EDUCATION SERVICES

CTR8780 ADVANCED MPLS FEATURES

TRN-CTR8780-MPLS A/B/C/D

Course Specifics

Duration:	5 days
Class capacity:	10 students
Materials provided:	Student Handbook (e-Book)

Course Description

The Aviat Networks IP/LAYER 3 and MPLS features course is recommended for design, field, and operations personnel, who design, deploy, configure, and operate IP networking equipment involving advanced routing protocols in Layer 3 and MPLS. This Five (5) day instructor-led course is focused on the configuration of IP/Layer 3 features on the CTR 8780 platform. Topics include the configuration and use of OSPF, ISIS and BGP. This is followed by an in-depth overview of MPLS technology, including concepts, services, architecture, configuration, design issues, operations, troubleshooting, LDP, L2-VPN, L3-VPN, and QoS.

The course content is enriched with hands-on labs (nearly 50% of the course duration) and case studies that offer students scenarios they will face in real deployments in their networks. All labs are conducted on the Aviat CTR8780 microwave router platform equipment enriched with the latest MPLS Advanced software.

AVIAT expert trainers conduct courses in a mentoring environment backed by their deep technology expertise and experience in the implementation of microwave wireless and IP/MPLS networks.

Target Audience

This course is intended for engineers requiring an advanced knowledge of IP routing, MPLS, and Traffic Engineering concepts within an IP/MPLS network.

Prerequisites

- Participants must have a high knowledge of routing protocol.
- Each student must have a laptop with administrative rights to install and run IP networking simulation software.

Objectives

Upon completing this course, participants will be able to:

- Understand the MPLS concepts, terminology, functions, and applications.
- Develop a strong understanding of implementing MPLS-based applications using L2VPNs and L3VPNs.

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Course Outline

Routing protocols

- Understand routing protocols
- Autonomous System (AS)
- Intra-AS
  - OSPF / IS-IS
- Inter-AS
  - BGP

CTR 8780 IP Setup

- System Overview
- CLI and Web Browser GUI
- Management Port Configuration
- IP Interface Configuration
- Static Routes
- Basic Setup Lab

OSPF configuration (Optional according to customer need)

- Understand the OSPF routing protocol:
- Single-area OSPF
- Multi-area OSPF
- Multi-area OSPF with stub network
- OSPF configuration Labs

IS-IS: Intermediate System to Intermediate System (Optional according to customer need)

- IS-IS routing protocol
- IS-IS concept – levels, transport, areas
- NSAP addressing
- IS-IS packet exchange
- LSP contents
- IS-IS metrics
- IS-IS configuration

BGP concept and configuration

- Understand BGP routing protocols
- Internal and External BGP
- BGP peers
- BGP attributes
- BGP route selection
- BGP states
- BGP configuration Labs

MPLS Concepts

- Objectives of MPLS
- Applications of MPLS
- MPLS Architecture
- Variants of MPLS: MPLS-TE; GMPLS; MPLS-TP
- Ingress & Egress Label Edge Routers
- Forward Equivalence Class
- Functions of Label Switched Routers and Requirements of LSPs
- MPLS Labels and Label Stack
- Forwarding Labeled Packets

LDP: Label Distribution Protocol

- LDP Protocol definition and advantages
- Static LSP versus Dynamic LSP
- LDP traffic and flow control
- IP routing process versus MPLS LDP process
- LDP messaging
- Building and LDP routing tables set up
- Label distribution; Downstream unsolicited mode
- Label distribution ; On-demand mode
- Label retention mode
- LDP convergence
- Penultimate Hop Popping
- Targeted label distribution mode

MPLS-Based Applications - L2 VPNs

- L2 VPN Overview, VPWS and VPLS
- VPWS Point-to-Point Solutions
- VPWS Frame Forwarding
- Pseudowire Architecture
- L2TPV3
- ATOM
- Pseudowire Discovery and Signaling
- Label Mapping Message TLVs
- The Control Word
- MPLS QoS
- Ethernet over MPLS (EoMPLS)
- EoMPLS Port mode and VLAN Mode
- MPLS VPLS (L2 Multipoint-to-Multipoint service)
- VPLS Architecture
- VPLS Configuration

MPLS-Based Applications - IP VPNs (L3 VPNs)

- CE-PE Interfaces
- How packets are associated with VRFs
- Label stacking aiding VPN support
- Use of MP-BGP within L3 VPNs
- Forwarding packets across the MPLS network
- Route Distinguisher
- Route Target: Import and Export targets
- Route distribution in MPLS L3 VPN
- Route and Label advertisement
- Independence from VPN addressing
- CE-PE Routing Protocols

MPLS Virtual Private Network Technology

- Introducing Virtual Private Networks
- Introducing MPLS VPN Architecture
- Introducing the MPLS VPN Routing Model
- Forwarding MPLS VPN Packets

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Required Equipment for Training Sessions at Customer Sites

RADIO	Not Applicable
OTHER EQUIPMENT	Not Applicable
CLASSROOM SET UP	Sufficient size to handle all participants, desks, chairs, and classroom equipment. The room must have 110 AC (220) AC power and air conditioning to operate all necessary equipment, including students' laptops.

Classroom Equipment

Multimedia projector and screen
Whiteboard and markers

Desk and Chairs

Desks or workstations with enough room for each student's laptop and training materials

Internet Access

Strong WiFi connection

Pricing & Scheduling

Please contact your Aviat local sales team for a quote or email aviatcareeducate@aviatnet.com and request pricing for the following items:

TRN-CTR8780-MPLS-A	CTR 8780: Configuration and Maintenance, MPLS- ILT, 5 Days, Aviat Training Center - Open Enrollment -per Student
TRN-CTR8780-MPLS-B	CTR 8780: Configuration and Maintenance, MPLS- ILT, 5 Days, Aviat Training Center- 10 Students Max
TRN-CTR8780-MPLS-C	CTR 8780: Configuration and Maintenance, MPLS- ILT, 5 Days, Customer Location- 10 Students Max
TRN-CTR8780-MPLS-D	CTR 8780: Configuration and Maintenance, MPLS- ILT, 5 Days, Customer Location-with Equipment- only for US- 10 Students Max