



IP Edge 2018 Training Programs

Catalog of Course Descriptions







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SE-164 80 Stockholm

Telephone: +46 10 719 0000



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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.

Service delivery is supported using various delivery methods including:

Icon	Delivery Method
	Instructor Led Training (ILT)
	eLearning (WBL)

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Advanced Services on SmartEdge Overview & Fundamentals



LZU 108 8526 R1A

Description

This course consists of two modules, Overview and Fundamentals

The Overview module gives an overview of what the Advanced Services Engine (ASE) is in relation to SmartEdge. It illustrates the benefits of ASE and the market drivers for it. It also explains the different services that are offered by Advanced Service Engine.

The Fundamentals module describes the Advanced Services Engine Card in detail and includes key ASE concepts including ASE Functionality and ASE Architecture. The course also gives an in depth explanation of the Advanced Services Processor (ASP) and the relationship between ASP Pools and Groups. The course looks at the concept of Service Enabled concepts and describes how features such as Load Balancing and High availability can be configured

Learning objectives

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

- 1 Explain what the Advanced Services Engine Card is
- 2 Understand how the functions of multiple systems can be collapsed into the Advanced Service Engine
- 3 Describe the Market Drivers for Advanced Service Engine
- 4 Explain the services offered by Advanced Service Engine
- 5 Describe the Advanced Services Engine Functionality.
- 6 Explain the Architecture of ASE.
- 7 Explain what the Advanced Services Engine Processor is.
- 8 Describe ASP Pools.
- 9 Describe ASP Groups.
- 10 Explain the use of Service Enabled Contexts.
- 11 Illustrate the benefit of Load Balancing and High Availability offered by ASE.
- 12 Describe in detail the maximum number of ASPs per SmartEdge Chassis



**Target audience**

The target audience for this course is:
Fundamentals

Prerequisites

Successful completion of the following courses:
SmartEdge Fundamentals LZU 108 8933

Duration and class size

The length of the course is appr. 1 hour.

Learning situation

This is a self-paced web based course

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	What is Advanced Service Engine (ASE) ASE Benefits Market Drivers for ASE Services Supported Explain the Architecture of ASE. Explain what the Advanced Services Engine Processor is. Describe ASP Pools. Describe ASP Groups. Explain the use of Service Enabled Contexts. Illustrate the benefit of Load Balancing and High Availability offered by ASE. Describe in detail the maximum number of ASPs per SmartEdge Chassis.	

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BGP Overview & Fundamentals



LZU 108 8532 R1A

Description

BGP Overview & Fundamentals consists of 2 modules: BGP Overview and BGP Fundamentals. Both parts end with a Knowledge Assessment.

BGP Overview module describes the background to BGP, what BGP is, reasons for using BGP and the different types of deployment scenarios for BGP.

BGP Fundamentals module describes what BGP is, why we use it and how it works. It also goes deeper into the peering process, how BGP shares prefixes and what attributes are used in path selection

Learning objectives

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

- 1 Know what Border Gateway Protocol (BGP) is
- 2 Understand why operators need to use BGP
- 3 Describe the market driver for BGP
- 4 Explain the way operators use BGP
- 5 Know the typical deployment scenarios for BGP
- 6 Appreciate the value it provides to the customers from technical point of view
- 7 Understand how BGP can be used by different groups of customers (Enterprises, Service Providers)
- 8 Explain what makes BGP different from other routing protocols
- 9 Describe how BGP works
- 10 Understand what a Finite State Machine is
- 11 Explain the different states in the BGP peering process and what messages are sent between each state.
- 12 Describe the different attributes that BGP sends and how these are used to select the best path.
- 13 Understand what BGP route Summarization is and why it important





- 14 Explain what makes BGP different from other routing protocols
- 15 Appreciate the challenges with worldwide BGP routing

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

IP Overview & Fundamentals	LZU 108 8538
IP Routing Overview & Fundamentals	LZU 108 8593
OSPF <u>or</u> IS-IS Overview & Fundamentals	LZU 108 8536 <u>or</u> LZU 108 8534

Duration and class size

The length of the course is 1.33 hours.

Learning situation

This is a self-paced web based course



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	Growth in the Internet BGP Concepts What is BGP Why BGP BGP Routing Policy Typical Deployment Scenarios How BGP works BGP Peering Sharing Prefixes BGP Attributes Summary	



DHCP-CLIPS Fundamentals



LZU1088460 R1A

Description

This course provides fundamentals of the DHCP protocol. It also explains Ericsson's method of managing DHCP subscribers – CLIPS

Learning objectives

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

- 1 Understand what DHCP is and how it is used.
- 2 Describe the role of DHCP client, server, relay and proxy.
- 3 Explain in details DHCP IP address assignment process.
- 4 Describe the differences between Static and Dynamic CLIPS.
- 5 Understand RADIUS's role in CLIPS.

Target audience

The target audience for this course is:

All

Prerequisites

Successful completion of the following courses:

Fixed Broadband Subscriber Management Overview
IP Overview & Fundamentals

Duration and class size

The length of the course is 0.5 hours.

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**Learning situation**

This course is a Web based course

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	What is DHCP DHCP IP Address Assignment DHCP IP Address release DHCP Message fields DHCP IP Address Lease Renewal and Rebinding DHCP Redundancy and Failover DHCP Options DHCP Relay Function DHCP Proxy Server Function Clientless IP Service Selection Dynamic CLIPS Static CLIPS RADIUS Accounting and Authentication DHCP RADIUS Proxy Summary	



DPI Fundamentals



LZU 108 8525 R1A

Description

This course provides fundamentals of Application Traffic Management and Deep Packet Inspection. The importance of both topics grows together with amount of data exchanged by networking society.

It ends with a knowledge assessment.

Learning objectives

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

- 1 Understand what Application Traffic Management is
- 2 Understand what Deep Packet Inspection (or D.P.I) is
- 3 Understand what are the market drivers for Application Traffic Management and DPI
- 4 Understand typical Deep Packet Inspection Solutions.
- 5 Understand applications supported by DPI and Traffic Detection and Control Mechanisms

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

There are no prerequisites for this course

Duration and class size

The length of the course is 0.83 hours.

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**Learning situation**

This is a self paced web based course

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)
	What is Application Traffic Management	
	What is DPI	
	Market Drivers	
	Deep Packet Inspection Solutions	
	Applications supported by Deep Packet Inspection	
	Traffic Detection and Control Mechanisms	
	Summary	



Ericsson NetOp EMS R13 Foundation and Operations



LZU1089312 R3A

Description

NetOp R13 EMS Foundation and Operations course explores in the functions of NetOp EMS System and provides broader understanding of the architecture.

