Training Proposal for Mobile Backhaul Solution Training Project

HUAWEI

HUAWEI Learning Service

2015

CONTENTS

1.1 Mobile Backhaul Solution TrainingTraining Path 3
1.1.1 Mobile Backhaul Solution Training ..... 错误！未定义书签。
1.2 Overview 3
1.3 Required Training Programs 25
1.3.1 IMSxxx Training Path 80
1.3.2 IMSBackground Introduction ..... 错误！未定义书签。

1 Training Solution

1.1 Background Introduction

1.2 Overview

1.3 Mobile Backhaul Solution Training Training Path

1.4 Required Training Programs

Mobile Backhaul Solution Training For this project, the whole training solution is designed into the following programs. List of Training Program(s) for Mobile Backhaul Solution Training Project：

Training Program	Program Level	Duration (workdays)	Training Location	Class Size
IP Network OSS				
iManager U2000 IP Backhaul Network Deployment Training	II	1		6 ~ 12
iManager U2000 IP Backhaul Network Performance Training	II	1		6 ~ 12
iManager U2000 IP Backhaul Network Service Management Training	III	5		6 ~ 12
iManager U2000 IP Backhaul Network Assurance Training	III	3		6 ~ 12
Mobile Backhaul Evolution and Trends Training				
ATN＆CX600 Mobile Backhaul Solution Training	II	0.5		6 ~ 12
LTE Mobile Backhaul Solution Introduction Training	II	0.5		6 ~ 12
LTE Small Cell Backhaul Solution Introduction Training	II	0.5		6 ~ 12
IP RAN SDN Solution Overview	III	0.5		6 ~ 12
PTN-Based Mobile Backhaul Evolution Solution Training	II	0.5		6 ~ 12
Mobile Backhaul Planning and Design Training				
ATN＆CX600 Mobile Backhaul Network Planning and Designing Training	IV	5		6 ~ 12
PTN Network Planning and Design Training	IV	3		6 ~ 12
PTN 6900 Network Planning and Design Training	IV	5		6 ~ 12

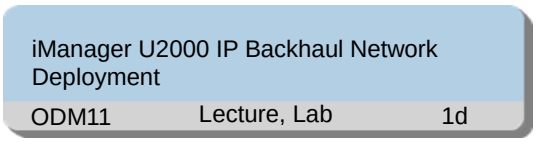
Mobile Backhaul Operation and Maintenance Training				
ATN&CX600 Mobile Backhaul Operation & Maintenance Training	II	10		6 ~ 12
ATN&CX600 Mobile Backhaul Operation & Maintenance Training (Advanced)	III	5		6 ~ 12
ATN Products 1st Line Maintenance Training	I	1		6 ~ 12
ATN Products Installation and Commissioning Training	I	2		6 ~ 12
LTE Mobile Backhaul Security Feature Training	III	3		6 ~ 12
LTE Mobile Backhaul Clock Synchronization(1588v2) Feature Training	III	2		6 ~ 24
MBB IDEAL(Seamless MPLS) Solution Training	III	5		6 ~ 12
ATN Series Products Fixed Network Solution Training	II	5		6 ~ 12
IP Backhaul Network Advanced Troubleshooting Training	III	5		6 ~ 12
PTN Products Installation and Commissioning Training	I	2		6 ~ 12
PTN Products 1st Line Maintenance Training	I	2		6 ~ 12
PTN Products 2nd Line Maintenance Training	II	10		6 ~ 12
PTN Products 3rd Line Maintenance Training	III	5		6 ~ 12
PTN 6900 Products Installation and Commissioning Training	I	1		6 ~ 12
PTN 6900 Products 1st Line Maintenance Training	I	1		6 ~ 12
PTN 6900 Products 2nd Line Maintenance Training	II	10		6 ~ 12
PTN 6900 Products 3rd Line Maintenance Training	III	5		6 ~ 12
PTN 7900 Products Installation and Commissioning Training	I	1		6 ~ 12
PTN 7900 Products 1st Line Maintenance Training	I	1		6 ~ 12
PTN 7900 Products 2nd Line Maintenance Training	II	10		6 ~ 12
PTN 7900 Products 3rd Line Maintenance Training	III	5		6 ~ 12

Level Description: Ⅰ: Basic Course Ⅱ: Intermediate Course Ⅲ: Advanced Course Ⅳ: Expert Course

1.5 IP Network OSS

1.5.1 iManager U2000 IP Backhaul Network Deployment Training

Training Path



Target Audience

Mobile backhaul network planning and designing engineer

Prerequisites

- Having basic knowledge of Datacom

Objectives

On completion of this program, the participants will be able to:

- Describe basic concepts of plug and play
- Describe the steps of the plug and play in the IP backhaul network
- Use U2000 to complete the plug and play

Training Content

ODM11 iManager U2000 IP Backhaul Network Deployment

- iManager U2000 IP Backhaul Network Server Deployment Solution
  - U2000 server deploying mode
  - DCN type
  - How to select U2000 server
- iManager U2000 IP Backhaul Network Plug and Play Introduction
  - How to implement plug and play
  - How to plan plug and play
  - Plug and play configuration by U2000
- iManager U2000 IP Backhaul Network PnP Practice Guide
  - Plug and play process
  - Using U2000 to Practice plug and play

Duration

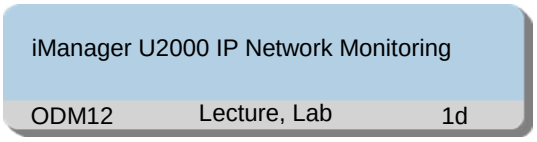
1 working day

Class Size

Min 6, Max 12

1.5.2 iManager U2000 IP Backhaul Network Performance Training

Training Path



Target Audience

Mobile backhaul network operation and maintenance engineer

Prerequisites

- Having basic knowledge of Datacom
- Familiar with operation of iManager U2000

Objectives

On completion of this program, the participants will be able to:

- Describe The purpose of the IP network performance monitoring
- Describe the method of IP network performance monitoring
- Use U2000 to complete the IP network performance monitoring

Training Content

ODM12 iManager U2000 IP Network Monitoring

- iManager U2000 IP Backhaul Network Monitoring and Maintenance Solution
  - The purpose of monitor IP network
  - Operations of U2000 report manager
  - Using U2000 to monitor IP network
- iManager U2000 IP Backhaul Network Monitoring and Maintenance Practice Guide
  - Daily monitoring and maintenance procedure
  - Using U2000 to maintain IP network

Duration

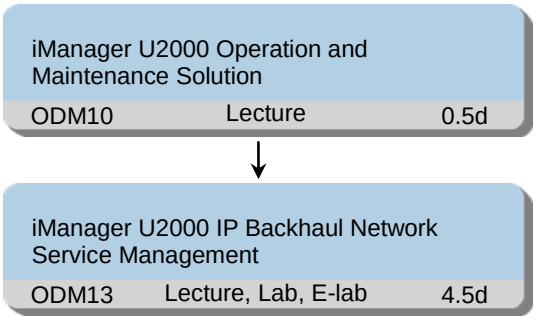
1 working day

Class Size

Min 6, Max 12

1.5.3 iManager U2000 IP Backhaul Network Service Management Training

Training Path



Target Audience

Mobile backhaul network operation and maintenance engineer

Prerequisites

- Familiar with the working principle of IGP routing protocol
- Familiar with the working principle of MPLS VPN including L3VPN、VPLS and PWE3

Objectives

On completion of this program, the participants will be able to:

- Describe the operation and maintenance challenges in the IP backhaul network
- Describe Huawei iManager U2000 end-to-end network management solutions
- Describe the value of U2000 in the IP backhaul network cell deployment
- Describe the value of U2000 in the IP backhaul network service deployment
- Describe the value of U2000 in the IP backhaul network service maintenance
- Describe the value of U2000 in the IP backhaul network fault troubleshooting
- Describe the common service of the IP backhaul network
- Describe L3VPN service implementation in the IP backhaul network
- Use U2000 to complete the L3VPN service management and configuration
- Describe PWE3 service implementation in the IP backhaul network
- Use U2000 to complete the PWE3 service management and configuration
- Describe VPLS service implementation in the IP backhaul network
- Use U2000 to complete the VPLS service management and configuration
- Describe HVPN service implementation in the IP backhaul network
- Use U2000 to complete the HVPN service management and configuration
- Describe Mixed VPN service implementation in the IP backhaul network
- Use U2000 to complete the Mixed VPN service management and configuration

Training Content

ODM10 iManager U2000 Operation and Maintenance Solution

- iManager U2000 Operation and Maintenance Solution
  - The challenge of IP backhaul network maintenance

- iManager U2000 end to end service management
- Using U2000 to implement IP backhaul network plug and play
- Visualized service deployment
- Minute-level Automatic Fault Locating

- iManager U2000 System Introduction(IP Backhaul)
  - The architecture and main features of U2000
  - The directory structure of U2000
  - The main functions of U2000

ODM13 iManager U2000 IP Backhaul Network Service Management

- iManager U2000 IP Backhaul Network L3VPN Service Introduction and Management
  - Introducing L3VPN service basic concept
  - Using U2000 to deploy L3VPN service
- iManager U2000 IP Backhaul Network PWE3 Service Introduction and Management
  - Introducing PWE3 service basic concept
  - Using U2000 to deploy PWE3 service
- iManager U2000 IP Backhaul Network VPLS Service Introduction and Management
  - Introducing VPLS service basic concept
  - Using U2000 to deploy VPLS service
- iManager U2000 IP Backhaul Network HVPN Service Introduction and Management
  - Introducing HVPN service basic concept
  - Using U2000 to deploy HVPN service
- iManager U2000 IP Backhaul Network Mixed VPN Service Introduction and Management
  - Introducing Mixed VPN service basic concept
  - Using U2000 to deploy Mixed VPN service
- iManager U2000 IP Backhaul Network L3VPN Service Practice Guide
  - L3VPN service configuring procedure
  - Using U2000 to configure L3VPN service
- iManager U2000 IP Backhaul Network PWE3 Service Practice Guide
  - PWE3 service configuring procedure
  - Using U2000 to configure PWE3 service
- iManager U2000 IP Backhaul Network VPLS Service Practice Guide
  - VPLS service configuring procedure
  - Using U2000 to configure VPLS service
- iManager U2000 IP Backhaul Network HVPN Service Practice Guide
  - HVPN service configuring procedure
  - using U2000 to configure HVPN service
- iManager U2000 IP Backhaul Network Mixed VPN Service Practice Guide
  - Mixed VPN service configuring procedure
  - Using U2000 to configure Mixed VPN service

Duration

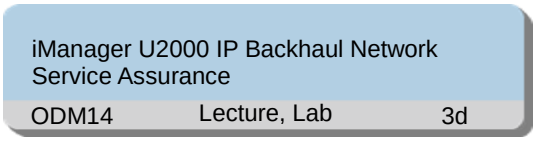
5 working days

Class Size

Min 6, Max 12

1.5.4 iManager U2000 IP Backhaul Network Assurance Training

Training Path



Target Audience

Mobile backhaul network senior operation and maintenance engineer

Prerequisites

- At Least one year U2000 products operation experience
- Familiar with the working principle of MPLS VPN including L3VPN. VPLS and PWE3

Objectives

On completion of this program, the participants will be able to:

- Describe the challenges of IP backhaul network maintenance
- Describe the U2000 alarm management
- Use U2000 to configure alarm management
- Describe the U2000 fault location and processing methods
- Use U2000 troubleshooting in the IP backhaul network

Training Content

ODM14 iManager U2000 IP Backhaul Network Service Assurance

- iManager U2000 Operation and Maintenance Solution
  - The challenge of IP backhaul network maintenance
  - iManager U2000 end to end service management
  - Using U2000 to implement IP backhaul network plug and play
  - Visualized service deployment
  - Minute-level Automatic Fault Locating
- iManager U2000 IP Backhaul Network Alarm Management
  - Alarm locating
  - Alarm experience
  - Alarm masking
  - Alarm correlation analysis
- iManager U2000 IP Backhaul Network Troubleshooting Guide
  - The requirement of IP backhaul network troubleshooting
  - Fault type and dealing process
  - Fault locating ways
  - The troubleshooting case on IP backhaul network
- iManager U2000 IP Backhaul Network Troubleshooting Practice Report
  - Using U2000 to do troubleshooting

Duration

3 working days

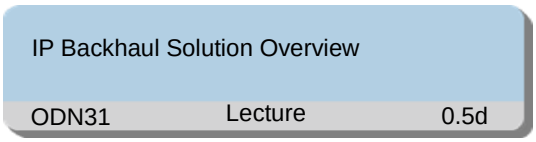
Class Size

Min 6, Max 12

1.6 Mobile Backhaul Evolution and Trends Training

1.6.1 ATN＆CX600 Mobile Backhaul Solution Training

Training Path



Target Audience

Operation manager

Technical manager

Prerequisites

- Having basic knowledge of TCP/IP

Objectives

On completion of this program, the participants will be able to:

- Describe the MBB overall development trend
- Describe the demands and challenges of the MBB backhaul network
- Describe the mobile backhaul solution
- Describe the LTE mobile backhaul solution
- Describe the operation and management of the MBB era

