



Router Networks R18 Training Programs

Catalog of Course Descriptions





Catalog of Course Descriptions

INTRODUCTION3



Introduction

Ericsson has developed a comprehensive Training Programs service to satisfy the competence needs of our customers, from exploring new business opportunities to expertise required for operating a network. The Training Programs service is delineated into packages that have been developed to offer clearly defined, yet flexible training to target system and technology areas. Each package is divided into flows, to target specific functional areas within your organization for optimal benefits.

The delivery of the Learning Products is realized by various Services:

Icon



Service

Instructor Led Training (ILT)



Router 6000 R18 IP Routing Operation & Configuration



LZU1082708 R1A

Description

IP routing moves information in IP packets across the Network from a source to a destination. It also determines the optimal paths to destinations through algorithms that use metrics or standards of measurement.

This course module covers hands-on configuration for IP Routing (OSPF, ISIS and BGP) on IPOS based systems. It provides multiple configuration tasks as well as verification and troubleshooting commands.

Learning objectives

On completion of this course the participants will be able to:

- 1 Describe IP Routing Concept
 - 1.1 Describe the Functions of IP Routing
 - 1.2 Describe IP Routing Types
 - 1.3 Describe Static Routing Concept
 - 1.4 Explain Static Routing and its type
 - 1.5 Describe the Static Routing Application
 - 1.6 Describe the Pros and Cons of Static Routing
- 2 Review Key Concept in Router 6000 IPOS Environment
 - 2.1 Explain the terminologies such as context, interface and bindings architecture
 - 2.2 Describe Command Line Interface and working with interfaces and its type, ports and circuits
 - 2.3 Describe the Binding Concept and its type
- 3 Describe the OSPF Operation Overview
 - 3.1 Describe the OSPF Operation Overview
 - 3.2 Explain the Hierarchical Structure of OSPF
 - 3.3 Describe the Area and its type
 - 3.4 Describe the OSPF Router Function
 - 3.5 Describe the Packet Types
 - 3.6 Describe the LSA Types
- 4 Build and Verify IP Infrastructure on the Router 6000
 - 4.1 Describe the IP Infrastructure in Network
 - 4.2 Configure OSPF Backbone area
 - 4.3 Define OSPF routing instance





- 4.4 Assign interfaces to OSPF instance with corresponding metric
- 5 Explain the Operation and Configure of OSPF Area
 - 5.1 Implement OSPF Non-Backbone areas
 - 5.2 Configure OSPF Normal Area
 - 5.3 Configure OSPF Stubby Area
 - 5.4 Configure OSPF Totally Stubby Area
 - 5.5 Explain the Route Summarization
- 6 Describe the Concept of Route Redistribution
 - 6.1 Describe the Concept of Route Redistribution
 - 6.2 Redistribution other protocols into OSPF
 - 6.3 Configure and Verify Route Redistribution
 - 6.4 Troubleshoot OSPF related problems
- 7 Describe the Basic ISIS Operations
 - 7.1 Describe the Basic Operation of ISIS protocol
 - 7.2 Implement IS-IS Configuration flow
 - 7.3 Verify Route Tables, IS Neighbor and Routing State
- 8 Describe Extending IS-IS Network
 - 8.1 Describe Multiple IS-IS Area Network
 - 8.2 Implement Level 2 – Backbone
 - 8.3 Explain the Route Summarization
 - 8.4 Describe and Implement IS-IS Redistribution
- 9 Describe the Basic BGP Operations
 - 9.1 Describe the Basic BGP Operations
 - 9.2 Describe role of BGP protocol in IP networks
 - 9.3 Explain BGP Protocol Operation
 - 9.4 Explain Routing Exchange Process
 - 9.5 Describe the differences between IGP and BGP protocols
- 10 Define and Interconnect Multiple Autonomous Systems
 - 10.1 Building IGP networks & adding customer networks
 - 10.2 Connecting Autonomous Systems
 - 10.3 Configure and verify status of BGP neighbor
- 11 Describe different ways of IGP prefix injection into BGP
 - 11.1 Explain the Concept of Injecting prefixes into BGP
 - 11.2 Describe BGP network statements
 - 11.3 Describe IP prefix lists
 - 11.4 Explain Redistributing IGP into BGP
 - 11.5 Configure and Verify Injecting Prefixes into BGP
- 12 Describe the difference between IBGP and EBGP
 - 12.1 Describe and solve a challenge related to next hop attribute in IBGP
 - 12.2 Describe the difference between signaling and forwarding path in transit AS
 - 12.3 Explain the reason for full mesh requirement in IBGP
 - 12.4 Configure and Verify iBGP



- 13 Describe BGP Best Path Selection Process
 - 13.1 Explain influence of various BGP attributes on path selection process
 - 13.2 Change BGP best path via route map configuration
 - 13.3 Configure and Verify Route maps

Target audience

The target audience for this course is:

Service Planning Engineer, Service Design Engineer, Network Design Engineer, Network Deployment Engineer, Service Deployment Engineer, System Technician, Service Engineer

Prerequisites

Successful completion of the following courses:

ILT: Router 6000 18 Operation and Configuration - LZU1082678

Duration and class size

The length of the course is 4 days and the maximum number of participants is 8.

