

Wired LAN Ethernet

Differences between LAN, MAN, WAN

BASIS	LAN	MAN	WAN
Range	A communication network linking a number of stations in same local area. Range is 1 to 10 km	This network shares the characteristics of packet broadcasting networks. Range is 100 km	A communication network distinguished from a Local Area Network. Range is Beyond 100 km
Media Used	Uses guided media	Uses guided as well as unguided media	Uses unguided media
Speed	A high speed i.e. 100kbps to 100mbps	Optimized for a large geographical area than LAN.	Long distance communications, which may or may not be provided by public packet network.
Cost	cheaper	costly	expensive
Equipment needed	NIC, switch and hub	Modem and router	Microwave, radio, infra-red laser
Protocols	Attached Resource computer network (ARCNET), Token ring	Frame relay and asynchronous transfer mode(ATM)	ATM, FDDI, SMDS

IEEE Standards

802.1	LAN/MAN bridging, remote MAC bridging
802.2	Logical Link control standards for connectivity
802.3	Ethernet standards for CSMA/CD
802.4	Standards for token passing bus access
802.5	Standards for token rings & LAN/MAN comm.
802.6	Standards for information exchange
802.7	Broadband LAN cabling
802.8	Fiber Optic connection
802.9	For services like voice and data

Speed	Common Name	Informal Name	Formal IEEE Name	Cable and Max. Length
10 Mbps	Ethernet	10BASE-T	802.3	Copper, 100 m
100 Mbps	Fast Ethernet	100BASE-T	802.3u	Copper, 100 m
1000 Mbps	Gig Ethernet	1000BASE-LX	802.3z	Fiber, 5000 m
1000 Mbps	Gig Ethernet	1000BASE-T	802.3ab	Copper, 100 m
10 Gbps	10 Gig Ethernet	10GBASE-T	802.3an	Copper, 100 m

Defining Ethernet LANs: Standard Names

Original IEEE	IEEE Shorthand Name	Informal Name(s)	Speed	Typical Cabling
802.3i	10BASE-T	Ethernet	10 Mbps	UTP
802.3u	100BASE-T	Fast Ethernet (Fast E)	100 Mbps	UTP
802.3z	1000BASE-X	Gigabit Ethernet (Gig E, GbE)	1000 Mbps	Fiber
802.3ab	1000BASE-T	Gigabit Ethernet (Gig E, GbE)	1000 Mbps	UTP
802.3ae	10GBASE-X	10 GbE	10 Gbps	Fiber
802.3an	10GBASE-T	10 GbE	10 Gbps	UTP
802.3ba	40GBASE-X	40GbE (40 GigE)	40 Gbps	Fiber
802.3ba	100GBASE-X	100GbE (100 GigE)	100 Gbps	Fiber

Ethernet Naming Summary

Table 5-4

Tutorials:

- Draw the table for the following and write its properties:
 - Ethernet evolution through four generations.
 - Categories of standard Ethernet w.r.t implementation.
 - Categories of Fast Ethernet w.r.t implementation.
 - Categories of Gigabit Ethernet w.r.t implementation.
- Draw the diagram of 802.3MAC frame and explain each fields in the frame.

Reference :

Chapter 13:

- Forouzan, Behrouz A. Data communications and networking I Behrouz A Forouzan. - 4th ed.