Training Content

ODN31 IP Backhaul Solution Overview

- ATN＆CX600 IP Backhaul Solution Overview (Tech-level)
  - The challenge of MBB
  - All kinds of mobile backhaul implement
  - Service data forwarding in IP backhaul solution(CX+ATN)
  - Service protection in IP backhaul solution(CX+ATN)
  - QOS and clock synchronization in IP backhaul solution(CX+ATN)
- ATN＆CX600 IP Backhaul Network Solution Overview (High-level)
  - Overall development trend of MBB
  - Requirements and challenges of MBB
  - Implementation and deployment of mobile backhaul network solutions
  - Operations and management of MBB

Duration

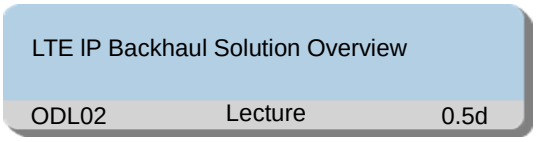
0.5 working day

Class Size

Min 6, Max 12

1.6.2 LTE Mobile Backhaul Solution Introduction Training

Training Path



Target Audience

Operation manager
Technical manager

Prerequisites

- Having basic knowledge of TCP/IP

Objectives

On completion of this program, the participants will be able to:

- Describe the wireless network evolution to LTE network
- Describe LTE network architecture and features
- Describe LTE mobile backhaul network requirements
- Describe LTE mobile backhaul network solutions

Training Content

ODL02 LTE lP Backhaul Solution Overview

- LTE Mobile Backhaul Network Solution Introduction
  - Wireless network standard of the evolution to LTE
  - Requirements and challenges of LTE mobile backhaul network
  - Implementation and deployment of the LTE bearer solutions
  - Operations and management of LTE bearer network

Duration

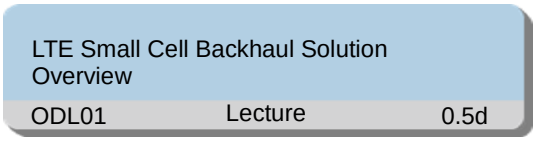
0.5 working day

Class Size

Min 6, Max 12

1.6.3 LTE Small Cell Backhaul Solution Introduction Training

Training Path



Target Audience

Operation manager

Technical manager

Prerequisites

- Having basic knowledge of TCP/IP

Objectives

On completion of this program, the participants will be able to:

- Describe small cell characteristics
- Describe small cell bearing requirements
- Describe small cell backhaul solution implementation
- Describe small cell backhaul products

Training Content

ODL01 LTE Small Cell Backhaul Solution Overview

- LTE Small Cell Backhaul Solution Overview
  - Small cell concepts and application scenarios
  - Small cell backhaul requirement and challenges
  - Small cell backhaul solution implementation
  - Huawei small cell backhaul products introduction

Duration

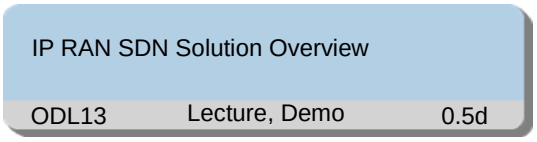
0.5 working day

Class Size

Min 6, Max 12

1.6.4 IP RAN SDN Solution Overview

Training Path



Target Audience

Mobile backhaul network senior operation and maintenance engineer
Manager

Prerequisites

- Familiar with the IP RAN solution

Objectives

On completion of this program, the participants will be able to:

- Describe basic concepts of SDN technology
- Describe the requirement of IP RAN SDN solution
- Describe the implementation of IP RAN SDN solution

Training Content

ODL13 IP RAN SDN Solution Overview

- IP RAN SDN Solution Overview
  - Basic concepts of SDN technology
  - The requirement of IP RAN SDN solution
  - The implementation of IP RAN SDN solution

Duration

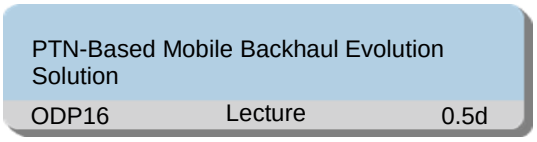
0.5 working day

Class Size

Min 6, Max 12

1.6.5 PTN-Based Mobile Backhaul Evolution Solution Training

Training Path



Target Audience

Technical manager

Prerequisites

- Having an overview of telecommunications

Objectives

On completion of this program, the participants will be able to:

- Describe Huawei PTN-Based mobile backhaul evolution solution

Training Content

ODP16 PTN-Based Mobile Backhaul Evolution Solution

- PTN-Based Mobile Backhaul Evolution Solution Overview
  - Huawei IP RAN Solution
  - Successful Applications of Huawei PTN products
  - PTN-Based Mobile Backhaul Evolution Solution

Duration

0.5 working day

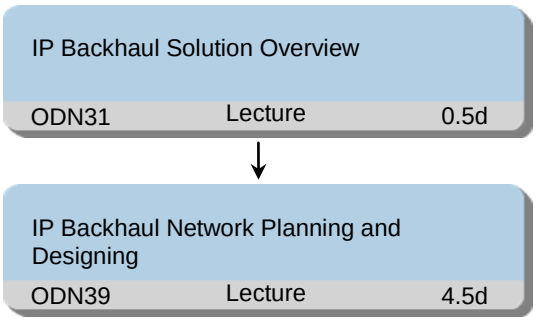
Class Size

Min 6, Max 12

1.7 Mobile Backhaul Planning and Design Training

1.7.1 ATN＆CX600 Mobile Backhaul Network Planning and Designing Training

Training Path



Target Audience

Mobile backhaul network planning and design engineer

Network evaluation and optimization engineer

Prerequisites

- Having basic knowledge of TCP/IP

Objectives

On completion of this program, the participants will be able to:

- Describe the MBB overall development trend
- Describe the demands and challenges of the MBB backhaul network
- Describe the mobile backhaul solution
- Describe the LTE mobile backhaul solution
- Describe the operation and management of the MBB era
- Describe planning and design principles of the IP backhaul network
- Describe planning and design methods of the IP backhaul network

Training Content

ODN31 IP Backhaul Solution Overview

- ATN＆CX600 IP Backhaul Solution Overview (Tech-level)
  - The challenge of MBB
  - All kinds of mobile backhaul implement
  - Service data forwarding in IP backhaul solution(CX+ATN)
  - Service protection in IP backhaul solution(CX+ATN)
  - QOS and clock synchronization in IP backhaul solution(CX+ATN)
- ATN＆CX600 IP Backhaul Network Solution Overview (High-level)
  - Overall development trend of MBB
  - Requirements and challenges of MBB
  - Implementation and deployment of mobile backhaul network solutions

- Operations and management of MBB

ODN39 IP Backhaul Network Planning and Designing

- IP Backhaul Network Planning and Designing Overview (Manual)
  - The basic concepts of HLD and LLD
  - How to planning IP backhaul network
  - IP backhaul network planning steps
- IP Backhaul Network Planning - Requirement Analysis (Manual)
  - Design Rule and Requirements Analysis
- IP Backhaul Network Planning - Topology and Hardware Planning (Manual)
  - Topology and Hardware Planning
- IP Backhaul Network Planning - NE Parameter and IP Address Planning (Manual)
  - NE parameter planning
  - IP address planning
- IP Backhaul Network Planning - NM and DCN Planning (Manual)
  - SNMP basic concept
  - DCN solution in IP backhaul network
  - NM planning
  - DCN planning
- IP Backhaul Network Planning - Routing Protocol Planning (Manual)
  - IP routing protocol basic concept
  - IS-IS routing protocol planning
  - OSPF routing protocol planning
- IP Backhaul Network Planning - Tunnel Planning (Manual)
  - MPLS basic concept
  - MPLS TE basic concept
  - Static tunnel planning
  - dynamic tunnel planning
- IP Backhaul Network Planning - Service Bearer Planning (Manual)
  - VPN concept and classification
  - MPLS L3VPN basic concept
  - MPLS L2VPN basic concept
  - TDM PWE3 services planning
  - ATM PWE3 service planning
  - ETH L3VPN service planning
- IP Backhaul Network Planning - High Availability Planning (Manual)
  - High availability concept
  - High availability of deployment
  - Voice service High availability planning
  - Data service High availability planning
- IP Backhaul Network Planning - QoS Planning (Manual)
  - QoS basic concept
  - Qos planning

- IP Backhaul Network Planning - Clock Synchronization Planning (Manual)
  - Clock concept (Synchronization Ethernet +1588 v2)
  - Deployment of the clock synchronization
  - Synchronization Ethernet planning
  - The IEEE1588v2 planning
- IP Backhaul Network Planning - Case Analysis (Manual)
  - Case Research

Duration

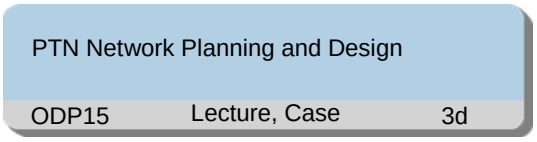
5 working days

Class Size

Min 6, Max 12

1.7.2 PTN Network Planning and Design Training

Training Path



Target Audience

PTN series network planning and design engineer

Prerequisites

- Completion of PTN 2nd Line Maintenance training

Objectives

On completion of this program, the participants will be able to:

- Describe the PTN network planning process
- Collect the network requirements information
- Plan the PTN network layers
- Plan the PTN network services
- Plan the PTN network management and DCN
- Plan the equipment types according to the network requirement
- Plan the PTN equipment boards
- Plan the PTN network protections
- Plan the PTN network synchronization
- Plan the PTN network QoS
- Design the PTN network layers
- Design the PTN network slots allocation
- Design the PTN equipment parameters
- Design the MPLS tunnel parameters
- Design CES /ATM /Ethernet services parameters

Training Content

ODP15 PTN Network Planning and Design

- PTN Network Planning and Design Overview
  - PTN network planning and design overview
- PTN Network Planning -- Products Specifications
  - Products specifications
- PTN Network Planning -- Requirements Collection
  - Requirements collection
- PTN Network Planning -- Topology and Hardware Planning
  - Topology and hardware planning
- PTN Network Planning -- NM and DCN Planning

    - NM and DCN planning
- PTN Network Planning -- NE Parameters Planning
    - NE parameters planning
- PTN Network Planning -- Service Bandwidth Analysis
    - Service bandwidth analysis
- PTN Network Planning -- Service and Tunnel Planning
    - Service and tunnel planning
- PTN Network Planning -- QoS Planning
    - QoS planning
- PTN Network Planning -- Protection Planning
    - Protection planning
- PTN Network Planning -- OAM Planning
    - OAM planning
- PTN Network Planning -- Synchronization Planning
    - Synchronization planning
- PTN Network Planning -- Case Research
    - Case research
- PTN Network Design
    - PTN network design overview

Duration

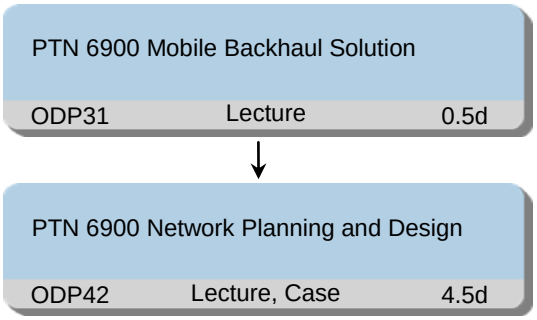
3 working days

Class Size

Min 6, Max 12

1.7.3 PTN 6900 Network Planning and Design Training

Training Path



Target Audience

PTN 6900 series network planning and design engineers

Prerequisites

- Completion of PTN 6900 3nd Line Maintenance Training

Objectives

On completion of this program, the participants will be able to:

- Describe Huawei PTN 6900 Mobile Backhaul Solution
- Describe planning and design principles of the PTN＆PTN 6900 mobile backhaul network
- Describe planning and design methods of the PTN＆PTN 6900 mobile backhaul network

Training Content

ODP31 PTN 6900 Mobile Backhaul Solution

- PTN 6900 Mobile Backhaul Solution Overview
  - The development of mobile backhaul
  - Huawei PTN 6900 backhaul network solution

ODP42 PTN 6900 Network Planning and Design

- PTN＆PTN 6900 Network Planning and Design Overview
  - The basic concepts of HLD and LLD
  - How to plan mobile backhaul network
  - Mobile backhaul network planning steps
- PTN＆PTN 6900 Network Planning-Requirement Analysis
  - Design rule and requirements analysis
- PTN＆PTN 6900 Network Planning-Topo and Hardware Planning
  - Topology and hardware planning
- PTN＆PTN 6900 Network Planning-NE Parameter and IP Planning
  - NE parameter planning
  - IP address planning
- PTN＆PTN 6900 Network Planning-NM and DCN Planning
  - Simple Network Management Protocol (SNMP) concept

