

MEF Carrier Ethernet 2.0 Certification

A 5 day training course



Description

The course progresses from a overview of the Carrier Ethernet service and how it works onto looking at the concepts in depth. Service attributes and management follow with the course finishing with studies of practical Carrier Ethernet.



Key outcomes

By the end of the course delegates will be able to:

- ✓ Discuss and understand key Carrier Ethernet Concepts.
- ✓ Understand tasks related to designing, deploying and maintaining a Carrier Ethernet network.
- ✓ Offer effective solutions to implementing a Carrier Ethernet enterprise network given available customer resources and requirements.
- ✓ Carry out informed discussions using industry Carrier Ethernet 'vocabulary'.



Training approach

This structured course uses Instructor Led Training to provide the best possible learning experience. Small class sizes ensure students benefit from our engaging and interactive style of teaching with delegates encouraged to ask questions throughout the course. Quizzes follow each major section allowing checking of learning.



Details

Who will benefit?

Anyone working with Carrier Ethernet.

Prerequisites

The course attendees need to be conversant with data networks, as well as Ethernet and IP technologies.

Duration: 5 days

Customer rating: ★★★★★

Generic training



Generic training compliments product specific courses covering the complete picture of all relevant devices including the protocols "on the wire".

"Friendly environment with expert teaching that teaches the why before the how."
G.C. Fasthosts

Small class sizes



We limit our maximum class size to 8 delegates; often we have less than this. This ensures optimal interactivity between delegates and instructor.

"Excellent course. The small class size was a great benefit..."
M.B. IBM

Hands On training



The majority of our courses use hands on sessions to reinforce the theory.

"Not many courses have practice added to it. Normally just the theoretical stuff is covered."
J.W. Vodafone

Our courseware



We write our own courses; courseware does not just consist of slides and our slides are diagrams not bullet point text.

"Comprehensive materials that made the course easy to follow and will be used as a reference point."
V.B. Rockwell Collins

Customise your course



Please contact us if you would like a course to be customised to meet your specific requirements. Have the course your way.

"I was very impressed by the combination of practical and theory. Very informative. Friendly approachable environment, lots of hands on."
S.R. Qinetiq

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Course content

Section One: Introduction to Carrier Ethernet

Introduction to Carrier Ethernet: What is Carrier Ethernet? Evolution, advantages, The MEF, MEF specifications; UNI, EVC, OVC, EPL/EVPL, EP-LAN/EVP-LAN, EP-Tree/EVP-Tree, etc, overview.

How Carrier Ethernet Works: Service Frame Handling. Carrier Ethernet at Customer Premises, metro and core. Carrier Ethernet Workings, UNI attributes, Service Attributes (EVC and EVC per UNI attributes), Bandwidth Profiles, service multiplexing, L2 protocol processing; Carrier Ethernet equipment, CPE, aggregation and homing nodes, core equipment; management systems.

The Setting Up of a Carrier Ethernet Service: Step 1: Choose service type, EPL/EVPL, EP-LAN/EVP-LAN, EP-Tree/EVP-Tree, EVLine...; Step 2: CPE tasks, UNI-C tasks (UNI attributes, service attributes (EVC and EVC per UNI) and bandwidth profiles), UNI-N tasks (L2 protocol handling); Step 3: Non-CPE tasks, Access, metro and core connections set up.

Section Two: Carrier Ethernet Concepts in depth

Carrier Ethernet Definitions in Depth: UNI, UNI I & II, UNI-N and UNI-C, etc.; NNI/ENNI; EVC; OVC, OVC type (P2P, M2M, Rooted MP), OVC end point (root, leaf, trunk), OVC end point map, OVC end point bundling; Service types in detail, EPL/EVPL, EP-LAN/EVP-LAN, EP-Tree/EVP-Tree, EVLine, Access EPL, Access EVPL .

Carrier Ethernet Service Frame Handling: Unicast, multicast and broadcast frame delivery, Tagged, untagged and priority; Tagging, C and S-Tags, 802.3, 802.1d, 802.1q, 802.1ad, 802.1ah evolution, VLAN ID translation/preservation. CoS preservation.

Other Key Carrier Ethernet Concepts: MTU, MTU at UNI, MTU at ENNI; Physical Layer Attributes, FE, GbE and 10GbE, Service Multiplexing and Bundling Concept and detail, rules and implications; Hairpin Switching

Managing Bandwidth in a Carrier Ethernet Network: Token Bucket Algorithm, EIR, CIR, CBS, EBS, Coupling Flag; Frame Colors, recoloring, Color Awareness attribute, Color Forwarding; Bandwidth Profiles, rules and concepts. MEF CoS identifiers, DEI bit (in S-Tag), PCP bit (in C-Tag or S-Tag), or DSCP (in IP header), Multi-flow bandwidth concepts; CoS Label/Color Identification.

Section Three: Carrier Ethernet Service Attributes

Overview: Carrier Ethernet 2.0; Blueprint C

Service Attributes: Per UNI, Physical interfaces, Frame format, Ingress/egress Bandwidth Profiles, CE-VLAN ID/EVC Map, UNI protection. EVC per UNI, Ingress/egress Bandwidth Profiles, etc.; Per EVC, CE-VLAN ID Preservation, CoS ID Preservation, Relationship between SLA and SLP, Class of Service, etc. OVC, ENNI, OVC End Point per UNI and OVC End Point per ENNI, Ingress/egress bandwidth profiles, etc.

Section Four: Managing Carrier Ethernet Networks

Overview: MEF Service Lifecycle.

Carrier Ethernet maintenance: Port, Link & NE failure, Service Protection Technologies, Fault Identification and Recovery, LAG, Active/Standby EVC, Single EVC with transport protection, G.8031, G.8032, MPLS FRR.

SOAMs: Connectivity fault management, connectivity Monitoring, Loopback, Linktrace; Performance Management, Frame Delay, Inter Frame Delay Variation, Availability, Frame Loss Ratio, Resiliency, HLI, DMM, DMR, SLM, SLR; Key Concepts, Single vs dual ended, ordered UNI pair calculations.

LOAMs: Link discovery, link monitoring, etc.

Terminology and Concepts: MEG levels, MIPs.

Section Five: Practical Carrier Ethernet

Carrier Ethernet Transport Technologies: Layer 1: SDH. Layer 2: Bridging, provider bridging, PBB, PBB-TE. Layer 2.5: MPLS VPWS, MPLS VPLS, MPLS-TP.

Carrier Ethernet Access Technologies: fiber, SDH, active fiber, PON, GPON, 10G PON, OTN, WDM; copper, PDH, G-SDSL, 10Pass-TS, HFC; packet radio.

Optimising mobile backhaul with Carrier Ethernet

Key challenges solutions: Market pressure, LTE evolution, elements and architecture (RAN BS, NC, GWIF.), synchronization, bandwidth management.

Circuit Emulation over Ethernet: Purpose, needs and applications. Synchronization: Phased, ToD, External Reference source, SynchE, NTP, IEEE-1588 v2/ PTP, ACR; MEF Service Definitions for emulated circuits.

Applying what you know: Practical examples and scenarios, Carrier Ethernet solutions; Practice Scenarios, Given a scenario, determine appropriate Ethernet services