The exercises can be based on different types of network element:
Ericsson SmartEdge family and/or
Ericsson Smart Services Router 8000 family

Theory to hands-on ratio of this course is 40/60

Learning objectives

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

- 1 Describe the NetOp EMS system architecture
- 2 Describe functions of all components of the system
- 3 Describe a role of communication protocols in the system
- 4 Describe a redundancy functions of the system
- 5 Perform Network setup
- 6 Perform system monitoring
- 7 Perform System Operations





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:

The participants should be familiar with and have practical experience with IP networks
As well as a solid understanding of general networking technologies.

A basic knowledge of NMS in general is also required.

- WBL: Ericsson SmartEdge Family Fundamentals, LZU1088933
- WBL: SSR Overview, LZU1088829
- WBL: SSR Fundamentals - Key Concepts, LZU1088855
- WBL: SSR Fundamentals - System Architecture, LZU1088854
- WBL: SSR Fundamentals - System Management Configuration, LZU1088856
- ILT/WS: Exercises for SSR Fundamentals - System Management Configuration, LZU1088821

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.

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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	• NetOp Foundation	
	• Overview	0.2
	• NetOp EMS Components	0.3
	• NetOp EMS – System architecture	0.5
	• NetOp EMS – Network Element Coverage	0.2
	• NetOp EMS – Redundancy <ul style="list-style-type: none"> - Server - Proxy Server - Database 	0.2
	• NetOp EMS – Scaling	0.1
	• NetOp Operations	
	• Initialization (EMS system)	-
	• Connection to the Lab	0.5
	• Introduction to NetOp EMS Client GUI	0.2
	• Server Manager <ul style="list-style-type: none"> - Checking a Configuration of NetOp EMS Server 	0.8
	• Exercise 1 Verify NetOp EMS Client connection and settings <ul style="list-style-type: none"> - Exercise 1.1 Connect to the remote desktop - Exercise 1.2 Launch the NetOp Client software on the remotely connected PC - Exercise 1.3 Connect to the NetOp EMS Server in the Lab - Exercise 1.4 Verify the configuration of the NetOp EMS Server 	0.5
• Network setup	-	

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<ul style="list-style-type: none"> • Basic configuration on the SmartEdge 	0.2
<ul style="list-style-type: none"> • Adding nodes 	0.2
<ul style="list-style-type: none"> • Network discovery 	0.2
<ul style="list-style-type: none"> • Advertising a node 	0.2
<ul style="list-style-type: none"> • Deleting a node 	0.2
<ul style="list-style-type: none"> • Topology maps and Icons 	0.5
<ul style="list-style-type: none"> • Exercise 2 Network setup <ul style="list-style-type: none"> - Exercise 2.1 Configure the node to communicate with the NetOp EMS - Exercise 2.2 Add the Topology Map and Icon - Exercise 2.3 Create own domain - Exercise 2.4 Manually add own nodes - Exercise 2.5 Delete own node - Exercise 2.6 Discover node - Exercise 2.7 Advertise node - Exercise 2.8 Assign node to domain - Exercise 2.9 Position node in maps 	1.5
<ul style="list-style-type: none"> • Provisioning 	
<ul style="list-style-type: none"> • Provisioning Cards 	0.2
<ul style="list-style-type: none"> • Provisioning Ports 	0.3
<ul style="list-style-type: none"> • Exercise 3 Card and Port Provisioning <ul style="list-style-type: none"> - Exercise 3.1 Working with Card Inventory - Exercise 3.2 Provision Card - Exercise 3.3 Provision Ports and Circuits 	1.0
<ul style="list-style-type: none"> • System monitoring: <ul style="list-style-type: none"> - Faults - Forwarding SNMP Traps - LOGs - Statistics (Performance Graphs) 	0.5



2	<ul style="list-style-type: none">• Exercise 4 System monitoring<ul style="list-style-type: none">- Exercise 4.1 Faults- Exercise 4.2 Live and Historical Logs- Exercise 4.3 SNMP Traps- Exercise 4.4 Statistics	1.0
	<ul style="list-style-type: none">• System operations	-
	<ul style="list-style-type: none">• Provisioning Contexts & Context Inventory	0.2
	<ul style="list-style-type: none">• Access the node CLI	0.1
	<ul style="list-style-type: none">• Provisioning Interfaces	0.2
	<ul style="list-style-type: none">• Port Profiles	0.2
	<ul style="list-style-type: none">• Circuits	0.2
	<ul style="list-style-type: none">• Subscribers	0.2
	<ul style="list-style-type: none">• QoS Policy	0.2
	<ul style="list-style-type: none">• Bindings	0.2
	<ul style="list-style-type: none">• Routing Protocols	0.2
	<ul style="list-style-type: none">• Bulk operations	0.2
	<ul style="list-style-type: none">• Exercise 5 System Operations<ul style="list-style-type: none">- Exercise 5.1 Node Configuration- Exercise 5.2 Configuration file backup- Exercise 5.3 (Optional) Perform Bulk Operations	1.0



Ericsson SmartEdge Family Fundamentals



LZU 108 8933 R1A

Description

SmartEdge System Fundamentals is a 2-hour lecture, web based learning module. This is required preparation for other SmartEdge technology courses.

This course module describes common foundation information for the SmartEdge family of products including SE1200, SE800, SE400, and SE100. It explains the hardware and software architecture of the system. It also covers the concept of Context and Binding architecture.

This is a 100 percent theory course module.

Learning objectives

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

- 1 Present the Ericsson SmartEdge, NetOp and SSR product family
- 2 Understand Ericsson SmartEdge hardware and software architecture
- 3 Understand the concept of Non-Stop Forwarding
- 4 Identify the Traffic Card Architecture
- 5 Explain Context & binding architecture

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

The participants should have a solid understanding of general networking technologies.

Duration and class size

The length of the course is 2 hours.



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**Learning situation**

This is a web-based interactive training course with multimedia content.

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	SmartEdge Highlights SmartEdge Architecture System Level Hardware Architecture High Availability & Software Architecture Forwarding architecture Quiz time Context & Bindings Architecture Quiz time	2



Ericsson SP R2 415/420 Operation and Maintenance



LZU1089745 R1A

Description

If your personnel do not have the appropriate skills and knowledge, operation and maintenance of equipment could be a complex and resource-consuming task. This course will provide you with the information about structure and features of the SP 415/420. Furthermore they will learn how to operate and maintain the SP 415/420 using the Ericsson IPOS Command Line Interface (CLI).

The SP 415/420 is different from the SP 110/210/310. The product has a different operating system and is managed using CLI. 415/420 is more focused on L3 services and features such as routing; MPLS and L3VPNs. Practical exercises for these features are included in this course.