- DCN overview
- Network management and DCN planning

- PTN＆PTN 6900 Network Planning-Routing Protocol Planning
  - Routing protocol basics
  - IS-IS basic concepts
  - IS-IS fast convergence
  - Planning the IS-IS routing protocol in mobile backhaul network
- PTN＆PTN 6900 Network Planning-Tunnel Planning
  - MPLS basic concept
  - MPLS TE basic concept
  - Tunnel planning
- PTN＆PTN 6900 Network Planning-Service Bearer Planning
  - VPN concept and classification
  - MPLS L3VPN basic concept
  - MPLS L2VPN basic concept
  - TDM PWE3 services planning
  - ATM PWE3 service planning
  - ETH L3VPN service planning
- PTN＆PTN 6900 Network Planning-High Availability Planning
  - HA overview
  - Key technologies for network HA
  - HA planning for PTN
  - PTN 6900 network
- PTN＆PTN 6900 Network Planning-QoS Planning
  - QoS Technology
  - QoS Planning
- PTN＆PTN 6900 Network Planning-Clock Synch Planning
  - Clock concept (Synchronization Ethernet +1588 v2)
  - Synchronization Ethernet planning
  - The IEEE1588v2 planning
- PTN＆PTN 6900 Network Planning-Case Analysis
  - Case research

Duration

5 working days

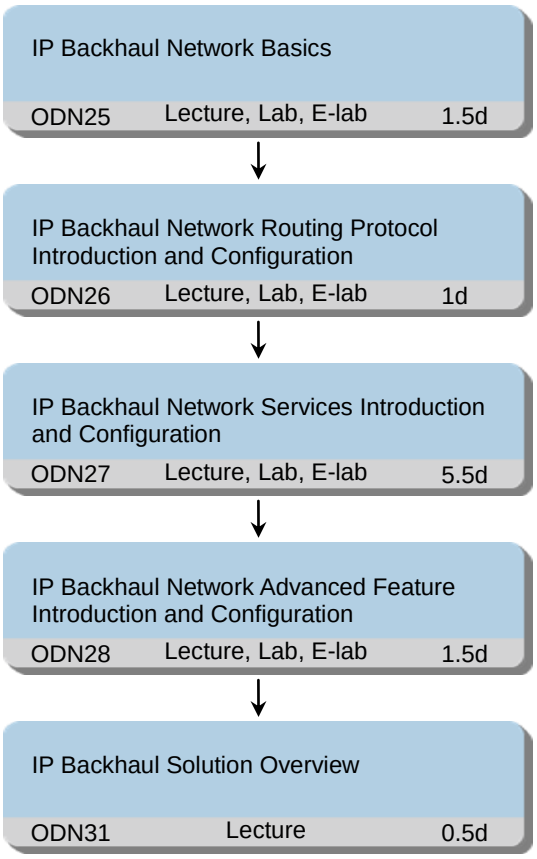
Class Size

Min 6, Max 12

1.8 Mobile Backhaul Operation and Maintenance Training

1.8.1 ATN＆CX600 Mobile Backhaul Operation ＆ Maintenance Training

Training Path



Target Audience

Mobile backhaul network operation and maintenance engineer

Prerequisites

- Familiar with the working principle of IGP routing protocol
- Familiar with the working principle of MPLS VPN including L3VPN and VPLS

Objectives

On completion of this program, the participants will be able to:

- Describe the MBB overall development trend
- Describe the demands and challenges of the MBB backhaul network
- Describe the mobile backhaul solution
- Describe the LTE mobile backhaul solution
- Describe the operation and management of the MBB era
- Describe the TCP/IP model and common network protocols
- Describe the ethernet technology

- Describe the switch working principle
- Describe the VLAN technology
- Describe the IP routing protocols
- Describe the router working principle
- Describe the IP backhaul networking equipment
- Describe the IGP routing protocol basics in IP backhaul network
- Describe the deployment of the IGP routing protocols in the IP backhaul network
- Complete the configuration of the IGP routing protocol in the IP backhaul network
- Describe the MPLS label technology
- Describe LDP Protocol
- Describe the MPLS TE tunnel establishment of technical
- Describe the reliability of the TE tunnel technology
- Complete the configuration of MPLS tunnels and reliability
- Describethe MPLS L3VPN bearing technology
- Describe the reliability of the VPN FRR service technology
- Complete the L3VPN service and reliability configuration
- Describe the MPLS L2VPN bearing technology
- Describe the reliability of PW Redundancy service technology
- Complete the TDM / ATM of PWE3 service and reliability configuration
- Describe the QoS technology
- Describe the QoS implementation and deployment in IP backhaul network
- Describe the clock synchronization technology
- Describe the clock synchronization implementation and deployment in IP backhaul network
- Complete QoS configuration in the IP backhaul network
- Complete clock synchronization technology configuration in IP backhaul network

Training Content

ODN25 IP Backhaul Network Basics

- TCP＆IP Basics (Manual)
  - TCP/IP and OSI Reference Model
  - Function of layers of TCP/IP
  - Classification of IP addresses
- Ethernet Basics (Manual)
  - Ethernet physical layer
  - Ethernet data link layer
  - VLAN technology and its applications
- IP Routing Basics (Manual)
  - What is router and route
  - IP routing table structure
  - The classification of routing protocols
- IP Backhaul Network U2000 Management Configuration
  - U2000 topology management

- Familiar with the U2000 software used to complete the basic configuration of the data
- Completion the experiments of the U2000 Plug and Play

- IP Backhaul Network High Availability Overview (Manual)
  - What is HA
  - BFD concept
  - OAM concept
  - Service availability overview
- IP Backhaul Networking Products Introduction (Manual)
  - Hardware structure of the ATN ＆ the CX600 ＆ NE products
  - ATN＆CX＆NE products chassis and boards
- iManager U2000 Operation and Maintenance Solution (Manual)
  - U2000 system structure
  - U2000 system functions
  - U2000 system common operation

ODN26 IP Backhaul Network Routing Protocol Introduction and Configuration

- IP Backhaul Network U2000 IS-IS Routing Protocol Configuration
  - U2000 configuration of IS-IS routing protocol in IP backhaul network
- IP Backhaul Network U2000 OSPF Routing Protocol Configuration
  - U2000 configuration of OSPF routing protocol in IP backhaul network
- IP Backhaul Network IS-IS Routing Protocol Basics (Manual)
  - IS-IS working process
  - IS-IS multi-process introduction
  - IS-IS configuration based on U2000 system
- IP Backhaul Network OSPF Routing Protocol Basics (Manual)
  - OSPF working process
  - OSPF areas introduction
  - OSPF multi-process introduction
  - OSPF configuration based on U2000 system
- IP Backhaul Network BGP Routing Protocol Basics (Manual)
  - BGP basic concepts
  - BGP working principle
  - BGP route reflector
  - BGP path attributes

ODN27 IP Backhaul Network Services Introduction and Configuration

- IP Backhaul Network U2000 MPLS TE and Tunnel Availability Configuration
  - U2000 configuration of MPLE TE Tunnel in IP backhaul network
  - U2000 configuration of TE hot-standby
- IP Backhaul Network U2000 MPLS L3VPN Service and L3VPN Availability Configuration
  - U2000 configuration of E2E L3VPN in IP backhaul network
  - U2000 configuration of VPN FRR
- IP Backhaul Network U2000 MPLS L2VPN Service and L2VPN Availability Configuration
  - U2000 configuration of E2E PWE3 in IP backhaul network

- U2000 configuration of PW redundancy

- IP Backhaul Network MPLS Basics (Manual)
  - MPLS basic concepts
  - MPLS LDP basic concepts
  - U2000 configureMPLS LDP
- IP Backhaul Network MPLS TE and TE Tunnel Availability Introduction (Manual)
  - MPLS TE working principle
  - MPLS TE deployment in IP backhaul scenario
  - TE FRR protection technology introduction
  - TE Hot-standby protection technology introduction
  - U2000 configuration of TE Tunnel
  - U2000 configuration of TE Hot-standby
- IP Backhaul Network MPLS L3VPN Service and L3VPN Availability Introduction (Manual)
  - VPN basic concept
  - BGP MPLS VPN working principle
  - BGP MPLS VPN in IP backhaul scenario
  - VPN FRR protection technology introduction
  - U2000 configuration of E2E BGP MPLS VPN
  - U2000 configuration of VPN FRR
- IP Backhaul Network MPLS L2VPN Service and L2VPN Availability Introduction (Manual)
  - The basic concepts of PWE3
  - How TDM service is emulated by PWE3
  - How ATM service is emulated by PWE3
  - How Ethernet service is emulated by PWE3
  - Deploying PWE3 services
  - PW Redundancy protection technology introduction
  - U2000 configuration of E2E PWE3
  - U2000 configuration of PW redundancy

ODN28 IP Backhaul Network Advanced Feature Introduction and Configuration

- IP Backhaul Network U2000 QoS Configuration
  - U2000 configuration of QoS in IP backhaul network
- IP Backhaul Network U2000 Clock Synchronization Configuration
  - U2000 configuration of Sync Eth in IP backhaul network
  - U2000 configuration of 1588v2 in IP backhaul network
- IP Backhaul Network QoS Implementation and Configuration (Manual)
  - QoS model introduction
  - QoS basic concept
  - Differv mode introduction
  - Deploying QoS in backhaul scenario
- IP Backhaul Network Clock Synchronization Implementation and Configuration (Manual)
  - The synchronization of Ethernet clock technology
  - SyncE clock technology

- 1588 v2 clock technology

ODN31 IP Backhaul Solution Overview

- ATN＆CX600 IP Backhaul Solution Overview (Tech-level)
  - The challenge of MBB
  - All kinds of mobile backhaul implement
  - Service data forwarding in IP backhaul solution(CX+ATN)
  - Service protection in IP backhaul solution(CX+ATN)
  - QOS and clock synchronization in IP backhaul solution(CX+ATN)
- ATN＆CX600 IP Backhaul Network Solution Overview (High-level)
  - Overall development trend of MBB
  - Requirements and challenges of MBB
  - Implementation and deployment of mobile backhaul network solutions
  - Operations and management of MBB

Duration

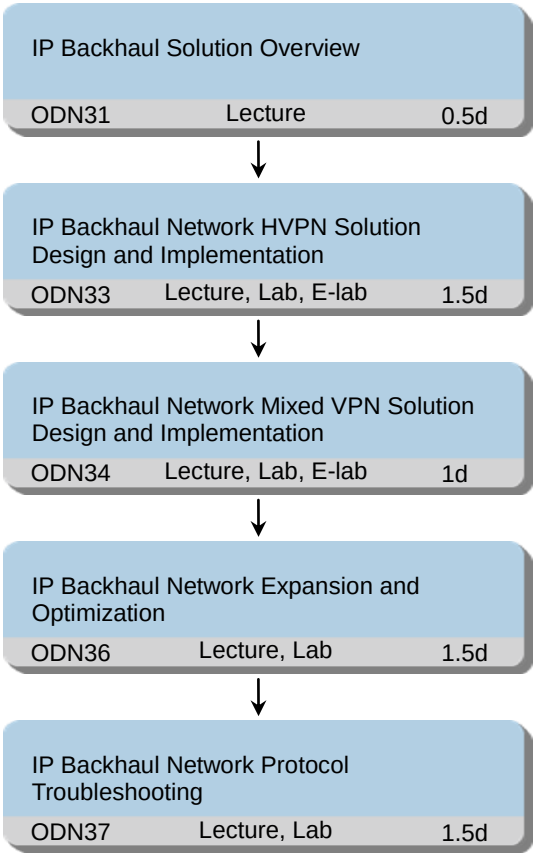
10 working days

Class Size

Min 6, Max 12

1.8.2 ATN＆CX600 Mobile Backhaul Operation ＆ Maintenance Training (Advanced)

Training Path



Target Audience

Mobile backhaul network senior operation and maintenance engineer

Prerequisites

- Familiar with the working principle of IGP routing protocol
- Familiar with the working principle of MPLS VPN including L3VPN and VPLS

Objectives

On completion of this program, the participants will be able to:

- Describe the MBB overall development trend
- Describe the demands and challenges of the MBB backhaul network
- Describe the mobile backhaul solution
- Describe the LTE mobile backhaul solution
- Describe the operation and management of the MBB era
- Design and deploy the HVPN docking program
- Design and deploy HVPN routing protocol

- Design and deploy layered TE tunnel and reliability technology
- Design and deploy hierarchical L2VPN program and technical reliability
- Design and deploy hierarchical L3VPN program and reliability technology
- Design and deploy the HVPN program QoS technology
- Design and deploy the HVPN program clock synchronization technology
- Design and deploy the Mixed VPN docking program
- Design and deploy Mixed VPN routing protocol
- Design and deploy layered TE tunnel and reliability technology
- Design and deploy hierarchical L2VPN program and technical reliability
- Design and deploy L2VPN+L3VPN program and reliability technology
- Design and deploy the Mixed VPN program QoS technology
- Design and deploy the Mixed VPN program clock synchronization technology
- Describe troubleshooting process on IP backhaul network
- Describe troubleshooting locating method on IP backhaul network
- Troubleshooting the ordinary fault of IP backhaul network

Training Content

ODN31 IP Backhaul Solution Overview

- ATN＆CX600 IP Backhaul Solution Overview (Tech-level)
  - The challenge of MBB
  - All kinds of mobile backhaul implement
  - Service data forwarding in IP backhaul solution(CX+ATN)
  - Service protection in IP backhaul solution(CX+ATN)
  - QOS and clock synchronization in IP backhaul solution(CX+ATN)
- ATN＆CX600 IP Backhaul Network Solution Overview (High-level)
  - Overall development trend of MBB
  - Requirements and challenges of MBB
  - Implementation and deployment of mobile backhaul network solutions
  - Operations and management of MBB