Learning situation

This course is based on theoretical and practical instructor-led lessons given in both classroom and in technical environment using equipment and tools.

This course can also be conducted as a workshop based on interactive training sessions in a classroom environment.

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.



Day	Topics in the course	Estimated Time (hours)
1	<p>Describe IP Routing Concept</p> <ul style="list-style-type: none">• Describe the Functions of IP Routing• Describe IP Routing Types• Describe Static Routing Concept• Explain Static Routing and its type• Describe the Static Routing Application• Describe the Pros and Cons of Static Routing	1.5
	<p>Review Key Concept in Router 6000 IPOS Environment</p> <ul style="list-style-type: none">• Explain the terminologies such as context, interface and bindings architecture• Describe Command Line Interface and working with interfaces and its type, ports and circuits• Describe the Binding Concept and its type• Hands-on: Configure and Verify Context, Interface and Binding• Hands-on: Configure and Verify Static Routing• Hands-on: Configure and Verify Inter-Context Routing	2.5
	<p>Describe the OSPF Operation Overview</p> <ul style="list-style-type: none">• Describe the OSPF Operation Overview• Explain the Hierarchical Structure of OSPF• Describe the Area and its type• Describe the OSPF Router Function• Describe the Packet Types• Describe the LSA Types	2.0
2	<p>Build and Verify IP Infrastructure on the Router 6000</p> <ul style="list-style-type: none">• Configure OSPF Backbone area• Define OSPF routing instance• Assign interfaces to OSPF instance with corresponding metric• Hands-on: Configure and Verify IP Infrastructure	2.0



	<p>Explain the Operation and Configure of OSPF Area</p> <ul style="list-style-type: none">• Configure OSPF Non-Backbone areas• Configure OSPF Normal Area• Configure OSPF Stubby Area• Configure OSPF Totally Stubby Area• Configure Route Summarization• Hands-on: Configure and Verify OSPF Area	2.5
	<p>Describe the Concept of Route Redistribution</p> <ul style="list-style-type: none">• Configure Route Redistribution• Redistribution other protocols into OSPF• Troubleshoot OSPF related problems• Hands-on: Configure and Verify Route Redistribution	1.5
3	<p>Describe the Basic ISIS Operations</p> <ul style="list-style-type: none">• Describe the Basic Operation of ISIS protocol• Implement IS-IS Configuration flow• Verify Route Tables, IS Neighbor and Routing State• Hands-on: Configure and Verify ISIS	1.5
	<p>Describe Extending IS-IS Network</p> <ul style="list-style-type: none">• Describe Multiple IS-IS Area Network• Implement Level 2 – Backbone• Explain the Route Summarization• Describe and Implement IS-IS Redistribution• Hands-on: Configure and Verify Multiple IS-IS Area Network• Hands-on: Configure and Verify IS-IS Route Redistribution	2.5
	<p>Describe the Basic BGP Operations</p> <ul style="list-style-type: none">• Describe the role of BGP protocol in IP networks• Explain BGP Protocol Operation• Explain Routing Exchange Process• Describe the differences between IGP and BGP protocols	2.0



4	<p>Define and Interconnect Multiple Autonomous Systems</p> <ul style="list-style-type: none">• Building IGP networks & adding customer networks• Connecting Autonomous Systems• Configure and verify status of BGP neighbor• Hands-on: Configure and Verify Network Infrastructure	2.0
	<p>Describe different ways of IGP prefix injection into BGP</p> <ul style="list-style-type: none">• Explain the Concept of Injecting prefixes into BGP• Describe BGP network statements• Describe IP prefix lists• Explain Redistributing IGP into BGP• Hands-on: Configure and Verify Injecting Prefixes into BGP	2.5
	<p>Describe the difference between IBGP and EBGP</p> <ul style="list-style-type: none">• Describe and solve a challenge related to next hop attribute in IBGP• Describe the difference between signaling and forwarding path in transit AS• Explain the reason for full mesh requirement in IBGP• Hands-on: Configure and Verify iBGP	0.5
	<p>Describe BGP Best Path Selection Process</p> <ul style="list-style-type: none">• Explain influence of various BGP attributes on path selection process• Change BGP best path via route map configuration• Hands-on: Configure and Verify Route maps	1.0



Router 6000 R18 IPSec VPN Operation & Configuration



LZU1082707 R1A

Description

The IP communications can be secure by a authenticating and encrypting each IP packet of a communication session through IPSec VPN service.

This course module covers hands-on configuration for IPSec VPN on Router 6000. It provides multiple configuration tasks as well as verification and troubleshooting commands.

