

Course Code – NET15001

The Evolution of Ethernet

This 4-day course enables delegates to construct a complete service in the classroom using a variety of network equipment. The course contains Hands On labs for implementation, troubleshooting and quality of service.

Ethernet is the most widely-installed LAN technology. Specified in a standard, IEEE 802.3, Ethernet was originally developed by Xerox and then developed further by Xerox, DEC, and Intel. The most commonly installed Ethernet systems are 10BASE-T and provide transmission speeds up to 10 Mbps.

Fast Ethernet or 100BASE-T provides transmission speeds up to 100 megabits per second and is typically used for LAN backbone systems, supporting workstations with 10BASE-T cards. Gigabit Ethernet provides an even higher level of backbone support at 1000 megabits per second.

Prerequisites:

None, but exposure to data networks would be an advantage.

Learning Objectives:

At the end of the course, participants will be able to understand:

- The Origins of Ethernet
- Ethernet Media Access Control
- Ethernet Cabling
- Ethernet Framing
- From 10Mbps to 100Mbps
- Designing Ethernet Networks
- Performance Enhancement
- Ethernet Bridging
- Introduction to Ethernet Switching
- Advanced Spanning-Tree and Trunking Features
- Introduction to VLANs
- Gigabit and 10 Gigabit Ethernet

Who Should Attend?

Engineers, Technicians and Technical Managers who are working in, or are responsible for Ethernet-based networks.

Course Outline

- In the beginning – Arpanet
- RFC – Request for Comments
- Internetworking Development 1960s & 1970s
- Internetworking Development 1980s
- Internetworking Development 1990s
- Internetworking Development 2000s

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- OSI – 7 Layer Reference Model
- DOD Reference – 4 Layer Model (TCP/IP)
- Aloha Radio System
- Original Ethernet
- 10 Mbps Standard
- StarLan
- IEEE 802.3

- CSMA/CD
- Collisions
- Ethernet MAC
- Ethernet Errors
- Ethernet Cabling
- Ethernet Standards (10base2, 10Base5)
- Twisted Pair Cable
- UTP Wiring
- Fibre Optic Cable
- Wireless – IEEE 802.11
- Wireless Modulation and Channels
- WLAN Topologies (IBSS, BSS, ESS)
- CSMA/CA

- Ethernet Framing (Ethernet II and IEEE 802.3)
- Locally Administered MAC Address
- Logical Link Control

- From 10Mbps to 100Mbps
- 100BaseX
- MII – Media Independent Interface
- 4B5B Encoding (Brief)
- 100BaseTX Physical Layer
- 100BaseT4 Physical Layer
- 100BaseFX Physical Layer
- SC Connectors
- ST Connectors
- MIC Connectors
- Fast Ethernet Development
- EIA/TIA Wiring

- 3 Layer Hierarchical Model
- SME Hierarchical Model
- Switched Hierarchical Model
- Router Hierarchical Model

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- Mesh Topologies
 - Types of LAN
 - Ethernet Diameter
 - Repeaters
 - Hubs
 - Autonegotiation
-
- Techniques for improving LAN Performance
 - Category 5 Cable
 - Category 5e Cable
 - Category 6 Cable
 - 1000BaseX
 - Multiple Rate Ethernet Networks
 - Link Aggregation
 - Network Management
 - SNMP
-
- Ethernet Bridges
 - Address Learning
 - Local and Remote Bridges
 - Flow Control in Bridges
-
- Switched Networks
 - Address Learning
 - Broadcast and Multicast Frames
 - Redundancy
 - Spanning Tree
 - Switching Modes
 - Duplex and Speed
-
- Cisco Switch Configuration
 - Working with MAC Address Tables
 - Port Security
 - Fast EtherChannel
 - Rapid Spanning Tree
-
- VLANs
 - VLAN Membership
 - VLAN Standards
 - VLAN Tagging
 - VTP
 - VLAN Configuration

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- Gigabit Ethernet Overview
- IEEE 802.3z
- Gigabit Ethernet Physical Layer
- 1000BaseT
- 10 Gigabit Ethernet
- 10 Gigabit Ethernet in the Metro Network