Theory to hands-on ratio of this course is 30/70

Learning objectives

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

- 1 Describe the SP 415/420 and its features.
 - 1.1 Illustrate the use of the equipment in the network.
 - 1.2 Demonstrate the main features the SP 415/420 offers.
 - 1.3 Explain the main system architecture.
 - 1.4 Identify the panel devices.
- 2 Use the Ericsson IPOS in SP 415/420.
 - 2.1 Understand the main concepts of Ericsson IPOS.
 - 2.2 Understand the basics of Ericsson IPOS Command Line Interface.
- 3 Operate the initial system set-up.
 - 3.1 Connect to the equipment.
 - 3.2 Navigate the Ericsson IPOS Command Line Interface.
 - 3.3 Configure management network parameters.
- 4 Operate the main maintenance procedures.
 - 4.1 Perform basic management of the system.
 - 4.2 Perform system file management tasks.
 - 4.3 Describe the software upgrade principles.
 - 4.4 Identify and manage some emergency conditions.
- 5 Describe the functionalities and features of the SP.
 - 5.1 Understand the main functionalities.





- 5.2 Describe the routing features.
- 5.3 Describe MPLS features.
- 5.4 Describe L3VPN Services.
- 5.5 Describe L2VPN services.

- 6 Configure and verify the main features of the SP 415/420.
 - 6.1 Configure basic IP connectivity.
 - 6.2 Configure routing functionalities.
 - 6.3 Configure Static MPLS.
 - 6.4 Configure IP/MPLS.
 - 6.5 Configure L3VPNs.



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

Prerequisites

Successful completion of the following courses:

WBL: SSR Fundamentals: Key Concepts, LZU1088854

WBL: SSR Fundamentals: System Management Configuration, LZU1088856

WBL: IP Overview and Fundamentals, LZU1088538

WBL: IP Routing Overview and Fundamentals, LZU1088593

WBL: OSPF Overview and Fundamentals, LZU1088536

WBL: MPLS Overview and Fundamentals, LZU1088534

The participants should be familiar with the IP Networking, Routing and Ethernet principles.

Duration and class size

The length of the course is 3 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.

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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	SP 415/420 and its features	0.5
	<ul style="list-style-type: none">• SP 415/420 in the network• The main features the SP 415/420• SP 415/420 system architecture	
	Ericsson IPOS in SP 415/420	1.5
	<ul style="list-style-type: none">• The main concepts of Ericsson IPOS• The basics of Ericsson IPOS Command Line Interface	
	The initial system set-up	1
	<ul style="list-style-type: none">• Connect to the equipment.• Navigate the Ericsson IPOS Command Line Interface.• Configure management network parameters.	
	Exercise: Management network	0.5
	The main maintenance procedures.	1
	<ul style="list-style-type: none">• Basic management of the system• System file management• The software upgrade principles.• Emergency conditions	
	Exercise: Basic system management	1
Exercise: System file management	1	
2	The functionalities and features of the SP	1.5
	<ul style="list-style-type: none">• The main functionalities• The routing features• MPLS features• L3VPN Services• L2VPN services	
	Configure and verify the main features of the SP 415/420.	
	Configure basic IP connectivity.	0.5
	Exercise: IP Connectivity	1.5

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	Configure routing functionalities	0.5
	• Static routes	
	Exercise: Static routes	0.5
	Configure routing functionalities	0.5
	• Dynamic routing	
	Exercise: OSPF	1
	MPLS: Multi-Protocol Label Switching	
	Configure Static MPLS	0.5
	Exercise: Static MPLS	1.5
3	Configure IP/MPLS	0.5
	Exercise: MPLS and LDP	1
	Configure L3 VPNs	0.5
	Exercise: L3 VPN and Customer Network	1
	L3 VPN signaling: iBGP	0.5
	Exercise: L3 VPN signaling and end-to-end verification	2
	MPLS L3VPN Configuration Summary	0.5



Ethernet OAM Enhancement



LZU 108 8518 R1A

Description

This course provides information about protocols used for Ethernet OAM (Operation Administration and Maintenance). It explains functionality provided by 802.1ag, 802.3ah and Y.1731 protocols. This course requires good understanding of Ethernet fundamentals

Learning objectives

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

- 1 Understand protocols used for Ethernet OAM (Operation Administration and Maintenance)
- 2 Understand the functionality provided by 802.1ag, 802.3ah and Y.1731 protocols

Target audience

The target audience for this course is:
Fundamentals

Prerequisites

Successful completion of the following courses:
Ethernet Transport Overview and Fundamentals, LZU1088519

Duration and class size

The length of the course is 1 hour

Learning situation

This is a self paced web based course



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)
	What is Ethernet OAM	
	Why Ethernet OAM is needed	
	Ethernet OAM Environment	
	802.3ah Protocol	
	802.1ag Protocol	
	Ethernet Maintenance Levels	
	ITU Y.1731	
	Summary	



Ethernet Standards



LZU 108 7591 R1A

Description

Ethernet is becoming one of the main standard communication protocols used in transport networks to handle the requirements of transporting data traffic in the networks in an efficient way.

Do you have the competence required to handle this?

This course covers the basics of Ethernet and related standards. The objectives of this course will be the prerequisites for many of the product Operations and Operation and Maintenance courses

Learning objectives

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

- 1 Understand the structure of the Ethernet frame and MAC address format
- 2 Describe the differences between bridging and switching
- 3 Understand Ethernet framing, Ethernet over PDH and Ethernet over SDH
- 4 Define and understand different Ethernet protection protocols
- 5 Understand the Operations, Administration and Maintenance (OAM) features of Ethernet
- 6 Define which traffic management mechanisms are available to manage Ethernet traffic performance assurance
- 7 Understand the use of IGMP over L2 Switches
- 8 Describe T-MPLS and PBT (PBB-TE)

Target audience

The target audience for this course is:

Fundamentals



**Prerequisites**

Successful completion of the following courses:

There are no prerequisites for this course

Duration and class size

The length of the course is appr. 1 hours.

Learning situation

This is a self-paced web based course

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	Introduction Bridge and Switching Ethernet Services Ethernet over PDH and SDH Ethernet Protections Ethernet OAM Traffic Management IGMP over Layer 2 Switch T-MPLS and PBT Test	



Ethernet Transport Overview & Fundamentals



LZU 108 8519 R1A

Description

This course is made of two modules. First the Overview module that gives an introduction into Carrier Ethernet. It explains the need for Carrier Ethernet when building a common Ethernet transport network. It describes the key attributes that make it different from LAN-based Ethernet, and the role of Metro Ethernet Forum in promoting Carrier Ethernet.

The second module is the "Ethernet Transport Fundamentals, web based learning module. This module describes the Ethernet protocol in detail and key concepts Ethernet is based on. It also gives in depth explanation of some of the features Ethernet offers. Telecom Grade Ethernet is also described and the different Telecom Grade Ethernet Solutions are explained."