Learning objectives

On completion of this course the participants will be able to:

- 1 Describe IPSec Overview and its Architecture
 - 1.1 Describe IPSec Overview and its Architecture
 - 1.2 Describe the need of IPSec
 - 1.3 Describe ESP and Tunnel mode
 - 1.4 Describe Symmetric and Public/Private Key encryption.
 - 1.5 Describe ISAKMP Security Associations.
 - 1.6 Describe IPSec Security Associations.
- 2 Describe the IPSec Use-case
 - 2.1 Securing the Last Mile
 - 2.2 Automatic Provisioning for IPSec RA Clients
- 3 Implement and Configure IPSec VPN
 - 3.1 Describe the IP Infrastructure for IPSec VPN
 - 3.2 Hands-on: Configure and Verify IP Infrastructure for IPSec VPN
 - 3.3 Explain the IKE Phase 1
 - 3.4 Hands-on: Configure and Verify IKEv2 SA
 - 3.5 Explain the IKE Phase 2
 - 3.6 Hands-on: Configure and Verify IPSec SA
 - 3.7 Describe IPSec ACLs
 - 3.8 Hands-on: Configure IPSec ACLs
 - 3.9 Describe E2E IPSec Tunnel
 - 3.10 Hands-on: Configure and Verify IPSec Tunnel Endpoint





Target audience

The target audience for this course is:

Service Planning Engineer, Service Design Engineer, Network Design Engineer, Network Deployment Engineer, Service Deployment Engineer, System Technician, Service Technician, System Engineer, Service Engineer

Prerequisites

Successful completion of the following courses:

- ILT, Router 6000 R18 Operation and Configuration - LZU1082678

Duration and class size

The length of the course is 1 day and the maximum number of participants is 8.

Learning situation

This course is based on theoretical and practical instructor-led lessons given in both classroom and in technical environment using equipment and tools.

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

Day	Topics in the course	Estimated Time (hours)
1	Describe IPSec Overview and its Architecture <ul style="list-style-type: none">• Describe the need of IPSec• Describe ESP and Tunnel mode• Describe Symmetric and Public/Private Key encryption.• Describe ISAKMP Security Associations.• Describe IPSec Security Associations.	1.0
	Describe the IPSec Use-case <ul style="list-style-type: none">• Securing the Last Mile• Automatic Provisioning for IPSec RA Clients	0.5

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	<p>Implement and Configure IPsec VPN</p> <ul style="list-style-type: none">• Describe the IP Infrastructure for IPsec VPN<ul style="list-style-type: none">• Hands-on: Configure and Verify IP Infrastructure for IPsec VPN• Explain the IKE Phase 1<ul style="list-style-type: none">• Hands-on: Configure and Verify IKEv2 SA• Explain the IKE Phase 2<ul style="list-style-type: none">• Hands-on: Configure and Verify IPsec SA• Describe IPsec ACLs<ul style="list-style-type: none">• Hands-on: Configure IPsec ACLs• Describe E2E IPsec Tunnel<ul style="list-style-type: none">• Hands-on: Configure and Verify IPsec Tunnel Endpoint	4.5
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Router 6000 R18 MPLS and VPN Technology Operation & Maintenance



LZU1082709 R1A

Description

MPLS is a method for efficiently forwarding packets through a network. MPLS VPN allows to implement a wide range of policies.

This course module covers hands-on configuration for MPLS, L3VPN and L2VPN on IPOS based systems. It provides multiple configuration tasks as well as verification and troubleshooting commands

It is also designed based on Work-Shop concept. It is possible for the students to use the practical course documents for self-study without assistance of an instructor. Remote Lab access is required to perform the practical exercises.

Learning objectives

On completion of this course the participants will be able to:

- 1 Describe the Fundamental Concept of MPLS
 - 1.1 Describe the features of MPLS
 - 1.2 Explain the Benefits of MPLS
 - 1.3 Describe the Application of MPLS
 - 1.4 Describe the MPLS Terminology
- 2 Explain Building Network Infrastructure
 - 2.1 Implementing Backbone Connections
 - 2.2 Implementing IGP Backbone Configuration
 - 2.3 Configure and verify Static LSPs across multiple Router 6000
 - 2.4 Configure and verify MPLS and LDP (Outer Label)
- 3 Describe the LDP Operation and Configuration
 - 3.1 Describe Label Distribution – LDP and LSP setup
 - 3.2 Configure and Verify LSP LDP circuits
 - 3.3 Configure and Verify explicit null labels
 - 3.4 Describe and Configure LDP Session Establishment and LDP Parameters
 - 3.5 Monitor and verify LDP operation
 - 3.6 Describe the Overview of IGP/LDP synchronization
 - 3.7 Describe the Overview of LDP Graceful Restart