ODN33 IP Backhaul Network HVPN Solution Design and Implementation

- iManager U2000 IP Backhaul Network HVPN Service Practice Guide(V1R8)
  - U2000 configuration HVPN solution
- IP Backhaul Network HVPN Solution Design and Implementation(Manual)
  - Design and implementation of docking in HVPN solution
  - Design and implementation of IGP in HVPN solution
  - Design and implementation of MPLS Tunnel in HVPN solution
  - Design and implementation of Ethernet service in HVPN solution
  - Design and implementation of TDM/ATM service in HVPN solution
  - Design and implementation of HA in HVPN solution
  - Design and implementation of QoS in HVPN solution
  - Design and implementation of Clock Synchronization in HVPN solution

ODN34 IP Backhaul Network Mixed VPN Solution Design and Implementation

- iManager U2000 IP Backhaul Network Mixed VPN Service Practice Guide(V1R8)
  - U2000 configuration Mixed VPN solution
- IP Backhaul Network Mixed VPN Solution Design and Implementation(Manual)
  - Design and implementation of docking in Mixed VPN solution
  - Design and implementation of IGP in Mixed VPN solution
  - Design and implementation of MPLS Tunnel in Mixed VPN solution
  - Design and implementation of Ethernet service in Mixed VPN solution
  - Design and implementation of TDM/ATM service in Mixed VPN solution
  - Design and implementation of HA in Mixed VPN solution
  - Design and implementation of QoS in Mixed VPN solution
  - Design and implementation of Clock Synchronization in Mixed VPN solution

ODN36 IP Backhaul Network Expansion and Optimization

- iManager U2000 IP Backhaul Network Expansion and Optimization Overview(HVPN)
  - How to add new service on IP backhaul network
  - How to add a CSG
  - How to delete a CSG
  - How to change chain to ring
- iManager U2000 IP Backhaul Network Expansion and Optimization Practice Guide(HVPN)
  - Add new service on CSG on access ring
  - Add a CSG to an access ring
  - Delete a CSG from an access ring
  - Change chain to ring

ODN37 IP Backhaul Network Protocol Troubleshooting

- iManager U2000 IP Backhaul Network Protocol Troubleshooting Overview(HVPN)
  - IP backhaul network troubleshooting ideas and processes
  - IP backhaul network fault location method
  - IP backhaul network troubleshooting cases
- iManager U2000 IP Backhaul Network Protocol Troubleshooting Practice Guide(HVPN)
  - Troubleshooting routing protocol problem on IP backhaul network
  - Troubleshooting MPLS tunnel problem on IP backhaul network
  - Troubleshooting VPN service problem on IP backhaul network

Duration

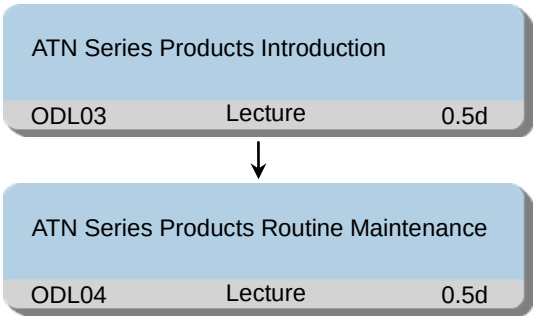
5 working days

Class Size

Min 6, Max 12

1.8.3 ATN Products 1st Line Maintenance Training

Training Path



Target Audience

ATN Series Product Operation and maintenance engineers

FO engineer

Prerequisites

- Having basic knowledge of TCP/IP

Objectives

On completion of this program, the participants will be able to:

- Describe ATN products chassis and boards
- Describe ATN network application
- Check if the board is running normally with LED
- Check the information of the system with the routine maintenance commands
- Check the info-center
- Check the U2000 system

Training Content

ODL03 ATN Series Products Introduction

- ATN Series Products Introduction
  - Mobile services trends and challenges
  - ATN products chassis and boards
  - ATN network application
- ATN905 Series Products Introduction
  - Small cell concepts and application scenarios
  - ATN905 products chassis and boards

ODL04 ATN Series Products Routine Maintenance

- ATN Series Products Routine Maintenance
  - Overview of routine maintenance
  - Routine maintenance item
  - Operations involving risks
  - Commonly used commands introduction

- ATN905 Series Products Routine Maintenance
  - ATN905 daily maintenance process
  - ATN905 daily manitenance implementation

Duration

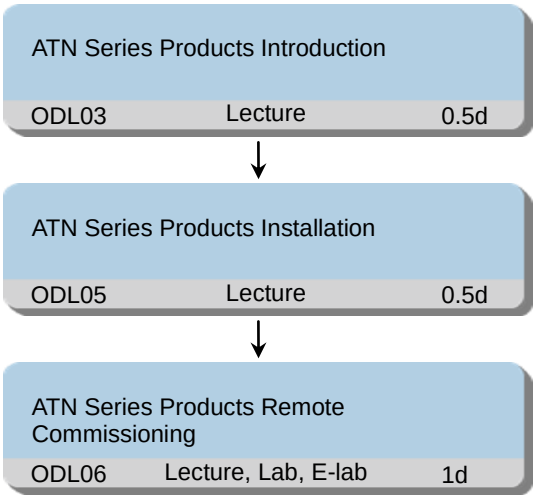
1 working day

Class Size

Min 6, Max 12

1.8.4 ATN Products Installation and Commissioning Training

Training Path



Target Audience

ATN Series Product Operation and maintenance engineers
FO engineer

Prerequisites

- Having basic knowledge of TCP/IP

Objectives

On completion of this program, the participants will be able to:

- Describe ATN products chassis and boards
- Describe ATN network application
- Install ATN series?products cabinet, frame and board properly
- Perform ATN series?products cable routing and termination properly
- Identify the cautions and facts which may affect ATN seriesproducts system running due to improperly installation
- Describe Plug-and-Play concepts
- Know how to perform remote commissioning through the DCN
- Know how to perform remote commissioning using DHCP

Training Content

ODL03 ATN Series Products Introduction

- ATN Series Products Introduction
  - Mobile services trends and challenges
  - ATN products chassis and boards
  - ATN network application
- ATN905 Series Products Introduction
  - Small cell concepts and application scenarios

- ATN905 products chassis and boards

ODL05 ATN Series Products Installation

- ATN Series Products Installation and Commission
  - Safety precautions
  - Installation preparation
  - Installing the ATN series products
  - Installing and routing cables
  - Checking cable connectivity
- ATN905 Series Products Installation and Commission
  - Safety precautions
  - Installation preparation
  - Installing the ATN905 series products
  - Installing and routing cables
  - Commissioning the ATN905 series products

ODL06 ATN Series Products Remote Commissioning

- ATN Series Products Remote Commissioning Principle
  - IP backhaul site deployment scenario
  - Basic configuration planning
  - Remote commissioning through the DCN
  - Remote commissioning using DHCP
  - Summary
- ATN Series Products Remote Commissioning Practice Guide
  - Remote commissioning introduction
  - ATN products remote commissioning through U2000

Duration

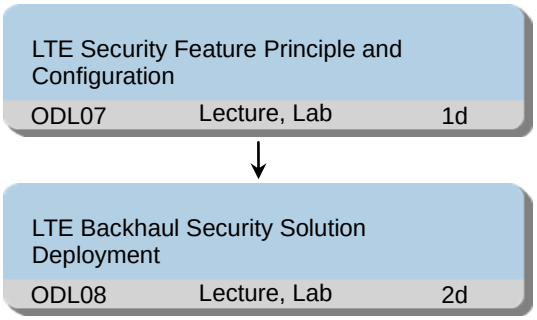
2 working days

Class Size

Min 6, Max 12

1.8.5 LTE Mobile Backhaul Security Feature Training

Training Path



Target Audience

Mobile backhaul network operation and maintenance engineer

Prerequisites

- Familiar with the working solution of IP backhaul network
- Completion of "IP Backhaul Network Operation and Maintenance training"

Objectives

On completion of this program, the participants will be able to:

- Describe IPsec concept
- Describe LTE security requirements
- Complete IPsec feature configuration
- Describe LTE backhaul solution
- Describe security Plug-and-Play PKI-based site deployment step
- Complete LTE backhaul IPsec feature deployment

Training Content

ODL07 LTE Security Feature Principle and Configuration

- LTE IPSec Feature Principle
  - VPN Introduction
  - Principles of IPSec
  - IKE Overview
  - IPSec Configuration
- LTE IPSec Feature Practice Guide
  - Basic concepts and operation commands introduction
  - Configure the IPSec VPN in IKE negotiation mode

ODL08 LTE Backhaul Security Solution Deployment

- LTE End-to-End Network Security Solution Overview
  - LTE security challenges
  - Huawei security solution
  - Transport Security Solution

- EPC Security Solution
- SGi Security Solution
- Wireless Security Solution
- eNodeB Security Solution
- OM Plane Security Solution

- LTE Backhaul Network Security Solution Introduction
  - LTE backhaul security challenges
  - LTE security scenarios and solutions
- LTE Backhaul Network Security Solution Deployment Practice Guide
  - Security Plug-and-Play PKI-based site deployment process
  - IPSec solution for LTE networks configuration guide

Duration

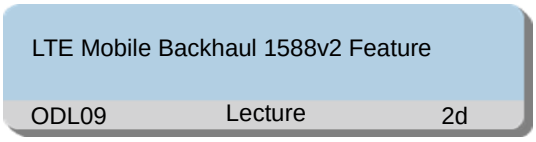
3 working days

Class Size

Min 6, Max 12

1.8.6 LTE Mobile Backhaul Clock Synchronization(1588v2) Feature Training

Training Path



Target Audience

Mobile backhaul network operation and maintenance engineer

Prerequisites

- Having basic experience of telecommunications network

Objectives

On completion of this program, the participants will be able to:

- Understand basic concepts of synchronization network
- Describe the principle of 1588V2
- Describe the 1588V2 device model, message and BMC algorithm
- Describe the typical application scenarios and deployment of 1588V2
- Outline the planning principles of mainstream 1588V2 network scenarios
- Perform the 1588V2 characteristics of deployment process
- Understand the 1588V2 detection methods

Training Content

ODL09 LTE Mobile Backhaul 1588v2 Feature

- 1588V2 Principle Introduction
  - IEEE 1588v2 Standard Introduction
  - IEEE 1588v2 Overview
  - IEEE 1588v2 Device Model
  - IEEE 1588v2 Messages
  - BMC Algorithm
  - IEEE 1588v2 Typical Application Scenarios
  - IEEE 1588v2 Deployment
- 1588V2 Planning and Design
  - IEEE 1588v2 Overview
  - IEEE 1588v2 Deployment Planning
  - IEEE 1588v2
  - Synchronize Ethernet Design
  - IEEE 1588v2 Network capability and performance Analysis
  - IEEE 1588v2 Reliability Design
  - IEEE 1588v2 Network Management Ability Analysis
- 1588V2 Deployment Guide

- Deployment Preparation
- IEEE 1588v2 Network Planning
- IEEE 1588v2 Configuration Process
- IEEE 1588v2 Asymmetry Compensation Analysis

- 1588V2 Maintenance and Troubleshooting
  - Maintenance and Troubleshooting Methods
  - IEEE 1588v2 Maintenance Process
  - IEEE 1588v2 Troubleshooting Process

Duration

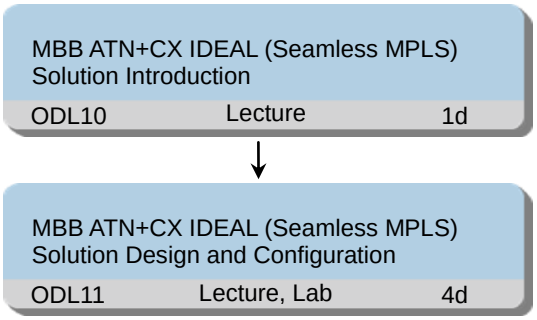
2 working days

Class Size

Min 6, Max 24

1.8.7 MBB IDEAL(Seamless MPLS) Solution Training

Training Path



Target Audience

Mobile backhaul network senior operation and maintenance engineer

Prerequisites

- Familiar with the working principle of routing protocol
- Familiar with the working principle of MPLS L3 VPN

Objectives

On completion of this program, the participants will be able to:

- Describe Requirement for IDEAL Solution
- Describe Network and Service Design and Implementation of IDEAL Solution
- Describe Network Protocol Implementation of IDEAL Solution
- Configure Network Protocol of IDEAL Solution
- Describe Service Implementation of IDEAL Solution
- Configure Services of IDEAL Solution

Training Content

ODL10 MBB ATN+CX IDEAL (Seamless MPLS) Solution Introduction

- MBB ATN+CX IDEAL (Seamless MPLS) Solution Introduction
  - IDEAL Solution Overview
  - Logical Network Design and Implementation
  - Service Design and Implementation
  - Reliability Design and Implementation
  - QoS Design and Implementation
  - Clock Solution Design and Implementation
  - Security Design and Implementation
  - OAM Design and Implementation

ODL11 MBB ATN+CX IDEAL (Seamless MPLS) Solution Design and Configuration

- MBB ATN+CX IDEAL (Seamless MPLS) Solution Network Implementation and Basic Configuration
  - Physical Network Implementation

