

Course ID
ETHER1
Course Duration
2 days

Course Title
Ethernet OAM (Operations, Administration and Management/Maintenance)

Aimed At Engineers and others who require an overview of Ethernet OA&M. While the second day of this course will be accessible to technical personnel only, less technical personnel such as sales/marketing staff may benefit from the subject overview presented in the first half day.

Group Size 5-25

Prerequisites Basic knowledge of the network layers and protocol operations.

Course in a Nutshell This course, one of a series of our courses related to Carrier Ethernet, will cover the basics of OA&M for Ethernet service providers as well as the impact of lower layer protocol issues on the Quality of Service (QoS) of the Ethernet service and higher layer protocols. Upon course conclusion, you will have a fundamental understanding of the IEEE 802.3ah and 802.1ag standards, the ITU-T Y.1731 standards and related protocols and standards.

Customize It! We can tailor this course to suit the needs of audiences such as engineers, sales engineers, and marketing/sales. Also, a three-day version of this course, focusing on the larger subject of Wide Area and Carrier Ethernet design, troubleshooting and problem resolution, is available. This 3-day course takes a deeper dive into frame structures, design logic of the protocol and includes hands-on lab exercises designed to develop a bit level understanding of the frame structure and protocol operations. The course can also be extended to include an in-depth discussion of the QoS issues.

Course Outline

- Ethernet Directions with Bob Metcalfe (video 9 minutes)
 - History
 - Current Status
 - Future Directions
- Ethernet in the First Mile (EFM)
 - EFM over Copper (EFMC)
 - EFM over Fiber (EFMF)
 - EFM over Passive Optical Networks (EPON)
- OA&M
 - Ethernet OAM Stack
 - Link Performance Monitoring
 - Fault Detection and Fault Signaling

- Loopback Testing
- Operations (O)
 - Broad Definition and Brief History
 - Ethernet Specific Definition
- Administration (A)
 - Broad Definition and Brief History
 - Ethernet Specific Definition
- Management/Maintenance (M)
 - Broad Definition and Brief History
 - Ethernet Specific Definition
- High Level View
 - Metro Ethernet Forum: MEF 4, MEF 12, MEF 10.1, MEF 17, MEF 16 (E-LMI)
 - IEEE: 802.3ah, 802.1ag Connectivity Fault Management
 - ITU: Y.1731
 - IETF: SNMP
- Architecture
 - Customer Equipment/Edge (CE): Routers, Switches, NIDs
 - Access
 - Provider Equipment/Edge (PE)
- Putting the Pieces Together
 - Customer View
 - Service Provider View
- 802.3 ah
 - LAN Ethernet vs MAN/WAN Ethernet
 - VLANs
 - Tags
 - Q-in-Q
 - Priorities and QoS
 - EFM Media and Transports
 - Metallic
 - Optical
 - EFM Protocols and Exchanges
- 802.1ag Connectivity Fault Management
 - Conformance
 - Architectural Concepts and Terms
 - Principles of Bridge Operation
 - Bridge Management
 - Support of the MAC Service by Provider Bridged Networks
 - Connectivity Fault Management
 - Management Protocol
 - Connectivity Fault Management operation
 - Connectivity Fault Management Entity operation

- Connectivity Fault Management protocols
- Encoding of CFM Protocol Data Units
- Connectivity Fault Management in systems
- Y.1731
 - Overview
 - Comparison with 802.1ag
 - Similarities
 - Differences
- QoS, QoE
 - Definitions
 - Service Level Agreements
 - Impact of Lower Layers on
 - Impact on Higher Layers
- Course Wrap-up: Recap and Discussion

How You Will Learn

- A highly qualified engineer/instructor will present this course in an interactive lecture format.
- Along with the lecture, we employ discussion, group activities, and case studies to help you understand the key points.
- If you already know something about the subject, we will build on that foundation. We'll compare and contrast what's already known to you with what's new, making the new material easier to learn.
- If your background is less technical, we will use appropriate examples and analogies to convey the complex subject matter in terms that make sense.
- You will receive a printed Participant Handbook which will help you remember and retain what you learned in class and use it on the job.

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