- 4 Describe MPLS Virtual Private Network Technology
 - 4.1 Explain the Concept of Virtual Private Networks
 - 4.2 Describe Benefits of VPNs
 - 4.3 Describe Drawbacks of VPNs
- 5 Describe the BGP/MPLS VPN
 - 5.1 Describe routing information exchange in L3VPN network
 - 5.2 Explain role of BGP and IGP in providers backbone
 - 5.3 Describe IPv4 VPN address family purpose
 - 5.4 Explain role of Route Target attribute in L3VPN network
 - 5.5 Explain iBGP for VPN signaling
 - 5.6 Configure and Verify VPN Context
- 6 Describe the CE Network in MPLS-VPN Environment
 - 6.1 Configure and Verify CE Context
 - 6.2 End to end packet flow walk through
 - 6.3 Verify a site in a multi-site corporate network over L3VPN
 - 6.4 Configure and Verify CE Context
- 7 Explain RSVP Operations
 - 7.1 Describe RSVP Operations
 - 7.2 Configure and verify MPLS label distribution through RSVP
 - 7.3 Describe Fast Reroute LSP protection
 - 7.4 Configure and verify Fast Reroute in node protection mode
 - 7.5 Configure and verify Fast Reroute in link protection mode
- 8 Describe LFA and LDP Operation
 - 8.1 Explain the Overview of LFA and LDP
 - 8.2 Configure and Verify LFA and LDP
- 9 Describe the Static Ethernet XC over PW
 - 9.1 Describe the Static Ethernet XC over PW
 - 9.2 Configure CE and its interface
 - 9.3 Configure port, circuits and bindings
 - 9.4 Verify Connectivity
 - 9.5 Configure and Verify Static XC over PW
- 10 Explain the PW Verification Tools
 - 10.1 Describe the Use of PW Verification Tools
 - 10.2 Configure L2VPN VPWS in context local
 - 10.3 Configure L2VPN in the VLAN
 - 10.4 Verify PW connectivity
 - 10.5 Verify End-to-End CE connectivity
- 11 Describe the Backup of PW
 - 11.1 Explain the Concept and Purpose of Backup of PW
 - 11.2 Configure L2VPN profile with backup peer
 - 11.3 Configure backup PW to second PE
 - 11.4 Configuring the primary and backup PW



- 11.5 Verify Backup PW
- 12 Explain the Operation and Configuration of VPLS
 - 12.1 Describe the Concept of VPLS
 - 12.2 Configure and verify VPN context
 - 12.3 Configure VPLS profile
 - 12.4 Configure bridge and VPN connections
 - 12.5 Verify PW connection
 - 12.6 Verify bridge MAC table
 - 12.7 Verify End-to-End CE connectivity
 - 12.8 Perform End-to-End packet walk through
- 13 Describe the Corporate LAN with VPLS
 - 13.1 Describe the Corporate LAN with VPLS
 - 13.2 Configure Hub-spoke architecture
 - 13.3 Verify PW connections
 - 13.4 Verify End-to-End CE connectivity

Target audience

The target audience for this course is:

Service Planning Engineer, Service Design Engineer, Network Design Engineer, Network Deployment Engineer, Service Deployment Engineer, System Technician, Service Engineer

Prerequisites

Successful completion of the following courses:

Router 6000 18 Operation and Maintenance LZU1082678 R1A

Duration and class size

The length of the course is 4 days and the maximum number of participants is 8.



Learning situation

This course is based on theoretical and practical instructor-led lessons given in both classroom and in technical environment using equipment and tools.

This course can also be conducted as a workshop based on interactive training sessions in a classroom environment.

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

Day	Topics in the course	Estimated Time (hours)
1	Describe the Fundamental Concept of MPLS <ul style="list-style-type: none">• Describe the features of MPLS• Explain the Benefits of MPLS• Describe the Application of MPLS• Describe the MPLS Terminology	0.5
	Explain Building Network Infrastructure <ul style="list-style-type: none">• Build a topology for MPLS Hands-on• Hands-on: Backbone Connections• Hands-on: IGP Backbone Configuration• Configure and verify Static LSPs across multiple Router 6000• Configure and verify MPLS and LDP (Outer Label)• Hands-on: MPLS and LDP (outer label)	2.0



	<p>Describe the LDP Operation and Configuration</p> <ul style="list-style-type: none"> • Describe Label Distribution – LDP and LSP setup • Configure and Verify LSP LDP circuits • Hands-on: Enable LDP LSP circuits • Configure and Verify explicit null labels • Describe and Configure LDP Session Establishment and LDP Parameters • Monitor and verify LDP operation • Hands-on: LDP session and LDP parameters • Describe the Overview of IGP/LDP synchronization • Hands-on: IGP/LDP synchronization • Describe the Overview of LDP Graceful Restart • Hands-on: LDP Graceful Restart 	3.5
2	<p>Describe MPLS Virtual Private Network Technology</p> <ul style="list-style-type: none"> • Explain the Concept of Virtual Private Networks • Describe Benefits of VPNs • Describe Drawbacks of VPNs 	1.0
	<p>Describe the Connectivity to the MPLS Backbone</p> <ul style="list-style-type: none"> • Establish Connectivity to the MPLS Backbone • Hands-on: Configure Connectivity MPLS Backbone 	2.0
	<p>Describe the BGP/MPLS VPN</p> <ul style="list-style-type: none"> • Describe routing information exchange in L3VPN network • Explain role of BGP and IGP in providers backbone • Describe IPv4 VPN address family purpose • Explain role of Route Target attribute in L3VPN network • Explain iBGP for VPN signaling • Configure and Verify VPN Context • Hands-on: Configure and Verify VPN Context 	3.0