    - Interconnection Implementation
    - Basic Configuration Example
- MBB ATN+CX IDEAL (Seamless MPLS) Solution IGP Implementation and Configuration
    - IGP(ISIS/OSPF) Implementation
    - IGP Configuration Example
- MBB ATN+CX IDEAL (Seamless MPLS) Solution BGP Implementation and Configuration
    - BGP Implementation
    - Route Priority and Routing Policy Implementation
    - BGP Configuration Example
- MBB ATN+CX IDEAL (Seamless MPLS) Solution MPLS Tunnel Implementation and Configuration
    - MPLS Tunnel(RSVP-TE/LDP) Implementation
    - MPLS Tunnel Configuration Example
- MBB ATN+CX IDEAL (Seamless MPLS) Solution MPLS (BGP LSP) Implementation and Configuration
    - MPLS(BGP LSP) Implementation
    - BGP LSP Configuration Example
- MBB ATN+CX IDEAL (Seamless MPLS) Solution ETH (LTE S1/3G) Services Implementation and Configuration
    - ETH (LTE S1/3G) Services Implementation
    - ETH (LTE S1/3G) Services Configuration Example
- MBB ATN+CX IDEAL (Seamless MPLS) Solution LTE X2 Services Implementation and Configuration
    - LTE X2 Services Implementation
    - LTE X2 Services Configuration Example
- MBB ATN+CX IDEAL (Seamless MPLS) Solution Enterprise Services Implementation and Configuration
    - Enterprise Services Implementation
    - Enterprise Services Configuration Example
- MBB ATN+CX IDEAL (Seamless MPLS) Solution QoS Implementation and Configuration
    - QoS Implementation
    - QoS Configuration Example
- MBB ATN+CX IDEAL (Seamless MPLS) Solution Clock Synchronization Implementation and Configuration
    - Clock Synchronization Implementation
    - Clock Synchronization Configuration Example
- MBB ATN+CX IDEAL (Seamless MPLS) Solution Network Management Implementation and Configuration
    - Network Management Implementation
    - Network Management Configuration Example
- MBB ATN+CX IDEAL (Seamless MPLS) Solution Practice Guide
    - IDEAL Solution Network and Service Practice Guide

Duration

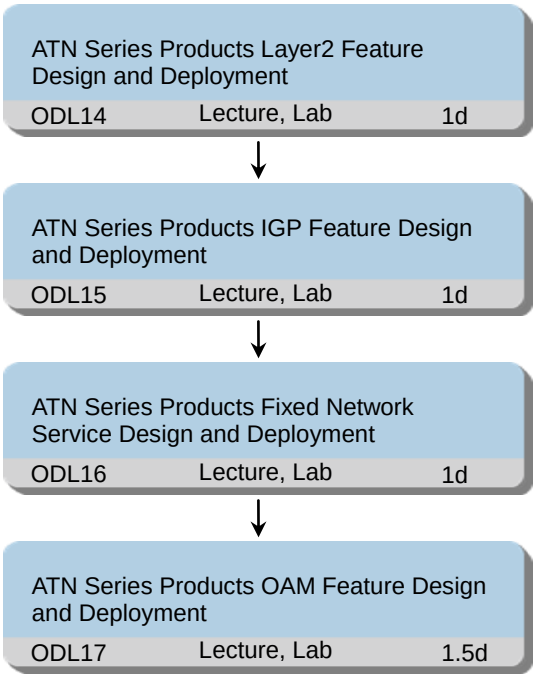
5 working days

Class Size

Min 6, Max 12

1.8.8 ATN Series Products Fixed Network Solution Training

Training Path



Target Audience

ATN Series Product Operation and maintenance engineers

FO engineer

Prerequisites

- Familiar with basic knowledge of data communications

Objectives

On completion of this program, the participants will be able to:

- Describe eth-trunk implementation
- Describe eth-trunk forwarding
- Describe LACP function
- Configure Eth-Trunk in ATN products
- Describe functions of QinQ
- Describe how QinQ is implemented
- Describe how selective QinQ is implemented
- Configure QinQ and selective QinQ on ATN products
- Describes IGP routing protocol functions
- Describe IGP routing protocol basic concepts
- Configure IGP routing protocol
- Describe the concept and architecture of MPLS L2VPN
- Describe the implementation of Ethernet service emulation

- Configure E-Line services
-
- Introduce the Huawei ATN EDD solution
- Describe the concept and principle of RFC2544
- Describe the concept and principle of basic Y.1731 functions
- Describe the concept and principle of HQoS
- Configure EDD
- Describe the concept and principle of Ethernet OAM
- Describe the concept and principle of MPLS-TP OAM
- Configure OAM
- Describe the concept and principle of Ethernet OAM.
- Describe the concept and principle of MPLS-TP OAM.
- Configure OAM.
-

Training Content

ODL14 ATN Series Products Layer2 Feature Design and Deployment

- ATN Series Products Eth-Trunk Feature Design and Deployment(Fixed Network)
  - Eth-Trunk overview
  - LACP protocol overview
  - Eth-Trunk practice
- ATN Series Products QinQ Feature Design and Deployment(Fixed Network)
  - QinQ overview
  - Selective QinQ overview
  - QinQ Practice

ODL15 ATN Series Products IGP Feature Design and Deployment

- ATN Series Products OSPF Protocol Design and Deployment(Fixed Network)
  - OSPF overview
  - Basic OSPF concepts
  - OSPF route calculation
  - OSPF fast convergence
  - OSPF Practice
- ATN Series Products ISIS Protocol Design and Deployment(Fixed Network)
  - IS-IS overview
  - IS-IS basic concepts
  - IS-IS route calculation
  - IS-IS fast convergence
  - IS-IS Practice

ODL16 ATN Series Products Fixed Network Service Design and Deployment

- ATN Series Products E-Line Service Design and Deployment(Fixed Network)
  - MPLS L2VPN overview
  - Ethernet service emulation

- E-Line service configuration practice

ODL17 ATN Series Products OAM Feature Design and Deployment

- ATN Series Products EDD Design and Deployment(Fixed Network)
  - Huawei ATN EDD solution
  - The concept and principle of RFC2544
  - The concept and principle of basic Y.1731 functions
  - The concept and principle of HQoS
  - EDD configuration
- ATN Series Products OAM Feature Design and Deployment(Fixed Network)
  - Ethernet OAM overview
  - MPL-TP OAM overview
  - OAM configuration practice

Duration

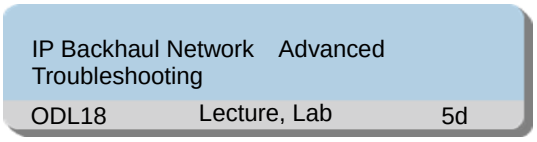
5 working days

Class Size

Min 6, Max 12

1.8.9 IP Backhaul Network Advanced Troubleshooting Training

Training Path



Target Audience

Mobile backhaul network senior operation and maintenance engineer

Prerequisites

- Familiar with the working principle of IGP routing protocol
- Familiar with the working principle of MPLS VPN including L3VPN and VPLS

Objectives

On completion of this program, the participants will be able to:

- Describe IP backhaul network problem scenario
- Decribe IP backhaul network toubleshooting process
- Decribe routing protocol problem handling process for IP backhaul network
- Decribe MPLS tunnel problem handling process for IP backhaul network
- Decribe VPN Service problem handling process for IP backhaul network
- Complete IP backhaul network problem analysis and troubleshooting

Training Content

ODL18 IP Backhaul Network Advanced Troubleshooting

- IP Backhaul Network Troubleshooting Overview
  - IP backhaul network standard solution introduction
  - IP backhaul network problem classification
  - IP backhaul network problem troubleshooting process
- IP Backhaul Network Routing Protocol Problem Analysis and Troubleshooting
  - Routing potocol application in IP backhaul network
  - Troubleshooting ISIS-Related problem
  - Troubleshooting BGP-Related problem
  - IP backhaul network routing protocol problem caes analysis
- IP Backhaul Network MPLS Tunnel Problem Analysis and Troubleshooting
  - MPLS tunnel application in IP backhaul network
  - Troubleshooting MPLS TE-related problem
  - IP backhaul network MPLS TE problem caes analysis
- IP Backhaul Network HVPN Solution Problem Analysis and Troubleshooting
  - HVPN solution application in IP backhaul network
  - Troubleshooting MPLS L3VPN problem
  - IP backhaul network HVPN solution problem caes analysis

- IP Backhaul Network Mixed VPN Solution Problem Analysis and Troubleshooting
  - Mixed VPN solution application in IP backhaul network
  - Troubleshooting MPLS L2VPN problem
  - Troubleshooting MPLS L2VPN problem
  - IP backhaul network Mixed VPN solution problem caes analysis
- IP Backhaul Network Live Netwok Problem Case Analysis
  - IP backhaul network live network problem case analysis and discussion

Duration

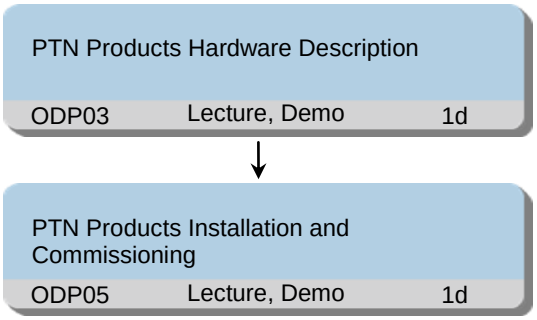
5 working days

Class Size

Min 6, Max 12

1.8.10 PTN Products Installation and Commissioning Training

Training Path



Target Audience

PTN series installation and commissioning engineer

Prerequisites

- Having an overview of PTN products applications
- Having an overview of telecommunications

Objectives

On completion of this program, the participants will be able to:

- Describe PTN Frame-Shaped Series hardware structure
- Describe PTN Case-Shaped Series hardware structure
- Describe PTN 3900＆1900 Installation and the precautions
- Describe PTN 950＆910 Installation and the precautions

Training Content

ODP03 PTN Products Hardware Description

- PTN Frame-Shaped Series Hardware Description
  - Networking applications of the PTN Frame-Shaped series products
  - System structure of the PTN Frame-Shaped series products
  - Main functions of the boards used on the PTN Frame-Shaped series products
  - System protection schemes of the PTN Frame-Shaped series products
- PTN Case-Shaped Series Hardware Description
  - PTN Case-Shaped series products application
  - PTN Case-Shaped series products chassis
  - PTN Case-Shaped series products boards

ODP05 PTN Products Installation and Commissioning

- PTN 3900＆1900 Installation Guide
  - Cabinet installation
  - PTN 3900 sub-rack installation
  - PTN 1900 sub-rack installation
- PTN 950＆910 Installation Guide

- Precautions of installation
- PTN 950 installation
- PTN 910 installation
- Checking process after installation

Duration

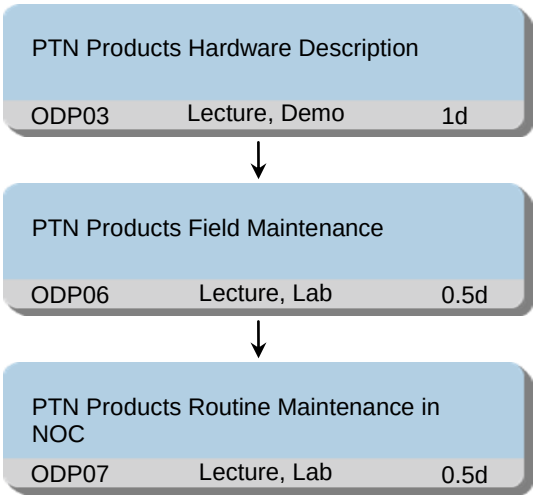
2 working days

Class Size

Min 6, Max 12

1.8.11 PTN Products 1st Line Maintenance Training

Training Path



Target Audience

PTN series 1st line /field maintenance engineer

Prerequisites

- Having an overview of PTN products applications
- Having an overview of telecommunications

Objectives

On completion of this program, the participants will be able to:

- Describe PTN Frame-Shaped Series hardware structure
- Describe PTN Case-Shaped Series hardware structure
- Describe PTN 3900＆1900 On-Site maintenance
- Describe PTN 950＆910 On-Site maintenance
- Describe 3900＆1900 troubleshooting
- Describe 950＆910 troubleshooting
- Describe PTN Products routine maintenance
- Describe the tools and method of routine maintenance in NOC

Training Content

ODP03 PTN Products Hardware Description

- PTN Frame-Shaped Series Hardware Description
  - Networking applications of the PTN Frame-Shaped series products
  - System structure of the PTN Frame-Shaped series products
  - Main functions of the boards used on the PTN Frame-Shaped series products
  - System protection schemes of the PTN Frame-Shaped series products
- PTN Case-Shaped Series Hardware Description

- PTN Case-Shaped series products application
- PTN Case-Shaped series products chassis
- PTN Case-Shaped series products boards

ODP06 PTN Products Field Maintenance

- PTN 3900＆1900 On-Site Maintenance
  - Routine maintenance in NMS Center
  - On-site routine maintenance
  - Routine maintenance of spare parts
- PTN 950＆910＆912 On-site Maintenance
  - Understand the meanings of PTN 950＆910＆912 indicators

ODP07 PTN Products Routine Maintenance in NOC

- PTN Products Routine Maintenance
  - Tools and method of routine maintenance in NOC.