Both modules end with a knowledge assessment

Learning objectives

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

- 1 Describe the concept and solution of Carrier Ethernet
- 2 To learn about challenges in Telco Networks
- 3 To know the background on Ethernet
- 4 To know about Carrier Ethernet Services
- 5 Describe the Ethernet Protocol
- 6 Explain how Ethernet Works
- 7 Compare the different Ethernet Link Types
- 8 Describe Ethernet Bridging and Switching
- 9 Explain Ethernet Loop Avoidance
- 10 Describe the Rapid Spanning Tree Protocol
- 11 Explain the operation of Ethernet VLANs and the IEEE802.1q Protocol
- 12 Describe Ethernet Resiliency and Link Aggregation
- 13 Describe Ethernet Ring Protection





- 14 Understand Provider Bridging - QinQ
- 15 Understand Provider Backbone Bridging Mac-in-Mac

Target audience

The target audience for this course is:
Fundamentals

Prerequisites

Successful completion of the following courses:

Ethernet Standards LZU 108 7591

Duration and class size

The length of the course is appr. 1 hour.

Learning situation

This is a self-paced web based course

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	BGP Concepts What is BGP Why BGP How BGP works BGP Peering Sharing Prefixes BGP Attributes Summary	

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Exercises for BGP Fundamentals on SSR/SmartEdge



LZU1088824 R3A

Description

Exercises for BGP Fundamentals on SSR/SmartEdge is available for students who attended overview and fundamentals modules for BGP technology as well as SmartEdge/SSR Overview/Fundamentals.

This course module covers hands-on configuration for BGP on SEOS / Ericsson IPOS based systems. It provides multiple configuration tasks as well as verification and troubleshooting commands.

There are two options for this course:

- Exercises for BGP Fundamentals on SSR/SmartEdge based on OSPF
- Exercises for BGP Fundamentals on SSR/SmartEdge based on IS-IS

Each group of two students can choose one of these options to work with for this course.

Theory to hands-on ratio of this course is 5/95

Learning objectives

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

- 1 Connect autonomous systems
- 2 Configure and Verify BGP neighbors
- 3 Troubleshooting BGP sessions
- 4 Inject prefixes into BGP
- 5 Implement BGP transit AS
- 6 Understand E-BGP and I-BGP
- 7 Configure and verify E-BGP and I-BGP
- 8 Configure and verify BGP path selection & control

Target audience

The target audience for this course is:

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





Technician, System Engineer

Prerequisites

Successful completion of the following courses:

SmartEdge Platform:

WBL: SmartEdge Family System Fundamentals, LZU 108 8933

SSR Platform:

WBL: SSR Overview, LZU 108 8829

WBL: SSR Fundamentals - Key Concepts, LZU 108 8855

WBL: SSR Fundamentals - System Architecture, LZU 108 8854

WBL: SSR Fundamentals - System Management Configuration, LZU 108 8856

ILT/WS: Exercises for SSR Fundamentals - System Management Configuration, LZU 108 8821

Basic Routing:

WBL: IP Routing Overview & Fundamentals, LZU 108 8593

WBL: IP Overview & Fundamentals, LZU 108 8538

OSPF module:

WBL: OSPF Overview & Fundamentals, LZU 108 8536

ILT: Exercises for OSPF Fundamentals on SSR/SmartEdge

or

IS-IS module:

WBL: IS-IS Overview & Fundamentals, LZU 108 8534

ILT: Exercises for IS-IS Fundamentals on SSR/SmartEdge

BGP module:

WBL: BGP Overview & Fundamentals, LZU 108 8532

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 a technical environment using equipment and tools.

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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	Introduction, Review basic concepts, Agenda & LAB setup	0.50
	Building IGP networks & adding customer networks	1.15
	Connecting autonomous systems	1.0
	Verification BGP neighbor	0.50
	Disconnect causes and troubleshooting	0.15
	Manual intervention BGP	0.15
	Injecting prefixes into BGP, introduction	0.15
	BGP network statements	1.65
	Prefix aggregation	0.75
	Redistributing IGP into BGP	0.75
2	IP prefix lists	0.70
	Implementing BGP transit AS	1.35
	Internal Border Gateway Protocol	0.15
	Implementing I-BGP	0.85
	I-BGP and the next hop	1.1
	I-BGP and full mesh	0.50
	BGP path selection & control	0.4
	Route maps	0.70
	BGP attributes	1.35
	BGP path selection algorithm	1.2

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Exercises for H-QoS Enhancement on Ericsson SmartEdge and SSR 8000 Family



LZU1088981 R2A

Description

This course module covers hands-on configuration and verification for Hierarchical Quality of Service Enhancement on SEOS based and Ericsson IPOS based systems (Ericsson SmartEdge family, SM family and SSR 8000 family). It provides multiple configuration tasks as well as verification and traffic flow analysis.

Theory to hands-on ratio of this course is 5/95

Learning objectives

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

- 1 Build a topology for simulation of traffic flow cases
- 2 Understand the basic concepts of H-QoS on the SmartEdge and the SSR platforms
- 3 Understand the configuration and verification command structure for H-QoS on the SmartEdge and the SSR
- 4 Understand Priority Weighted Fair Queuing and relate to H-QoS
- 5 Configure, verify and examine PWFQ for two circuits within one port
- 6 Configure, verify and examine PWFQ minimum rate
- 7 Configure, verify and examine PWFQ with Maximum Rate and Weight
- 8 Configure, verify and examine Priority Group max rate with the exceed option
- 9 Configure, verify and examine PWFQ policy applied to parent and child circuits
- 10 Configure and verify traffic path to the subscriber (optional)
- 11 Configure, verify and examine application of PWFQ policy to subscriber record (optional)

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

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Prerequisites

Successful completion of the following courses:

Basic modules:

WBL: IP Overview & Fundamentals, LZU 108 8538

SmartEdge Platform:

WBL: Ericsson SmartEdge Family Fundamentals, LZU 108 8933

SSR Platform:

WBL: Smart Services Router (SSR) Product Overview, LZU 108 8829

WBL: SSR Fundamentals - Key Concepts, LZU 108 8855

WBL: SSR Fundamentals - System Architecture, LZU 108 8854

WBL: SSR Fundamentals - System Management Configuration, LZU 108 8856

ILT/WS: Exercises for SSR Fundamentals - System Management Configuration, LZU 108 8821

QoS:

WBL: IP QoS Overview & Fundamentals, LZU 108 8528

ILT: Exercises for QoS Fundamentals on SmartEdge/SSR, LZU 108 8093

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.