3	<p>Describe the CE Network in MPLS-VPN Environment</p> <ul style="list-style-type: none">• Configure and Verify CE Context• End to end packet flow walk through• Verify a site in a multi-site corporate network over L3VPN• Hands-on 3: Configure and Verify CE Context	2.5
	<p>Explain RSVP Operations</p> <ul style="list-style-type: none">• Describe RSVP Operations• Configure and verify MPLS label distribution through RSVP• Describe Fast Reroute LSP protection• Configure and verify Fast Reroute in node protection mode• Configure and verify Fast Reroute in link protection mode• Hands-on: Configure and Verify RSVP and FRR	2.5
	<p>Describe LFA and LDP Operation</p> <ul style="list-style-type: none">• Explain the Overview of LFA and LDP• Implementing LFA and LDP• Hands-on: Configure and Verify LFA and LDP	1.0
4	<p>Describe the Static Ethernet XC over PW</p> <ul style="list-style-type: none">• Configure static Ethernet cross connect over PW• Configure CE and its interface• Configure port, circuits and bindings• Verify Connectivity• Hands-on 1: Configure and Verify Static XC over PW	1.5
	<p>Explain the PW Verification Tools</p> <ul style="list-style-type: none">• Configure L2VPN VPWS in context local• Configure L2VPN in the VLAN• Verify PW connectivity• Verify End-to-End CE connectivity• Hands-on 2: Configure and Verify E2E CE Connectivity	1.0



	<p>Describe the Backup of PW</p> <ul style="list-style-type: none">• Configure L2VPN profile with backup peer• Configure backup PW to second PE• Configuring the primary and backup PW• Verify backup PW• Hands-on 3: Configure and Verify Backup PW	1.0
	<p>Explain the Operation and Configuration of VPLS</p> <ul style="list-style-type: none">• Configure and verify VPN context• Configure VPLS profile• Configure bridge and VPN connections• Verify PW connection• Verify bridge MAC table• Verify End-to-End CE connectivity• Perform End-to-End packet walk through• Hands-on 4: Configure and Verify VPLS	1.5
	<p>Describe the Corporate LAN with VPLS</p> <ul style="list-style-type: none">• Configure Hub-spoke architecture• Verify PW connections• Verify End-to-End CE connectivity• Hands-on 5: Configure and Verify Corporate LAN with VPLS	1.0



Router 6000 R18 Operation and Maintenance



LZU1082678 R1A

Description

The Ericsson R6000 combines multiple functions into a single platform that provides Layer 3 (IP) routing and Layer 2 (Ethernet) network aggregation.

This course introduces the main tasks for system operation and maintenance of the Ericsson Router 6000 Family. It includes Router 6000 platform and the main available features. It shows how to identify hardware and software components, failures, alarms and how to perform software upgrades. Hands-on exercises allow participants to work with the Router 6000 CLI focusing on operations and maintenance related commands and tools.

This course module also describes administration and security functions on the Ericsson Router 6000 system. Several features related to system level administration and security are presented both in theory and also using hands-on exercises.

Learning objectives

On completion of this course the participants will be able to:

- 1 Router 6000 Fundamental Concepts
 - 1.1 Describe the Router 6000 Overview
 - 1.2 Explain the features and its function
 - 1.3 Describe the HW and SW Architecture Overview
 - 1.4 Describe the Use-Cases of Router 6000
- 2 Key Concepts in Router 6000 IPOS Environment
 - 2.1 Explain the terminologies such as context, interface and bindings architecture
 - 2.2 Describe the IPOS Command Line Interface
 - 2.3 Configure contexts, move between contexts and recognize where you are in the CLI
 - 2.4 Work with interfaces, ports, circuits and bindings and verify their status
- 3 File and Configuration Management in Router 6000
 - 3.1 Describe the Managing Configuration file in Router 6000
 - 3.2 Describe the File Storage Organization and Configuration Files
 - 3.3 Explain the active configuration and the transaction database
 - 3.4 Explain the Managing of Configuration Files
 - 3.5 Explain boot configuration and how to reset to default configuration
 - 3.6 Explain concept of auto-configuration
- 4 Ericsson IPOS Software Structure, Management and Licensing