Duration

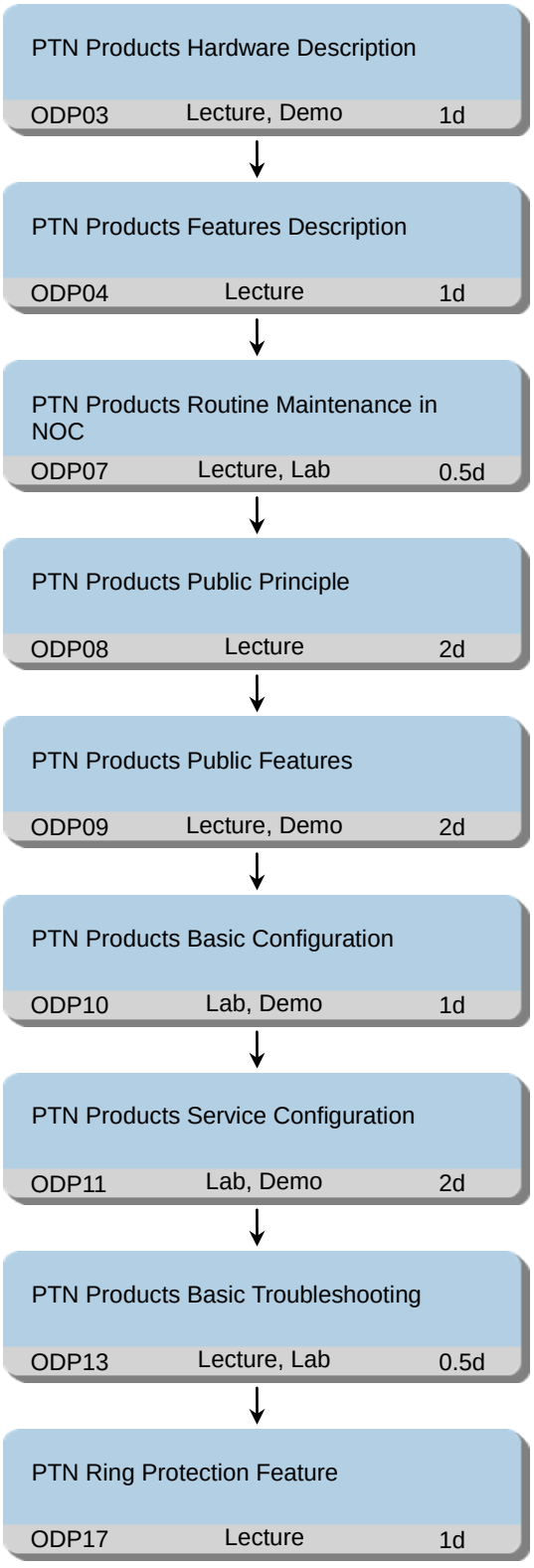
2 working days

Class Size

Min 6, Max 12

1.8.12 PTN Products 2nd Line Maintenance Training

Training Path



Target Audience

PTN series 2nd Line maintenance engineer

Prerequisites

- Having an overview of PTN products applications
- Having an overview of telecommunications

Objectives

On completion of this program, the participants will be able to:

- Describe TCP&IP basic concepts
- Describe Ethernet basic principle
- Describe basic IP routing protocol works
- Describe MPLS basic concepts
- Describe PTN Frame-Shaped Series hardware structure
- Describe PTN Case-Shaped Series hardware structure
- Describe PTN Frame-Shaped Series software feature
- Describe PTN Case-Shaped Series software feature
- Describe PTN products PWE3 technology
- Describe PTN products control plane
- Describe PTN products QoS technology
- Describe PTN products protection technology
- Describe PTN products packet clock technology
- Configure PTN products basic parameters
- Configure PTN products interfaces
- Configure PTN products control plane
- Configure PTN products MPLS tunnel
- Configure PTN products CES service
- Configure PTN products ATM service
- Configure PTN products E-Line service
- Configure PTN products E-LAN service
- Configure PTN products E-AGGR service
- Describe PTN Products routine maintenance
- Describe the tools and method of routine maintenance in NOC
- Describe PTN products basic troubleshooting process
- Describe PTN Ring Protection working principle
- Configure PTN Ring Protection

Training Content

ODP03 PTN Products Hardware Description

- PTN Frame-Shaped Series Hardware Description
  - Networking applications of the PTN Frame-Shaped series products
  - System structure of the PTN Frame-Shaped series products
  - Main functions of the boards used on the PTN Frame-Shaped series products

- System protection schemes of the PTN Frame-Shaped series products
- PTN Case-Shaped Series Hardware Description
  - PTN Case-Shaped series products application
  - PTN Case-Shaped series products chassis
  - PTN Case-Shaped series products boards

ODP04 PTN Products Features Description

- PTN Frame-Shaped Series Feature Description
  - PTN Frame-Shaped series products applications
  - PTN Frame-Shaped series products protection features
  - PTN Frame-Shaped series products QoS features
  - PTN Frame-Shaped series products OAM features
  - PTN Frame-Shaped series products synchronization features
  - PTN Frame-Shaped series products In-band DCN features
- PTN Case-Shaped Series Feature Description
  - Service type of PTN Case-Shaped series products
  - Microwave feature of PTN Case-Shaped series products
  - PTN Case-Shaped series products protection, QoS, OAM, Synchronization, xDSL features etc.

ODP07 PTN Products Routine Maintenance in NOC

- PTN Products Routine Maintenance
  - Tools and method of routine maintenance in NOC.

ODP08 PTN Products Public Principle

- TCP-IP Fundamental
  - TCP/IP and OSI Reference Model
  - Function of layers of TCP/IP
  - Describe classification of IP addresses
  - Basic principle of IP routing
- Ethernet Technology
  - Ethernet physical layer
  - Ethernet data link layer
  - VLAN technology and its applications
  - MSTP technology and its applications
- IP Routing Basic
  - What are router and route
  - Classification of routing protocols
  - How IS-IS routing protocol works
- MPLS Basic
  - MPLS concepts
  - How LSP is setup and how MPLS forward packets
  - Common ways of MPLS troubleshooting
  - MPLS OAM concepts and applications

ODP09 PTN Products Public Features

- PTN PWE3 Technology
  - Basic concepts of PWE3
  - How TDM service is emulated by PWE3
  - How ATM service is emulated by PWE3
  - How Ethernet service is emulated by PWE3
  - Typical applications of different service type
- PTN Control Plane Introduction
  - Four elements of MPLS TE
  - How IS-IS TE distribute the TE information
  - How the TE path is calculated
  - How RSVP-TE works
  - Basic principle of LDP
- PTN QoS Technology
  - QoS model
  - QoS basic concept
  - ATM QoS
  - Concepts of the HQoS
  - QoS typical application in PTN network
- PTN Protection Technology
  - MPLS APS and MPLS FRR protection
  - LMSP protection
  - Ethernet LAG protection
  - E1-link protection
- PTN Packet Clock Technology
  - Necessity of synchronization on IP network
  - Principle of ACR/TOP
  - Principle of synchronization Ethernet
  - IEEE 1588v2 principle

ODP10 PTN Products Basic Configuration

- PTN Products Basic Configuration
  - Starting U2000
  - Creating network using U2000
- PTN Products Interface Configuration
  - Configuration flow of SDH interface
  - SDH interface configuration using T2000
  - Parameters of SDH interface
- PTN Control Plane Configuration
  - Basic configuration of Control plane
  - IS-IS configuration process
  - LDP configuration process
  - RSVP configuration process
  - Static route configuration process

- PTN Tunnel Configuration
  - Dynamic MPLS Tunnel Configuration
  - Static MPLS Tunnel Configuration
- PTN Basic Configuration Practice
  - U2000 basic operation through practice
  - Interface configuration
  - Tunnel configuration

ODP11 PTN Products Service Configuration

- PTN PWE3 Service Configuration
  - Using trail function to configure CES service
  - CES service configuration process based on per-NE basis
  - E-Line service configuration
  - E-Line service related parameters
  - Using trail function to configure ATM service
  - ATM service configuration process based on per-NE basis
- PTN E-LAN Service Configuration
  - E-LAN service configuration
  - E-LAN service related parameters

ODP13 PTN Products Basic Troubleshooting

- PTN Products Troubleshooting Basic
  - Fault handing flow
  - Familiar with methods of analyzing and locating faults
  - Regular operations for troubleshooting
  - Software package loading ＆ diffusion

ODP17 PTN Ring Protection Feature

- PTN Ring Protection Introduction
  - PTN Ring Protection Basic Concepts
  - PTN Ring Protection Switchover
  - PTN Ring Protection Application
- PTN Ring Protection Practice Guide
  - PTN Ring Protection Practice

Duration

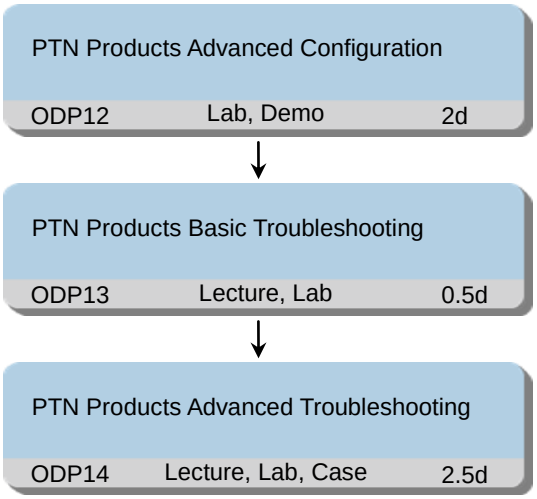
10 working days

Class Size

Min 6, Max 12

1.8.13 PTN Products 3rd Line Maintenance Training

Training Path



Target Audience

PTN series 3rd Line maintenance engineer

Prerequisites

- Completion of PTN 2nd Line Maintenance Training

Objectives

On completion of this program, the participants will be able to:

- Configure PTN products QoS features
- Configure PTN products protection
- Deploy PTN products integrated services
- Describe PTN products basic troubleshooting process
- Describe PTN products alarm and performance analysis
- Describe PTN products common troubleshooting case
- Locate and eliminate PTN products faults

Training Content

ODP12 PTN Products Advanced Configuration

- PTN Products Protection Configuration
  - MPLS APS protection configuring process
  - MPLS FRR protection configuring process
  - Ethernet LAG configuring process
- PTN Products QoS Configuration
  - Creating a DiffServ Domain
  - Creating the Service WRED Policy
  - Creating the WFQ Scheduling Policy

- Creating the Port Policy
- Creating the V-UNI Ingress Policy
- Creating the V-UNI Egress Policy
- Creating the PW Policy
- Creating the QinQ Policy
- Configuring the ATM CoS Mapping
- Creating the ATM Policy

- PTN Products Integrated Service Deployment
  - End-to-end CES service configuration
  - End-to-end ATM service configuration
  - End-to-end E-Line service configuration
  - End-to-end E-LAN service configuration
  - End-to-end E-Aggr service configuration

ODP13 PTN Products Basic Troubleshooting

- PTN Products Troubleshooting Basic
  - Fault handing flow
  - Familiar with methods of analyzing and locating faults
  - Regular operations for troubleshooting
  - Software package loading ＆ diffusion

ODP14 PTN Products Advanced Troubleshooting

- PTN Products Alarm and Performance Analysis
  - PTN Products Alarm and Performance Analysis
- PTN Products Troubleshooting Case Study
  - DCN Communication Faults
  - Operation Fails
  - Interconnection Faults
  - Service Faults
- PTN Products Troubleshooting Practice Guide
  - Network Topology and Parameter Settings
  - Troubleshooting of Faults of the NMS and DCN
  - Troubleshooting of Control Plane Faults
  - Tunnel Fault Troubleshooting
  - CES Service Troubleshooting
  - Ethernet Service Troubleshooting
  - ATM Service Troubleshooting

Duration

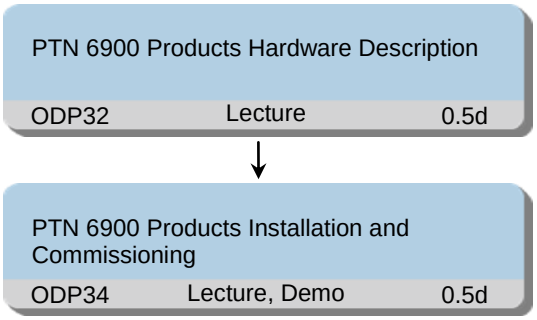
5 working days

Class Size

Min 6, Max 12

1.8.14 PTN 6900 Products Installation and Commissioning Training

Training Path



Target Audience

PTN 6900 series installation and commissioning engineers

Prerequisites

- Having an overview of PTN 6900 products applications
- Having an overview of telecommunications

Objectives

On completion of this program, the participants will be able to:

- Describe PTN 6900 series hardware structure
- Describe PTN 6900 series boards
- Describe PTN 6900 products installation and the precautions

Training Content

ODP32 PTN 6900 Products Hardware Description

- PTN 6900-3/8/16 Hardware Description
  - PTN 6900-3/8/16 products application scenarios
  - Cabinet and system overview
  - PTN 6900 boards introduction