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**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	Review: Context, Interfaces & Bindings Architecture	0.5
	LAB Environment and Access Exercise 1 – Management Interface	0.5
	QoS and H-QoS: Review of Fundamental Concepts Introducing QoS on SmartEdge platforms	0.5
	Building The Topology Exercise 2: Building Topology	1.0
	Traffic Flows Exercise 3: Traffic Verification	0.5
	Classification and Marking Exercise 4: Classification and Marking	0.3
	Queuing: Review	0.2
2	Priority Weighted Fair Queuing (PWFQ)	0.5
	Scheduling: PWFQ Exercises	0.3
	Web based rate calculator	0.2
	Exercise 5: PWFQ for two circuits within one port	1
	Exercise 6: PWFQ minimum rate	0.5
	Exercise 7: PWFQ policy with max rate and weight combination	0.5
	Exercise 8: Priority Group max rate with the exceed option	0.5
	Exercise 9: PWFQ policy applied to parent and child circuits	0.5
	Exercise 10, Part 1: Preparing traffic path to the subscriber (optional)	0.5
	Exercise 10, Part 2: Apply PWFQ policy to subscriber record (optional)	1

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Exercises for IPv6 Fundamentals on SE-SSR



LZU1089357 R2A

Description

This course module covers hands-on configuration and verification for IPv6 fundamentals on Ericsson IPOS based systems (SSR 8000 family) and SEOS based systems (SmartEdge family). It provides multiple configuration tasks as well as verification and troubleshooting.

Theory to hands-on ratio of this course is 5/95

Learning objectives

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

- 1 Understand IPv6 basics
- 2 Understand the IPv6 addressing:
 - 2.1 Private and global addresses
 - 2.2 Link-local addresses
- 3 Configure and verify a network with basic IPv6 connectivity containing multiple routers
- 4 IPv6 Neighbor Discovery on the SmartEdge
- 5 Verify ND for the topology





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:

Basic modules:

- WBL: IP Overview & Fundamentals, LZU1088538
- WBL: IPv6 Overview & Fundamentals, LZU1088537

SmartEdge Platform:

- WBL: Ericsson SmartEdge Family Fundamentals, LZU1088933

SSR Platform:

- WBL: SSR Overview, LZU1088829
- WBL: SSR Fundamentals - Key Concepts, LZU1088855
- WBL: SSR Fundamentals - System Architecture, LZU1088854
- WBL: SSR Fundamentals - System Management Configuration, LZU1088856
- ILT/WS: Exercises for System Management Configuration Fundamentals on Ericsson SSR 8000 Family, LZU1088821

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.

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

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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	<ul style="list-style-type: none">• Introduction	0.25
	<ul style="list-style-type: none">• Review: Context, Interfaces & Bindings Architecture• Review: The SSR/SmartEdge Command Line Interface	0.25
	<ul style="list-style-type: none">• LAB Environment and Access• Management Lab<ul style="list-style-type: none">- Exercise 1 – Management Interface	0.25
	<ul style="list-style-type: none">• IPv6: Fundamental Concepts	1.0
	<ul style="list-style-type: none">• Reference Topology Network• Building IP connectivity for Rb-1 / 2 / 3 nodes<ul style="list-style-type: none">- Exercise 2 – Build and Verify IP connectivity for Backbone	1.0
	<ul style="list-style-type: none">• IPv6 Neighbor Discovery	1.5
	<ul style="list-style-type: none">• Building IP connectivity for Re-1/2/3 nodes<ul style="list-style-type: none">- Exercise 3 – Extend and Verify the IP connectivity	0.5



Exercises for IPv6 Transition Mechanisms on Ericsson SSR 8000 Family



LZU1088987 R1A

Description

This course module covers hands-on configuration and verification for a IPv6 transition from IPv4 addressing on Ericsson IPOS based systems (SSR family). It also explain details on dual stack, tunneling and address translation technologies. It provides multiple configuration tasks as well as verification and troubleshooting.

Theory to hands-on ratio of this course is 40/60.

Learning objectives

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

- 1 Understand the need of Transition Technology
- 2 Understand the Dual Stack
- 3 Configure and Verify Dual Stack on IPOS
- 4 Understand the Concept of IPv6 over IPv4 Tunneling
- 5 Configure and Verify IPv6 over IPv4 GRE Tunnel
- 6 Configure and Verify IPv6 Manual Tunnel
- 7 Understanding Automatic 6to4 Tunnel
- 8 Understand the Protocol Translation Mechanisms



**Target audience**

The target audience for this course is:

Technical Staff, Design Engineer, Deployment Engineer, System Technician, Service Technician, System Engineer, Service Engineer and Product Development Engineers.

Prerequisites

Successful completion of the following courses:

Basic modules:

- WBL: IP Overview & Fundamentals, LZU1088538
- WBL: IPv6 Overview & Fundamentals, LZU1088537

SmartEdge Platform:

- WBL: Ericsson SmartEdge Family Fundamentals, LZU1088933
- ILT/WS: Exercises for IPv6 Fundamentals on SE/SSR LZU1089357 R2A

Routing:

- WBL: IP Routing Overview & Fundamentals, LZU1088593
- WBL: OSPF Overview & Fundamentals, LZU1088536
- WBL: OSPFv3 Fundamentals, LZU1088535

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.

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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	<ul style="list-style-type: none"> • Introduction 	0.25
	<ul style="list-style-type: none"> • Review: Context, Interfaces & Bindings Architecture • Review: The SmartEdge Command Line Interface 	0.25
	<ul style="list-style-type: none"> • LAB Environment and Access • Management Lab <ul style="list-style-type: none"> - Exercise 1 – Management Interface 	0.25
	<ul style="list-style-type: none"> • Reference Topology Network • Building IP connectivity for Rb-1 / 2 / 3 nodes <ul style="list-style-type: none"> - Exercise 2 – Build and Verify IPv4 and IPv6 connectivity for Backbone 	2.0
	<ul style="list-style-type: none"> • Configuring Dual Stack <ul style="list-style-type: none"> - Exercise 3 – Configure and Verify IP Connectivity for IPv4 and IPv6 	2.0
	<ul style="list-style-type: none"> • Building IP connectivity for Host-1/2 nodes <ul style="list-style-type: none"> - Exercise 4 – Extend and Verify the IPv6 connectivity 	0.25
	<ul style="list-style-type: none"> • IPv6 Manually Configured Tunnel <ul style="list-style-type: none"> - Exercise 5 – Configure and Verify Manual Tunnel between Rb-1 and Rb-2 	1.0
2	<ul style="list-style-type: none"> • IPv6 over IPv4 GRE Tunnel <ul style="list-style-type: none"> - Exercise 6 – Configure and Verify 6to4 Tunnel between Rb-1 and Rb-2 	1.0
	<ul style="list-style-type: none"> • Understanding Dynamic Tunnel <ul style="list-style-type: none"> - 6to4 Router Tunneling - Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) - Teredo Tunneling 	2.0
	<ul style="list-style-type: none"> • NAT Overview for Translation between IPv4 and IPv6 	3.0



Exercises for ISIS Fundamentals on SSR/SmartEdge



LZU1088823 R3A

Description

Exercises for IS-IS Fundamentals on SSR/SmartEdge is available for students who attended overview and fundamentals modules for IS-IS technology as well as SmartEdge/SSR Overview/Fundamentals.

