITCHING

- ⇒ An ethernet switch gives each of its ports its own network
- ⇒ Can attach either a single node or a whole LAN segment into each port
- ⇒ The switch essentially "bridges" between the ports
- ⇒ If only one node uses port, the full 10 Mbps bandwidth is dedicated to individual node

Servers are usually placed on dedicated ports with clients on shared ports.

Note: **ethernet switching** is not the same as **ethernet port switching** (like in 8250, 8260). Port switching means that multiple ports are configured to same backplane so they share the backplane bandwidth. This is in contrast to ethernet switching where each port has dedicated bandwidth. (This same concept applies to Token-Ring switching and Token-Ring port switching).

FULL DUPLEX ETHERNET

- ⇒ Requires both a switch with full duplex support and a full duplex adapter
- ⇒ Only attach a single node to each full duplex port
- ⇒ Half duplex ports can be shared by multiple nodes
- ⇒ Collision detection is unnecessary, so node is free to transmit and receive at same time doubling throughput from 10 Mbps to 20 Mbps

The maximum number of nodes in a bridged ethernet configuration can vary as no IEEE standard exists. It is typically up to 2,500 nodes, but is dependent on the bridges used and the network performance requirements.

Some vendors support 10baseT and 100baseT on the same adapter (known as 10/100 Mbps adapters). 100baseT guidelines and constraints apply for 100 Mbps operation, while 10baseT guidelines and constraints apply to 10 Mbps operation.

Note 1: Emerging high speed LANs will very likely adopt ATM as the switch interconnect backbone.