ODP34 PTN 6900 Products Installation and Commissioning

- PTN 6900 Installation Guide
  - Installation preparation
  - PTN 6900 installation guide
  - Checking process after installation
- PTN 6900 Commissioning Guide
  - Safety operation guide
  - Preparations for commissioning
  - On-Site commissioning

Duration

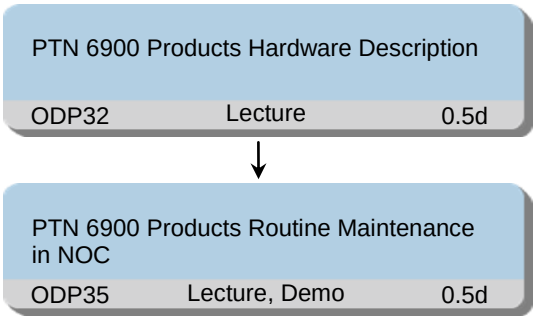
1 working day

Class Size

Min 6, Max 12

1.8.15 PTN 6900 Products 1st Line Maintenance Training

Training Path



Target Audience

PTN 6900 series 1st line /field maintenance engineers

Prerequisites

- Having an overview of PTN 6900 products applications
- Having an overview of telecommunications

Objectives

On completion of this program, the participants will be able to:

- Describe PTN 6900 series hardware structure
- Describe PTN 6900 series boards
- Describe PTN 6900 products routine maintenance
- Describe the tools and method of routine maintenance in NOC

Training Content

ODP32 PTN 6900 Products Hardware Description

- PTN 6900-3/8/16 Hardware Description
  - PTN 6900-3/8/16 products application scenarios
  - Cabinet and system overview
  - PTN 6900 boards introduction

ODP35 PTN 6900 Products Routine Maintenance in NOC

- PTN 6900 Product Routine Maintenance Introduction
  - Maintenance items and operations
  - Dustproof maintenance of the fevice
  - Operations involving risks
- PTN 6900 Product Parts Replacement Introduction
  - Overview of parts replacement
  - Replacing boards
  - Replacing other parts

Duration

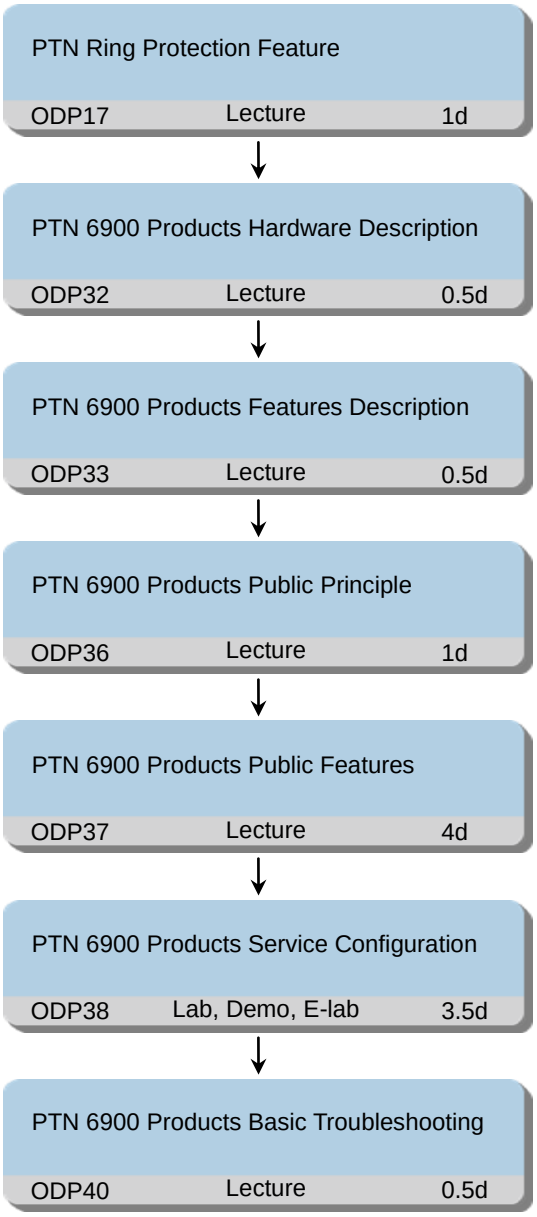
1 working day

Class Size

Min 6, Max 12

1.8.16 PTN 6900 Products 2nd Line Maintenance Training

Training Path



Target Audience

PTN 6900 series 2nd Line maintenance engineers and 3rd Line maintenance engineers and network planning and design engineers

Prerequisites

- Having an overview of PTN 6900 products applications
- Having an overview of telecommunications

Objectives

On completion of this program, the participants will be able to:

- Describe PTN 6900 series hardware structure
- Describe PTN 6900 series boards
- Describe PTN 6900 series software feature
- Describe TCP&IP basic concepts
- Describe Ethernet basic principle
- Describe basic IP routing protocol works
- Describe routing protocol technology
- Describe MPLS/MPLS TE technology
- Describe MPLS L3VPN technology
- Describe protection technology
- Describe QoS technology
- Describe clock synchronization technology
- Configure basic parameters
- Configure mpls tunnel
- Configure CES service
- Configure ATM service
- Configure ETH L2 service
- Configure ETH L3 service
- Describe basic troubleshooting process
- Describe PTN Ring Protection working principle
- Configure PTN Ring Protection

Training Content

ODP17 PTN Ring Protection Feature

- PTN Ring Protection Introduction
  - PTN Ring Protection Basic Concepts
  - PTN Ring Protection Switchover
  - PTN Ring Protection Application
- PTN Ring Protection Practice Guide
  - PTN Ring Protection Practice

ODP32 PTN 6900 Products Hardware Description

- PTN 6900-3/8/16 Hardware Description
  - PTN 6900-3/8/16 products application scenarios
  - Cabinet and system overview
  - PTN 6900 boards introduction

ODP33 PTN 6900 Products Features Description

- PTN 6900 Feature Description
  - PTN 6900 service features
  - PTN 6900 routing features
  - PTN 6900 protection features
  - PTN 6900 OAM features
  - PTN 6900 QoS features

- PTN 6900 synchronization features

ODP36 PTN 6900 Products Public Principle

- TCP-IP Fundamental(PTN 6900)
  - TCP/IP and OSI Reference Model
  - Function of layers of TCP/IP
  - Describe classification of IP addresses
  - Basic principle of IP routing
- Ethernet Technology(PTN 6900)
  - Ethernet physical layer
  - Ethernet data link layer
  - VLAN technology and its applications
  - MSTP technology and its applications
- IP Routing Basics(PTN 6900)
  - What is router and route
  - Classification of routing protocols
  - How IS-IS routing protocol works

ODP37 PTN 6900 Products Public Features

- PTN＆PTN 6900 ISIS Routing Protocol Basics
  - IS-IS overview
  - IS-IS basic concepts
  - IS-IS route calculation
  - IS-IS fast convergence
  - PTN 6900 network ISIS planning
- PTN＆PTN 6900 BGP Routing Protocol Basics
  - BGP overview
  - BGP working principles
  - BGP route attributes
  - BGP extended applications
- PTN＆PTN 6900 High Availability Overview
  - Reliability technology overview
  - Fast detection technology
  - Reliability technologies
- PTN＆PTN 6900 MPLS Basics
  - MPLS basics
  - Static MPLS tunnels
  - Dynamic MPLS LDP tunnels
- PTN＆PTN 6900 MPLS TE Introduction
  - MPLS TE overview
  - Working Principles of MPLS TE
  - MPLS Tunnel APS Protection
  - MPLS Tunnel configuration
- PTN＆PTN 6900 MPLS L2VPN Service Introduction

- MPLS L2VPN overview
- TDM Sservice emulation
- ATM service emulation
- Ethernet service emulation
- L2VPN service protection techniques
- Service and reliability configuration

- PTN＆PTN 6900 MPLS L3VPN Service Introduction
  - MPLS BGP VPN overview
  - Implementation principles of MPLS BGP VPN
  - MPLS BGP VPN service protection techniques
- PTN＆PTN 6900 QoS Technology
  - QoS measurement counters
  - QoS models
  - IP＆MPLS QoS technology
  - ATM QoS technology
  - Analysis of QoS requirements for wireless services
- PTN＆PTN 6900 Clock Synchronization Implementation
  - Mobile network synchronization requirements
  - Mobile network synchronization system
  - Implementation of time synchronization on mobile networks

ODP38 PTN 6900 Products Service Configuration

- PTN＆PTN 6900 Basics Configuration
  - Starting U2000
  - Creating network and discovering devices using U2000
  - Interface configuration by using U2000
- PTN＆PTN 6900 IS-IS Routing Protocol Configuration
  - IS-IS configuration for legacy PTN
  - IS-IS configuration for PTN 6900
- PTN＆PTN 6900 MPLS TE Tunnel and Tunnel Availability Configuration
  - Control plane parameters configuration
  - E2E MPLS Tunnels configuration
  - MPLS tunnel APS 1:1 protection configuration
- PTN＆PTN 6900 TDM Service Configuration
  - E-APS configuration
  - E2E TDM PW APS 1:1 protection
- PTN＆PTN 6900 ATM Service Configuration
  - AC-Side E-APS 1:1 protection
  - E2E ATM PW APS 1:1 protection
- PTN＆PTN 6900 ETH Service(L2) Configuration
  - E2E ETH PW APS 1:1 protection
- PTN＆PTN 6900 ETH Service (L3)Configuration
  - MP-BGP configuration for PTN 6900

- MP-BGP configuration for legacy PTN
- E2E ETH L3 VPN protection

ODP40 PTN 6900 Products Basic Troubleshooting

- PTN＆PTN 6900 Troubleshooting Basic
  - Fault processing flow
  - Familiar with methods of analyzing and locating faults
  - Regular operations for troubleshooting

Duration

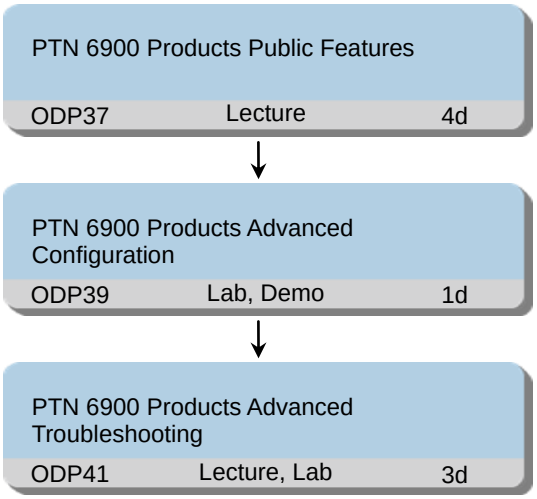
10 working days

Class Size

Min 6, Max 12

1.8.17 PTN 6900 Products 3rd Line Maintenance Training

Training Path



Target Audience

PTN 6900 series 3rd Line maintenance engineers

Prerequisites

- Completion of PTN 6900 2nd Line Maintenance Training

Objectives

On completion of this program, the participants will be able to:

- Describe routing protocol technology
- Describe MPLS/MPLS TE technology
- Describe MPLS L3VPN technology
- Describe protection technology
- Describe QoS technology
- Describe clock synchronization technology
- Configure QoS in mobile backhaul network
- Configure clock synchronization in mobile backhaul network
- Describe alarm and performance analysis
- Describe common troubleshooting case
- Locate and eliminate PTN products faults

Training Content

ODP37 PTN 6900 Products Public Features

- PTN＆PTN 6900 ISIS Routing Protocol Basics
  - IS-IS overview
  - IS-IS basic concepts
  - IS-IS route calculation

- IS-IS fast convergence
- PTN 6900 network ISIS planning

- PTN＆PTN 6900 BGP Routing Protocol Basics
  - BGP overview
  - BGP working principles
  - BGP route attributes
  - BGP extended applications
- PTN＆PTN 6900 High Availability Overview
  - Reliability technology overview
  - Fast detection technology
  - Reliability technologies
- PTN＆PTN 6900 MPLS Basics
  - MPLS basics
  - Static MPLS tunnels
  - Dynamic MPLS LDP tunnels
- PTN＆PTN 6900 MPLS TE Introduction
  - MPLS TE overview
  - Working Principles of MPLS TE
  - MPLS Tunnel APS Protection
  - MPLS Tunnel configuration
- PTN＆PTN 6900 MPLS L2VPN Service Introduction
  - MPLS L2VPN overview
  - TDM Sservice emulation
  - ATM service emulation
  - Ethernet service emulation
  - L2VPN service protection techniques
  - Service and reliability configuration
- PTN＆PTN 6900 MPLS L3VPN Service Introduction
  - MPLS BGP VPN overview
  - Implementation principles of MPLS BGP VPN
  - MPLS BGP VPN service protection techniques
- PTN＆PTN 6900 QoS Technology
  - QoS measurement counters
  - QoS models
  - IP＆MPLS QoS technology
  - ATM QoS technology
  - Analysis of QoS requirements for wireless services
- PTN＆PTN 6900 Clock Synchronization Implementation
  - Mobile network synchronization requirements
  - Mobile network synchronization system
  - Implementation of time synchronization on mobile networks