- 4.1 Explain Ericsson IPOS structure
- 4.2 Describe Router 6000 software packages and licensing
- 4.3 Explain the release upgrade procedure of Ericsson IPOS
- 4.4 Ericsson IPOS roll-back procedure
- 4.5 Restore System to Previous Image
- 5 Router 6000 System Level Operation Concepts
 - 5.1 Describe router 6000 hardware components
 - 5.2 Verify router 6000 hardware components status
 - 5.3 Verify hardware diagnostics
 - 5.4 Describe IPOS software structure and processes
 - 5.5 Manipulate processes and use Core Dumps
- 6 Router 6000 System Security Concepts
 - 6.1 Explain administrative access
 - 6.2 Describe the Privilege Levels
 - 6.3 Explain the concept of Services
 - 6.4 Describe the concept and types of ACLs
 - 6.5 Describe administrator local and remote AAA using TACACS+/RADIUS
 - 6.6 Understand password recovery
 - 6.7 Describe the Reset of Administrator Password
- 7 Router 6000 System Troubleshooting
 - 7.1 Describe CLI troubleshooting tools (GREP, EMACS, reg-exp, alias, macro)
 - 7.2 Describe the Router 6000 system debug structure
 - 7.3 Identify the Router 6000 debug process
 - 7.4 Explain system logs and syslog
 - 7.5 Describe connectivity and traffic troubleshooting (port, interface and binding states, traffic statistics, errors, debug)
 - 7.6 Explain traffic mirroring

Target audience

The target audience for this course is:

Service Planning Engineer, Service Design Engineer, Network Design Engineer, Network Deployment Engineer, Service Deployment Engineer, System Technician, Service Technician, System Engineer, Service Engineer

Prerequisites

Successful completion of the following courses:



Duration and class size

The length of the course is 4 days and the maximum number of participants is 8.

Learning situation

This course is based on theoretical and practical instructor-led lessons given in both classroom and in a technical environment using equipment and tools, which are accessed remotely.

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

Day	Topics in the course	Estimated Time (hours)
1	Router 6000 Fundamental Concepts <ul style="list-style-type: none">Router 6000 OverviewRouter 6000 Features and its FunctionHardware and Software Architecture OverviewUse-Cases of Router 6000	1.0
	Key Concepts in Router 6000 IPOS Environment <ul style="list-style-type: none">Explain the terminologies such as context, interface and bindings architectureDescribe the IPOS Command Line Interface	1.5
	Describe the Lab Access and Hands-on <ul style="list-style-type: none">Hands-on: Configure contexts, move between contexts and exploring CLIHands-on: Work with interfaces, ports, circuits and bindings and verify their status	2.0
	File and Configuration Management in Router 6000 <ul style="list-style-type: none">Configuration file management in Router 6000Active configuration and the transaction databaseBoot configuration and how to reset to default configurationHands-on: File and Configuration Management	1.5

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2	<p>Upgrade the New Ericsson IPOS Release Image</p> <ul style="list-style-type: none"> Describe upgrading from different release Ericsson IPOS roll-back procedure Restore System to Previous Image Hands-on: Upgrade the IPOS Release Image 	2.5
	<p>Router 6000 System Level Operation Concepts</p> <ul style="list-style-type: none"> Describe router 6000 hardware components Verify router 6000 hardware components status Verify hardware diagnostics Hands-on: Hardware Diagnostics and Status 	1.0
	<p>IPOS Software Structure and Processes</p> <ul style="list-style-type: none"> Describe IPOS Software Structure and Processes Manipulate processes and use Core Dumps Hands-on: Process Management 	2.5
3	<p>Describe the Specific Services within Context</p> <ul style="list-style-type: none"> Describe the different between local and non-local contexts Admin account Understanding and configuring connection via context local Describe and configuring Connection via non-local context Compare and contrast local and non-local context Connection Describe the concept of Services in Router 6000 Enable Application-Level Services in Nonlocal Contexts Verify specific services within context (local and non-local) Hands-on: Service Management 	1.5
	<p>Understand administrative privileges and command privilege levels</p> <ul style="list-style-type: none"> Describe the Privilege Level for an Administrator Account Modify the Privilege Level in an Active Session Configure a Password to Enable a Privilege Level Hands-on: Privilege Level 	1.0



	<p>Configure AAA using TACACS+ server for administrator sessions</p> <ul style="list-style-type: none"> Describe the method of authenticating the users Describe the TACACS+ Server Describe the setup of a TACACS+ Server Configure a TACACS+ Server for a context Configure TACACS+ Timers and Counters for a Context Hands-on: TACACS+ Server 	1.0
	<p>Understanding the concept of Access Control Lists in IPOS</p> <ul style="list-style-type: none"> Describe the concept of Access Control List Describe the type of ACL Understand the filtering of traffic to a specific host Configuring the administrative Access Control Lists Hands-on: Access Control Lists 	1.5
	<p>Describe the procedure of password recovery</p> <ul style="list-style-type: none"> Describe password recovery Perform the administrator and Privilege Level Passwords Hands-on: Password Recovery 	0.5
4	<p>Router 6000 System Troubleshooting</p> <ul style="list-style-type: none"> Describe the CLI Tools for Troubleshooting Describe the GREP and its Options Describe the use of CLI Command Aliases as Shortcuts Using CLI Command macros to Execute Multiple Command with Single Command Hands-on: CLI Troubleshooting Tools 	1.0
	<p>Router 6000 Debug Process</p> <ul style="list-style-type: none"> Use and Impact of Debugging on the IPOS System Describe the System Debug Structure Identify the System Debug Process Hands-on: Debug Process 	1.0
	<p>Describe the Log in Router 6000</p> <ul style="list-style-type: none"> Describe the different type of logs in Router 6000 Describe the communication with Syslog Server Describe the concept of communication with Syslog Server Configure communication to a Syslog server Hands-on: System Log and Syslog Server 	1.0



