Ethernet, TCP/IP & MPLS in Modern Networks

COURSE DESCRIPTION:

This course will explain how Ethernet became carrier grade and now supercedes SDH as the transport technology of choice. We will explain the framing, V-LAN's & prioritisation, traffic profiles, and how to test the UNI and then the EVC using standards based tests. We then explore the Internet Protocol, v6 addressing, quality of service levels, security & VPN's and the emergence of MPLS as a transport technology. Learn how these technologies are shaping modern networks into "All Ethernet & IP" Infrastructures.

WHO SHOULD ATTEND:

Technical managers, network design engineers, software engineers, telecommunications & ICT installation, commissioning and maintenance engineers & technicians plus anyone needing a detailed technical understanding of today's Layer 2/3 networks and how to test them to ensure SLA conformance.

SOME COURSE BENEFITS:

- Understand how these technologies interconnect to form "next generation" architectures.
- Know the technical benefits and limitations of the technologies
- Plan, Design and Test these networks effectively
- Ensure SLA's are being met

COURSE OBJECTIVES:

- Understand the technologies and how the protocols interact
- Understand the technical interactions of "data friendly" Ethernet, TCP/IP and MPLS
- Be able to properly test both Ethernet Services and IP Application channels.

FORMAT:

2 days, interactive classroom based, with discussions, quizzes, and group exercises.

Maximum attendees: 12 per course

CONTENT:

Day 1 –Ethernet and CarrierE & Sync

- Introduction
- OSI 7 layer model Layers 1-3
- Layer 1 – Fibre Optic connectivity, essentials, handling & safety.
- Layer 2 – LAN's & Ethernet
- Switched Ethernet
- Traffic Priority
- CoS & QoS
- V-LAN's – Port based, V-LAN tagging, (802.1Q) headers
- Carrier Ethernet
    - Networks
    - Services
    - Shaping, Queuing & Policing
    - Connection Oriented Ethernet (COE) – Linear & Ring
    - Ethernet Services (E-Line & E-LAN)
    - Ethernet Linear Protection Switching
    - Ethernet Ring Protection Switching
    - Applications
    - V-LAN's (QinQ)
- Ethernet Testing
    - RFC2544 (Testing the UNI)
    - Y.1564 (Testing the EVC
- Ethernet Synchronisation
    - IEEE1588v2 & SyncE overview

Day 2 – IPv4, IPv6, Routing, Pseudo Wires & MPLS

- Layer 3
- TCP/IP
    - Addressing
    - Packet Structure
    - TOS & DiffServ
- IP v4 Addressing
    - Public & Private
    - Static & Dynamic
    - Address Classes
- IPv4 Subnetting
- IP Version6
    - Addressing
    - Security
    - Header format
    - Compatibility with IPV4

- ICMP & other related protocols
- Routing Protocols Overview (OSPF, IS-IS, BGP)
- Layer 4
    - TCP
    - UDP
- Routing vs. Switching
- Multi Protocol Label Switching (MPLS)
    - Label switch router
    - Label switched path
    - Push, Swap, Pop
    - MPLS Label
    - Label stack
- Label Distribution Protocol
- Layer 2 MPLS Services
    - Virtual Private LAN Segment (VPLS – Multipoint to Multipoint)
    - Virtual Private Wire Service (VPWS-Point to Point)
- PWE3, CESoPSN (Pseudo wires) explained
- MPLS-TP (Transport Profile)
- The Converged “All-IP” Network – what the future holds

Assessment (Optional for in-house courses)

- Instructor led interactive quizzes
- Daily “show what you know” group presentations
- The abbreviation game (explain TLA’s)