This course module covers hands-on configuration for IS-IS protocol on SEOS and/or Ericsson IPOS based systems. It provides multiple configuration tasks as well as verification and troubleshooting commands.

Please note that in this course there will be NO DIFFERENCE between the results from any of the practical exercises performed on SmartEdge or SRR platform. The participants can perform the hands-on exercises on either of the systems.

Learning objectives

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

- 1 IS-IS Level 1 area on SmartEdge
- 2 Multiple IS-IS area network
- 3 Level 2 – Backbone area
- 4 IS-IS Attached bit – a way out of Level 1 area
- 5 IS-IS Level 2 Route Leaking mechanism
- 6 IS-IS IP summarization
- 7 Routers Level 2 participation with overload bit
- 8 Configuration and troubleshoot IS-IS problems
- 9 Redistribution other protocols into IS-IS
- 10 IS-IS related problems

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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, System Engineer

Prerequisites

Successful completion of the following courses:

WBL: IP Overview & Fundamentals, LZU1088538

WBL: IP Routing Overview & Fundamentals, LZU1088593

WBL: IS-IS Overview & Fundamentals, LZU1088534

WBL: Ericsson SmartEdge Family Fundamentals LZU1088933 and/or

WBL: Ericsson SSR 8000 Family Overview and Fundamentals course flow

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.

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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	IS-IS configuration flow	1.5
	IS-IS – Verification of route tables	0.5
	LSP entries in the IS-IS database	0.5
	Verification of IS Neighbors	0.5
	Verification of Routing state	0.5
	Debug behavior in the IPOS/SEOS	1.0
	Extending IS-IS network	1.5
2	Multiple IS-IS area network	1.5
	Level 2 – Backbone	0.5
	Attached Bit	0.5
	Level 2 Route Leaking	0.5
	Summarization	0.5
	Overload Bit	0.5
	IS-IS Redistribution	1.5

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Exercises for MPLS Fundamentals on SSR/SmartEdge



LZU1088826 R3A

Description

This course module covers hands-on configuration and verification for MPLS on IPOS/SEOS based systems (SSR 8000, SmartEdge, SM480). It provides multiple configuration and verification tasks as well as verification and troubleshooting commands. There are two options for this course:

- Exercises for MPLS Fundamentals on SSR/SE based on OSPF
- Exercises for MPLS Fundamentals on SSR/SE based on IS-IS

Each group of two students can choose one of these options to work with for this course. Theory to hands-on ratio of this course is 5/95

Learning objectives

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

- 1 Understand MPLS/LDP operation in SSR/SE platform
- 2 Build a topology for MPLS exercises
- 3 Configure and verify Static LSPs across multiple SSR/SE
- 4 Configure and verify MPLS and LDP (Outer Label)
- 5 Perform End to End Packet Flow Walk Through Verification
- 6 Understand Label Distribution – LDP and LSP setup
- 7 Configure and verify LSP LDP circuits
- 8 Enable and verify explicit null labels
- 9 Understand and Configure LDP Session Establishment and LDP Parameters
- 10 Monitor and verify LDP operation





Target audience

The target audience for this course is:

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

Prerequisites

Successful completion of the following courses:

- WBL: Ericsson SmartEdge Family Fundamentals, LZU 108 8933
 - WBL:SSR Overview, LZU 108 8829
 - WBL:SSR Fundamentals-System Architecture, LZU 108 8854
 - WBL:SSR Fundamentals-Key Concepts, LZU 108 8855
 - WBL:SSR Fundamentals-System Management Configuration, LZU 108 8856
 - WBL: IP Routing Overview & Fundamentals, LZU 108 8593
 - WBL: MPLS Overview & Fundamentals, LZU 108 8517
- Additional pre-requirement for Exercises for Fundamentals on SSR/SE based on OSPF:
- WBL: OSPF Overview & Fundamentals, LZU 108 8536
 - ILT: Exercises for OSPF Fundamentals on SE/SSR, LZU 108 8822
- Additional pre-requirement for Exercises for Fundamentals on SSR/SE based on IS-IS:
- WBL: IS-IS Overview & Fundamentals, LZU 108 8534
 - ILT: Exercises for IS-IS Fundamentals on SE/SSR, LZU 108 8823

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.

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Time schedule

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

1	Introduction, Review basic concepts, Agenda & LAB setup	30 min
	Exercise 1 – Management interface	20 min
	MPLS Overview	15 min
	Putting Things in Place within the SSR/SE System	15 min
	MPLS LAB Topology Overview (1)	10 min
	Building Network Infrastructure	10 min
	Exercise 2 – Backbone connections	30 min
	Exercise 3 – IGP backbone configuration	25 min
	Static LSPs across multiple SSR/SE/SM	20 min
	Exercise 4 – Static LSP configuration	30 min
	MPLS LAB Topology Overview (2)	15 min
	Configure IP Backbone Connectivity	20 min
	Exercise 5 – Backbone connection	20 min
	Exercise 6 – Configure IGP Backbone	35 min
	Configure MPLS and LDP (Outer Label)	30 min
2	Exercise 7 – MPLS and LDP (outer label)	30 min
	End to End Packet Flow Walk Through Verification	30 min
	Exercise 8 – Return path for the packet	30 min
	Label Distribution – LDP and LSP setup	30 min
	MPLS LSP LDP circuits	15 min
	Exercise 9 – Enable LDP LSP circuits	20 min
	Implicit vs Explicit null label	15 min
	Exercise 10 – Enable explicit null labels	15 min
	LDP session establishment and LDP parameters	30 min
	Exercise 11 – LDP session and LDP parameters	30 min
Verifying LDP operation	15 min	
LDP prefix filtering: introduction	15 min	

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Exercise 12 – LDP prefix filtering	30 min
IGP/LDP synchronization: introduction	15 min
Exercise 13 – IGP/LDP synchronization	15 min
LDP Graceful Restart: introduction	20 min
Exercise 14 – LDP Graceful Restart	30 min



Exercises for MPLS L2VPN Fundamentals on Ericsson SmartEdge Family



LZU108 8982 R1A

Description

This course module covers hands-on configuration for L2VPN on SEOS based systems (Ericsson SmartEdge and SM). It provides multiple configuration tasks as well as verification and troubleshooting commands.

There are two options for this course:

- Exercises for L2VPN Fundamentals on SmartEdge based on OSPF
- Exercises for L2VPN Fundamentals on SmartEdge based on IS-IS

Each group of two students can choose one of these options to work with for this course.