ODP39 PTN 6900 Products Advanced Configuration

- PTN＆PTN 6900 QoS Configuration
  - QoS configuration in mobile backhaul network
- PTN＆PTN 6900 Clock Syn Configuration
  - Clock Syn configuration in mobile backhaul network

ODP41 PTN 6900 Products Advanced Troubleshooting

- PTN＆PTN 6900 Performance Monitoring and Analysis
  - Performance monitoring and analysis
- PTN＆PTN 6900 Troubleshooting Case Study
  - Troubleshooting case study
- PTN＆PTN 6900 Troubleshooting Practice Guide
  - Troubleshooting practice

Duration

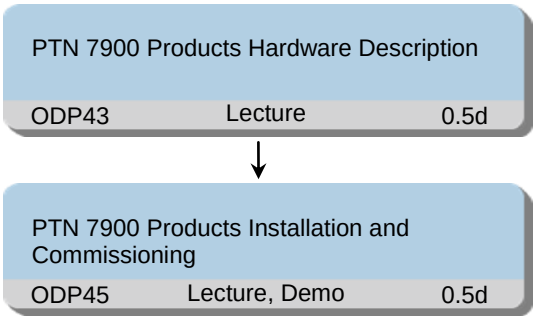
5 working days

Class Size

Min 6, Max 12

1.8.18 PTN 7900 Products Installation and Commissioning Training

Training Path



Target Audience

PTN 7900 series installation and commissioning engineers

Prerequisites

- Having an overview of PTN 7900 products applications
- Having an overview of telecommunications

Objectives

On completion of this program, the participants will be able to:

- Describe PTN 7900 series hardware structure
- Describe PTN 7900 series boards

Training Content

ODP43 PTN 7900 Products Hardware Description

- PTN 7900 Hardware Description
  - PTN 7900 products application scenarios
  - Cabinet and system overview
  - PTN 7900 boards introduction

ODP45 PTN 7900 Products Installation and Commissioning

- PTN 7900 Installation Guide
  - Installation preparation
  - PTN 7900 installation guide
  - Checking process after installation
- PTN 7900 Commissioning Guide
  - Safety operation guide
  - Preparations for commissioning
  - On-Site commissioning

Duration

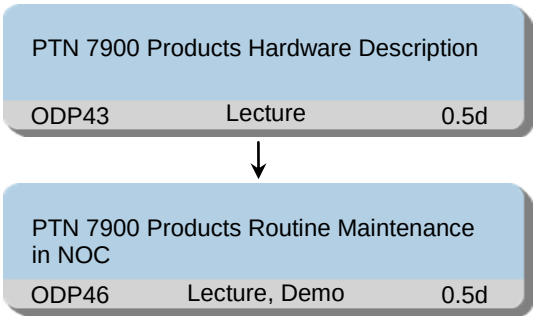
1 working day

Class Size

Min 6, Max 12

1.8.19 PTN 7900 Products 1st Line Maintenance Training

Training Path



Target Audience

PTN 7900 series 1st line /field maintenance engineers

Prerequisites

- Having an overview of PTN 7900 products applications
- Having an overview of telecommunications

Objectives

On completion of this program, the participants will be able to:

- Describe PTN 7900 series hardware structure
- Describe PTN 7900 series boards

Training Content

ODP43 PTN 7900 Products Hardware Description

- PTN 7900 Hardware Description
  - PTN 7900 products application scenarios
  - Cabinet and system overview
  - PTN 7900 boards introduction

ODP46 PTN 7900 Products Routine Maintenance in NOC

- PTN 7900 Product Routine Maintenance Introduction
  - Maintenance items and operations
  - Dustproof maintenance of the fevice
  - Operations involving risks
- PTN7900 Product Parts Replacement Introduction
  - Overview of parts replacement
  - Replacing boards
  - Replacing other parts

Duration

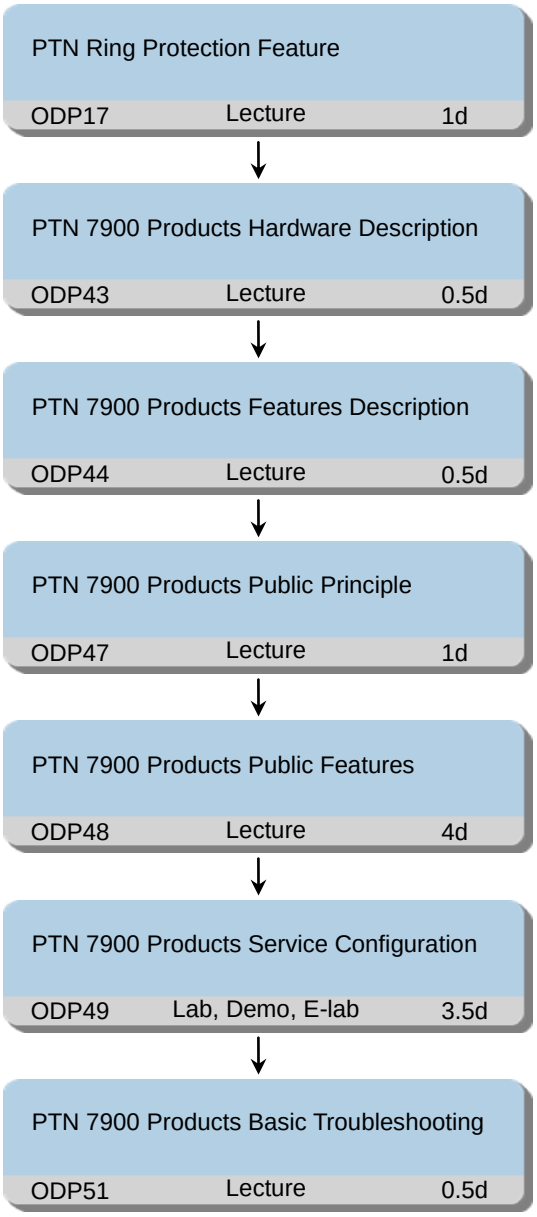
1 working day

Class Size

Min 6, Max 12

1.8.20 PTN 7900 Products 2nd Line Maintenance Training

Training Path



Target Audience

PTN 7900 series 2nd Line maintenance engineers and 3rd Line maintenance engineers and network planning and design engineers

Prerequisites

- Having an overview of PTN 7900 products applications
- Having an overview of telecommunications

Objectives

On completion of this program, the participants will be able to:

- Describe PTN 7900 series hardware structure
- Describe PTN 7900 series boards
- Describe PTN 7900 series software feature
- Describe PTN Ring Protection working principle
- Configure PTN Ring Protection

Training Content

ODP17 PTN Ring Protection Feature

- PTN Ring Protection Introduction
  - PTN Ring Protection Basic Concepts
  - PTN Ring Protection Switchover
  - PTN Ring Protection Application
- PTN Ring Protection Practice Guide
  - PTN Ring Protection Practice

ODP43 PTN 7900 Products Hardware Description

- PTN 7900 Hardware Description
  - PTN 7900 products application scenarios
  - Cabinet and system overview
  - PTN 7900 boards introduction

ODP44 PTN 7900 Products Features Description

- PTN 7900 Feature Description
  - PTN 7900 service features
  - PTN 7900 protection features
  - PTN 7900 OAM features
  - PTN 7900 QoS features
  - PTN 7900 synchronization features

ODP47 PTN 7900 Products Public Principle

- TCP-IP Fundamental(PTN 7900)
  - TCP/IP and OSI Reference Model
  - Function of layers of TCP/IP
  - Describe classification of IP addresses
  - Basic principle of IP routing
- Ethernet Technology(PTN 7900)
  - Ethernet physical layer
  - Ethernet data link layer
  - VLAN technology and its applications
  - MSTP technology and its applications
- IP Routing Basics(PTN 7900)
  - What is router and route
  - Classification of routing protocols
  - How IS-IS routing protocol works

ODP48 PTN 7900 Products Public Features

- PTN＆PTN 7900 ISIS Routing Protocol Basics
  - IS-IS overview
  - IS-IS basic concepts
  - IS-IS route calculation
  - IS-IS fast convergence
  - PTN 6900 network ISIS planning
- PTN＆PTN 7900 BGP Routing Protocol Basics
  - BGP overview
  - BGP working principles
  - BGP route attributes
  - BGP extended applications
- PTN＆PTN 7900 High Availability Overview
  - Reliability technology overview
  - Fast detection technology
  - Reliability technologies
- PTN＆PTN 7900 MPLS Basics
  - MPLS basics
  - Static MPLS tunnels
  - Dynamic MPLS LDP tunnels
- PTN＆PTN 7900 MPLS TE Introduction
  - E2E MPLS Tunnels configuration
  - MPLS tunnel protection configuration
- PTN＆PTN 7900 MPLS L2VPN Service Introduction
  - MPLS L2VPN overview
  - TDM Sservice emulation
  - ATM service emulation
  - Ethernet service emulation
  - L2VPN service protection techniques
  - Service and reliability configuration
- PTN＆PTN 7900 MPLS L3VPN Service Introduction
  - MPLS BGP VPN overview
  - Implementation principles of MPLS BGP VPN
  - MPLS BGP VPN service protection techniques
- PTN＆PTN 7900 QoS Technology
  - QoS measurement counters
  - QoS models
  - IP＆MPLS QoS technology
  - ATM QoS technology
  - Analysis of QoS requirements for wireless services
- PTN＆PTN 7900 Clock Synchronization Implementation
  - Mobile network synchronization requirements
  - Mobile network synchronization system

- Implementation of time synchronization on mobile networks

ODP49 PTN 7900 Products Service Configuration

- PTN＆PTN 7900 Basics Configuration
  - Starting U2000
  - Creating network and discovering devices using U2000
  - Interface configuration by using U2000
- PTN＆PTN 7900 IS-IS Routing Protocol Configuration
  - IS-IS configuration for legacy PTN
  - IS-IS configuration for PTN 7900
- PTN＆PTN 7900 MPLS TE Tunnel and Tunnel Availability Configuration
  - Control plane parameters configuration
  - E2E MPLS Tunnels configuration
  - MPLS tunnel APS 1:1 protection configuration
- PTN＆PTN 7900 TDM Service Configuration
  - E-APS configuration
  - E2E TDM PW APS 1:1 protection
- PTN＆PTN 7900 ATM Service Configuration
  - AC-Side E-APS 1:1 protection
  - E2E ATM PW APS 1:1 protection
- PTN＆PTN 7900 ETH Service(L2) Configuration
  - E2E ETH PW APS 1:1 protection
- PTN＆PTN 7900 ETH Service (L3)Configuration
  - MP-BGP configuration for PTN 7900
  - E2E ETH L3 VPN protection

ODP51 PTN 7900 Products Basic Troubleshooting

- PTN＆PTN 7900 Troubleshooting Basic
  - Fault processing flow
  - Familiar with methods of analyzing and locating faults
  - Regular operations for troubleshooting

Duration

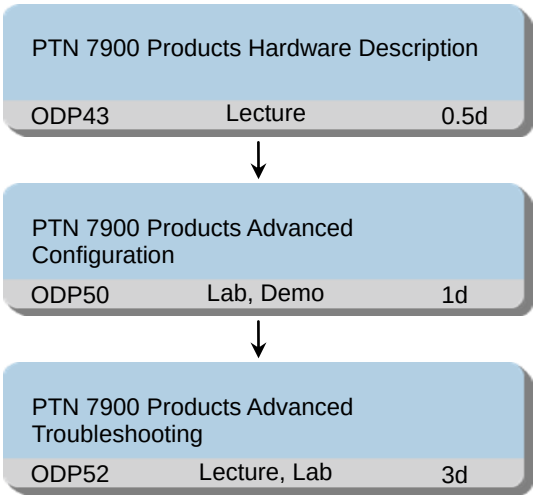
10 working days

Class Size

Min 6, Max 12

1.8.21 PTN 7900 Products 3rd Line Maintenance Training

Training Path



Target Audience

PTN 7900 series 3rd Line maintenance engineers

Prerequisites

- Completion of PTN 7900 2nd Line Maintenance Training

Objectives

On completion of this program, the participants will be able to:

- Describe PTN 7900 series hardware structure
- Describe PTN 7900 series boards

Training Content

ODP43 PTN 7900 Products Hardware Description

- PTN 7900 Hardware Description
  - PTN 7900 products application scenarios
  - Cabinet and system overview
  - PTN 7900 boards introduction

ODP50 PTN 7900 Products Advanced Configuration

- PTN＆PTN 7900 QoS Configuration
  - QoS measurement counters
  - QoS models
  - IP＆MPLS QoS technology
  - ATM QoS technology
  - Analysis of QoS requirements for wireless services
- PTN＆PTN 7900 Clock Syn Configuration
  - Mobile network synchronization requirements

- Mobile network synchronization system
- Implementation of time synchronization on mobile networks

ODP52 PTN 7900 Products Advanced Troubleshooting

- PTN＆PTN 7900 Performance Monitoring and Analysis
  - Performance monitoring and analysis
- PTN＆PTN 7900 Troubleshooting Case Study
  - Troubleshooting case study
- PTN＆PTN 7900 Troubleshooting Practice Guide
  - Troubleshooting practice

Duration

5 working days

Class Size

Min 6, Max 12