

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