Theory to hands-on ratio of this course is 10/90

Learning objectives

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

- 1 Configure and verify an MPLS/LDP enabled network
- 2 Perform packet walk from PE to PE
- 3 Configure static Ethernet cross connect over PW
- 4 Configure dynamic Ethernet cross connect over PW
- 5 Work with PW verification tools: mpls ping pw, mpls trace pw
- 6 Perform end to end packet walk with PW
- 7 Understand backup PW and different modes
- 8 Configure backup PW
- 9 Configure port pseudowire
- 10 Understand the concept of and configure transport range VLANs and VLAN manipulation
- 11 Configure VPLS





- 12 Use VPLS verification tools: cpe ping, mpls ping mac, mpls trace mac
- 13 Explain transport range VLAN handling
- 14 Configure BVI – add IP routing to L2 domain created with VPLS
- 15 Create corporate LAN with VPLS
- 16 Configure Hierarchical VPLS

Target audience

The target audience for this course is:

Network Design Engineers, Solution Architects, Network Deployment Engineers, System Engineers, Service Engineers and Research and Development Engineer.

Prerequisites

Successful completion of the following courses:

- WBL: Ericsson SmartEdge Family Fundamentals, LZU1088933
- WBL: IP Routing Overview & Fundamentals, LZU1088593
- WBL: MPLS Overview & Fundamentals LZU1088517
- WBL: MPLS L2VPN Overview & Fundamentals LZU1088513

Additional pre-requirement for Exercises for L2VPN Fundamentals on SmartEdge based on OSPF:

- WBL: OSPF Overview & Fundamentals, LZU1088536
- ILT: Exercises for OSPF Fundamentals on SE/SSR, LZU1088822

Additional pre-requirement for Exercises for L2VPN Fundamentals on SmartEdge based on IS-IS:

- WBL: IS-IS Overview & Fundamentals, LZU1088534
- ILT: Exercises for IS-IS Fundamentals on SE/SSR, LZU1088823

Duration and class size

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

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Learning situation

Work-Shop training or Instructor Led Training.



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	<ul style="list-style-type: none">• Introduction, Review basic concepts, Agenda & LAB setup	45 min
2	<ul style="list-style-type: none">• Exercise 1 – Management interface• MPLS Overview• Putting Things in Place within the SE/SSR System• MPLS LAB Topology Overview (1)• Building Network Infrastructure• Exercise 2 – Backbone connections• Exercise 3 – IGP backbone configuration• Static LSPs across multiple SE/SSR• Exercise 4 – Static LSP configuration• Exercise 5 - Emulating customer edge router• Exercise 6 – Configure static Ethernet cross-connect over VPWS• Exercise 7 – Configure dynamic L2VPN VPWS• Exercise 8 – End to end packet walk though• L2VPN XC redundancy• Exercise 9 - Configure backup PW using VPWS• Exercise 10: - Port pseudowires• Exercise 11 - Transport range VLANs• Exercise 12 – Configure L2VPN VPLS• Exercise 13 – End to end packet walk through• Exercise 14 - Transport range VLANs• Exercise 15 – Corporate LAN over VPLS	20 min 15 min 15 min 10 min 10 min 30 min 25 min 20 min 30 min 30 min 20 min 20 mins 50 min 20 min 20 min 15 min 30 min 20 min 50 min 20 min 20 min

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- Exercise 16 – Hierarchal VPLS

30 min



Exercises for MPLS L3VPN Fundamentals on SSR/SmartEdge



LZU1088825 R3A

Description

This course module covers hands-on configuration for L3VPN on SEOS based systems. It provides multiple configuration tasks as well as verification and troubleshooting commands. There are two options for this course:

- Exercises for L3VPN Fundamentals on SSR/SmartEdge based on OSPF
- Exercises for L3VPN Fundamentals on SSR/SmartEdge based on IS-IS

Each group of two students can choose one of these options to work with for this course. Theory to hands-on ratio of this course is 5/95

Please note that in this course there will be NO DIFFERENCE between the results from any of the practical exercises performed on SmartEdge or SSR platform. The participants can perform the hands-on exercises on either of the systems.

Learning objectives

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

- 1 Understand L3VPN concept in SE/SSR systems
- 2 IP and OSPF/IS-IS Backbone infrastructure
- 3 MPLS Backbone
- 4 IBGP for VPN signaling
- 5 Verify VPN Context
- 6 Verify CE Context
- 7 End to end packet flow walk through
- 8 Verify a site in a multi-site corporate network over L3VPN

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:

- WBL: IP Overview & Fundamentals, LZU 108 8538
- WBL: IP Routing Overview & Fundamentals, LZU 108 8593
- WBL: MPLS Overview & Fundamentals, LZU 108 8517
- WBL: SSR Overview, LZU 108 8829
- WBL: SSR Fundamentals-System Architecture, LZU 108 8854
- WBL: SSR Fundamentals-Key Concepts, LZU 108 8855
- WBL: SSR Fundamentals-System Management Configuration, LZU 108 8856
- ILT: Exercises for System Management Configuration Fundamentals on Ericsson SmartEdge Family, LZU 108 8821
- WBL: Ericsson SmartEdge Family Fundamentals LZU 108 8933, and/or
- WBL: BGP Overview & Fundamentals, LZU 108 8532
- WBL: MPLS L3VPN Overview & Fundamentals, LZU 108 8514
- ILT: Exercises for BGP Fundamentals on SSR/SmartEdge, LZU108 8824
- ILT: Exercises for MPLS Fundamentals on SR/SE, LZU 108 8826

Additional pre-requirement for Exercises for L3VPN Fundamentals on SSR/SmartEdge based on OSPF:

- WBL: OSPF Overview & Fundamentals, LZU 108 8536
- ILT: Exercises for OSPF Fundamentals on SSR/SE, LZU 108 8822

Additional pre-requirement for Exercises for L3VPN Fundamentals on SSR/SmartEdge based on IS-IS:

- WBL: IS-IS Overview & Fundamentals, LZU 108 8534
- ILT: Exercises for IS-IS Fundamentals on SSR/SE, LZU 108

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.

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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 (minutes)
1	Introduction, review basic concepts, agenda & lab setup	45
	MPLS L3vpn overview	30
	Putting things in place within the se system	15
	MPLS L3vpn lab topology	15
	Configuration flow diagram	10
	IP backbone connectivity	30
	IGP backbone infrastructure	45
	MPLS and LDP - outer label	30
	IBGP (inner label)	30
	VPN context	45
	CE Router / context	60
End to end packet flow walk through verification	90	
2	Second Vpn – configuration exercise	45
	Multi-site corporate network over l3vpn	60
	Corporate network with centralized traffic/policy control	60

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Exercises for OSPF Fundamentals on SSR/SmartEdge



LZU1088822 R3A

Description

Exercises for OSPF Fundamentals on SSR/SmartEdge is available for students who attended Overview and Fundamentals modules for OSPF as well as SE/SSR Overview/Fundamentals.