	Connectivity and Traffic Troubleshooting <ul style="list-style-type: none">• Troubleshooting for Traffic Flow through Ports, Circuits and Interfaces• Explain the traffic flow in Router 6000 System• Identify the Connectivity Issue and Troubleshooting• Hands-on: Connectivity and Traffic Troubleshooting	1.5
	Traffic Mirroring <ul style="list-style-type: none">• Overview of Port and Circuit Mirroring	0.5
	Q&A and Post-test	1.0



Router 6000 R18 QoS Operation & Configuration



LZU1082704 R1A

Description

Router 6000 differentiates traffic based on the traffic type and the application. QoS policies create and enforce quality of service levels, bandwidth rates, and prioritize how incoming and outgoing packets are scheduled.

This course module covers fundamentals of Quality of Service on Ericsson Router 6000 product family. It provides multiple configuration tasks based on Ericsson IPOS, as well as verification and troubleshooting.

Learning objectives

On completion of this course the participants will be able to:

- 1 Explain QoS Handling in the System
 - 1.1 Describe QoS overview
 - 1.2 Explain the QoS blocks
 - 1.3 Identify the QoS packet flow
 - 1.4 Identify QoS Implementation for Router 6000
- 2 Describe QoS Propagation and its type
 - 2.1 Explain QoS indicators
 - 2.2 Identify Different Types of Propagation
 - 2.3 Configure and Verify IP QoS propagation
- 3 Describe QoS Classification and Marking
 - 3.1 Describe the QoS Classification using ACLs
 - 3.2 Configure and Verify Classification using ACLs
 - 3.3 Describe internal QoS Marking
 - 3.4 Configure and verify internal QoS marking
- 4 Explain Rate Limiting and Configuring
 - 4.1 Describe Token Bucket Concept
 - 4.2 Describe Class-based Policing
 - 4.3 Configure and verify QoS policy policing/metering with classes
- 5 Explain the Concept of QoS Queuing
 - 5.1 Describe the QoS Management Concept
 - 5.2 Describe the QoS Queue Maps
 - 5.3 Configure and verify QoS Queue-map





- 6 Describe Congestion Scheduling
 - 6.1 Explain the Queuing and Scheduling Concepts
 - 6.2 Describe the Priority Weighted Fair Queuing Policies
 - 6.3 Configure and verify scheduling, Priority Weighted Fair Queuing (PWFQ)
- 7 Describe Congestion Avoidance
 - 7.1 Explain Congestion Avoidance Concept
 - 7.2 Describe the Random Early Detection and WRED
 - 7.3 Configure and verify congestion avoidance – Weighted Random Early Discard (WRED)
- 8 Describe QoS Hierarchical Scheduling
 - 8.1 Identify Concept of Hierarchical QoS
 - 8.2 Describe QoS Hierarchical Scheduling in TM
 - 8.3 Compare H-QoS and flat QoS
 - 8.4 Configure and Verify H-QoS

Target audience

The target audience for this course is:

Service Planning Engineer, Service Design Engineer, Network Design Engineer, Network Deployment Engineer, Service Deployment Engineer, System Technician, Service Technician, System Engineer, Service Engineer

Prerequisites

Successful completion of the following courses:

- ILT, Router 6000 R18 Operation and Configuration - LZU1082678

Duration and class size

The length of the course is 2 days and the maximum number of participants is 8.

Learning situation

This course is based on theoretical and practical instructor-led lessons given in both classroom and in technical environment using equipment and tools.

This course can also be conducted as a workshop based on interactive training sessions in a classroom environment.



Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

Day	Topics in the course	Estimated Time (hours)
1	Explain QoS Handling in the System <ul style="list-style-type: none">Describe QoS overviewExplain the QoS blocksIdentify the QoS packet flowIdentify QoS deployment for Router 6000Hands-on: LAB environment and QoS Topology	2.0
	Describe QoS Propagation and its type <ul style="list-style-type: none">Explain QoS indicatorsIdentify Different Types of PropagationConfigure and Verify IP QoS propagationHands-on: Configure and Verify IP QoS propagation	1.5
	Describe QoS Classification and Marking <ul style="list-style-type: none">Describe the QoS Classification using ACLsConfigure and Verify Classification using ACLsDescribe internal QoS MarkingConfigure and verify internal QoS markingHands-on: Configure and verify classification using ACLs	1.5
	Explain Rate Limiting and Configuring <ul style="list-style-type: none">Describe Token Bucket ConceptDescribe Class-based PolicingConfigure and verify QoS policy policing/metering with classesHands-on: Configure and verify QoS policy policing/metering with classes	1.0

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2	<p>Explain the Concept of QoS Queuing</p> <ul style="list-style-type: none">• Describe the QoS Queue Maps• Configure and verify QoS Queue-map• Hands-on: Configure and verify QoS Queue-map	1.0
	<p>Describe Congestion Scheduling</p> <ul style="list-style-type: none">• Explain the Queuing and Scheduling Concepts• Describe the Priority Weighted Fair Queuing Policies• Configure and verify scheduling, Priority Weighted Fair Queuing (PWFQ)• Hands-on: Configure and Verify Scheduling - PWFQ	1.5
	<p>Describe Congestion Avoidance</p> <ul style="list-style-type: none">• Explain Congestion Avoidance Concept• Describe the Random Early Detection and WRED• Configure and verify congestion avoidance – Weighted Random Early Discard (WRED)• Hands-on: Configure and Verify Congestion Avoidance – WRED	1.0
	<p>Describe QoS Hierarchical Scheduling</p> <ul style="list-style-type: none">• Identify Concept of Hierarchical QoS• Describe QoS Hierarchical Scheduling in TM• Compare H-QoS and flat QoS• Configure and Verify H-QoS• Hands-on: Configure and Verify H-QoS	2.5



Router 6000 R18 SyncE Operation & Configuration



LZU1082705 R1A

Description

The router is a part of the next-generation IP Routers products designed to integrate Ericsson Radio Access Network (RAN) and backhaul solution it supports both frequency and time/phase synchronization with a variety of synchronization features.

This course covers timing and synchronization features of the Ericsson Router 6000 Family. It includes Synchronous Ethernet and IEEE 1588 concepts. The participants will perform multiple hands-on configuration and verification exercises for these features.

Learning objectives

On completion of this course the participants will be able to:

- 1 Describe the Timing and Synchronization Overview
 - 1.1 Explain Timing and Synchronization General Concepts and Protocols
 - 1.2 Describe Timing Features in Router 6000
- 2 Review Key Concept in Router 6000 IPOS Environment
 - 2.1 Explain the terminologies such as context, interface and bindings architecture
 - 2.2 Describe Command Line Interface and working with interfaces and its type, ports and circuits
 - 2.3 Describe the Binding Concept and its type
- 3 Explain Synchronous Ethernet on Router 6000
 - 3.1 Describe the Synchronous Ethernet Overview
 - 3.2 Describe Synchronous Ethernet on Router 6000
 - 3.3 Configure and Verify SyncE on Router 6000
- 4 Explain IEEE 1588 PTP on Router 6000
 - 4.1 Describe the Purpose and concept of IEEE 1588
 - 4.2 Configure and Verify PTP on Router 6000
- 5 Explain G.8275.2 Profile on Router 6000
 - 5.1 Describe the Purpose and Concept of G.8275.2 Profile
 - 5.2 Configure and Verify G.8275.2 Profile





Target audience

The target audience for this course is:

Service Planning Engineer, Service Design Engineer, Network Design Engineer, Network Deployment Engineer, Service Deployment Engineer, System Technician, Service Engineer

Prerequisites

Successful completion of the following courses:

- ILT, Router 6000 R18 Operation and Configuration - LZU1082678 R1A

Duration and class size

The length of the course is 1 day and the maximum number of participants is 8.

Learning situation

This course is based on theoretical and practical instructor-led lessons given in both classroom and in technical environment using equipment and tools.



Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate.

Day	Topics in the course	Estimated Time (hours)
1	Describe the Timing and Synchronization Overview <ul style="list-style-type: none">• Explain Timing and Synchronization General Concepts and Protocols• Describe Timing Features in Router 6000	1.5
	Review Key Concept in Router 6000 IPOS Environment <ul style="list-style-type: none">• Explain the terminologies such as context, interface and bindings architecture• Describe Command Line Interface and working with interfaces and its type, ports and circuits• Describe the Binding Concept and its type	0.5
	Explain Synchronous Ethernet on Router 6000 <ul style="list-style-type: none">• Describe the Synchronous Ethernet Overview• Describe Synchronous Ethernet on Router 6000• Configure and Verify SyncE on Router 6000	1.5
	Explain IEEE 1588 PTP on Router 6000 <ul style="list-style-type: none">• Describe the Purpose and concept of IEEE 1588• Configure and Verify PTP on Router 6000	1.5
	Explain G.8275.2 Profile on Router 6000 <ul style="list-style-type: none">• Describe the Purpose and Concept of G.8275.2 Profile• Configure and Verify G.8275.2 Profile	1.0

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