

Course Description

Carriers have offered connectivity services based on traditional TDM, Frame Relay and ATM for many years. However, the cost of operating separate networks to provide each of these services, as well as the need to sell higher bandwidth services than can be offered with these traditional networks, is forcing them to move to newer, more cost effective technologies, namely Ethernet, IP and MPLS.

Ethernet and IP have allowed networks to deliver high bandwidth and new services with greater flexibility, while MPLS has allowed these new services to become more "carrier-class", offering the connection-oriented behavior, quality of service, and reliability normally associated with traditional technologies. Recently, there has been increased interest in Layer 2 MPLS based services, which support LAN and legacy traffic, and are lower cost and simpler to manage.

Virtual Private LAN Service (VPLS) is a fast growing Layer 2 MPLS based service that offers multi-point connectivity making enterprise LANs in multiple sites appear as if they are on the same LAN.

This course provides an in-depth overview of VPLS, how it works, how it can be deployed within a carrier network and what benefits to carrier and user that it provides.

Students Will Learn

- **Describe How VPLS Functions And Its Major Benefits**
- **Identify How It Can Be Deployed Using Ethernet And MPLS**
- **Appreciate How VPLS Leverages Label Distribution Protocol To Signal VPLS Services**
- **Analyse The Different PWE3 Functions Used To Construct VPLS Services**
- **Compare Its Operation To Alternatives**
- **Examine Example Deployments For Delivery Of Next Generation Services**
- **And Much More**

Prerequisites

Students should have a good understanding of IP and WAN principles. They should also understand the basics of Next Generation Networks.

Course Outline

Module I: Next Generation Carrier Network Requirements

What services carriers need from their infrastructure

Services to be delivered

Quality and Protection Demands

Access and Core divisions

User interface requirements

Private networking needs: at layer 2 and/or Layer 3

Security and isolation

Service models

Management

Automatic capability discovery

Module II: Customer Private Service Needs

Virtual Private Network Services

Topology needs

Point to point services using Pseudo Wires

Emulated LAN using multipoint services

VPLS Model for carrier services

Control Plane vs Data plane

Requirements for requested QoS and Protection

Module III: MPLS Primer

Label switching concepts

Normal hop-by-hop routing

Creation of Labels

Distribution of Labels

Function of Label switching
Forward Equivalence Class (FEC)
Label Edge Switches
Label Distribution Protocol
Explicit routed Label Switched Paths
Constraint routed Label Switched Paths
Traffic Engineering
Fast Rerouting

Module IV: Gigabit Ethernet Primer

Ethernet Speed Evolution to 10Gbit/s
Ethernet switching
Bridging functions
Learning Bridges
Problems with MAC address Tables
Mac-in-Mac solutions
Multicasting over Ethernet
GARP and GMRP
IEEE802.1Q VLANs
GVRP
Overcoming the VLAN limit
Q-in-Q solutions
IEEE802.1P QoS
Aggregation and Protection
VPLS Solutions
Service Signalling concepts
Virtual Private Wire Services
MAC address Learning

Hierarchical VPLS
Deployment over LDP
Generalized PwID FEC
Learning Actions
MAC address withdrawal
Scalability
Deployment over BGP
Control Plane and Auto Discovery
Multi-AS VPNs
Multicasting over VPLS
IGMP
IGMP snooping
VPLS in Triple-Play Solutions

Module V: Deploying VPLS in existing Networks

Case Studies
Scaling Issues
Service Level Agreements
MTU issues
Future of VPLS
Operations, Administration and Management
Ethernet Service Definitions

Delivery Method

Instructor led with numerous Hands-On labs and exercises.

Equipment Requirements

(This apply's to our hands-on courses only)

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

Course Length

2 Days