This course module covers hands-on configuration for OSPF protocol on SEOS/Ericsson 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 Build and verify IP infrastructure on the SSR/SE
- 2 Configure OSPF Backbone area
 - 2.1 Define OSPF routing instance
 - 2.2 Assign interfaces to OSPF instance with corresponding metric
- 3 Configure OSPF Non-Backbone areas
 - 3.1 Configure OSPF Normal Area
 - 3.2 Configure OSPF Stubby Area
 - 3.3 Configure OSPF Totally Stubby Area
- 4 Configure Route Redistribution
 - 4.1 Redistribution other protocols into OSPF
- 5 Configure Prefix Summarization
- 6 Troubleshoot OSPF related problems

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:

The participants should be familiar with and have practical experience with IP networks as well as a solid understanding of general networking technologies.

Successful completion of the following courses:

- WBL: IP Overview & Fundamentals, LZU 108 8538
- WBL: IP Routing Overview & Fundamentals, LZU 108 8593
- WBL: OSPF Overview & Fundamentals, LZU 108 8536
- WBL: Ericsson SmartEdge Family Fundamentals, LZU 108 8933 and/or
- WBL: Ericsson SSR 8000 Family Overview and Fundamentals course flow

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.



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	Build and verify IP infrastructure on the IPOS/SEOS based system	1.5
	Configure OSPF Backbone area	1.5
	Configure OSPF Non-backbone area	1
	Configure OSPF Stub area, Totally Stubby area	1
	Configure Route Redistribution	0.30
	Configure Prefix Summarization	0.25
	Troubleshooting OSPF related problems	0.40



Exercises for OSPFv3 (IPv6) Fundamentals on SSR/SE



LZU1088983 R3A

Description

This course module covers hands-on configuration and verification for OSPFv3 on Ericsson IPOS based systems (SSR 8000 family) and SEOS based systems (SmartEdge family). It provides multiple configuration tasks as well as verification and troubleshooting.

Theory to hands-on ratio of this course is 5/95

Learning objectives

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

- 1 Build and verify a network with basic IPv6 connectivity containing multiple routers
- 2 IPv6 Neighbor Discovery on the SmartEdge
- 3 and verify basic OSPFv3 routing
- 4 IPv6 routing table
- 5 OSPFv3 Link State Database
- 6 OSPFv3 routing state and neighbors
- 7 debugging OSPFv3
- 8 OSPFv3 with Point to Point links (Optional)
- 9 OSPFv3 network
- 10 routers in different OSPFv3 areas
- 11 redistribution
- 12 Stubby and Totally Stubby Areas
- 13 Prefix Summarization
- 14 OSPFv3 Originate Default





Target audience

The target audience for this course is:

Network Design Engineer, Solution Architect, Network Deployment Engineer, System Engineer, Service Engineer

Prerequisites

Successful completion of the following courses:

Basic modules:

- WBL: IP Overview & Fundamentals, LZU 108 8538
- WBL: IPv6 Overview and Fundamentals, LZU 108 8537

SmartEdge Platform:

- WBL: Ericsson SmartEdge Family Fundamentals, LZU 108 8933

SSR Platform:

- WBL: SSR Overview, LZU 108 8829
- WBL: SSR Fundamentals - Key Concepts, LZU 108 8855
- WBL: SSR Fundamentals - System Architecture, LZU 108 8854
- WBL: SSR Fundamentals - System Management Configuration, LZU 108 8856
- ILT/WS: Exercises for System Management Configuration Fundamentals on Ericsson SSR 8000 Family, LZU 108 8821

Routing:

- WBL: IP Routing Overview & Fundamentals, LZU 108 8593
- WBL: OSPF Overview & Fundamentals, LZU 108 8536
- WBL: OSPFv3 Fundamentals, LZU 108 8535

Duration and class size

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

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Learning situation

This course is based on theoretical and practical instructor-led lessons

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	<ul style="list-style-type: none">• Introduction	0.25
	<ul style="list-style-type: none">• Review: Context, Interfaces & Bindings Architecture• Review: The SSR/SmartEdge Command Line Interface	0.25
	<ul style="list-style-type: none">• LAB Environment and Access• Management Lab<ul style="list-style-type: none">- Exercise 1 – Management Interface	0.75
	<ul style="list-style-type: none">• IPv6: Review of Fundamental Concepts	0.5
	<ul style="list-style-type: none">• Reference Topology Network• Building IP connectivity for Rb-1 / 2 / 3 nodes<ul style="list-style-type: none">- Exercise 2 – Build and Verify IP connectivity for Backbone	1.0
	<ul style="list-style-type: none">• IPv6 Neighbor Discovery	0.75
	<ul style="list-style-type: none">• Building IP connectivity for Re-1/2/3 nodes<ul style="list-style-type: none">- Exercise 3 – Extend and Verify the IP connectivity	0.5
	<ul style="list-style-type: none">• OSPFv2/OSPFv3: Review of Fundamental Concepts	0.75
	<ul style="list-style-type: none">• Routing Configuration Flow<ul style="list-style-type: none">- Exercise 4 – Enable and Verify OSPFv3 for Rb-1, Rb-2 and Rb-3	1.0
	<ul style="list-style-type: none">• Examining IPv6 Routing Tables<ul style="list-style-type: none">- Exercise 5 – IPv6 Routing Table	1.0

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2	<ul style="list-style-type: none">• OSPFv3: Inside the Database<ul style="list-style-type: none">- Exercise 6 – Examine OSPFv3 Database	1.0
	<ul style="list-style-type: none">• Verification of OSPFv3 Routing state and Neighbors<ul style="list-style-type: none">- Exercise 7 – OSPFv3 routing state and neighbor verification (optional)	0.5
	<ul style="list-style-type: none">• Using Debug Function Review• Debugging OSPFv3<ul style="list-style-type: none">- Exercise 8 – Debugging OSPFv3 (optional)	1.0
	<ul style="list-style-type: none">• Configure OSPFv3 with Point to Point links (Optional)<ul style="list-style-type: none">- Exercise 9 – OSPFv3 P2P Links (optional)	0.5
	<ul style="list-style-type: none">• OSPF Areas – Review	0.25
	<ul style="list-style-type: none">• Attaching Spokes to the Backbone<ul style="list-style-type: none">- Exercise 10 – Add Re-1 to OSPFv3 area 0 and Verify	0.75
	<ul style="list-style-type: none">• Connecting to Different Area<ul style="list-style-type: none">- Exercise 11 – Add Re-2 to Area 0.0.0.2	0.75
	<ul style="list-style-type: none">• Redistribution<ul style="list-style-type: none">- Exercise 12 – Add and Verify Non OSPFv3 Customers	1.0
	<ul style="list-style-type: none">• Implementing Stubby Area<ul style="list-style-type: none">- Exercise 13 – Add Re-3 to OSPFv3 Stubby Area	0.75
	<ul style="list-style-type: none">• Implementing Totally Stubby Area<ul style="list-style-type: none">- Exercise 14 – Convert Area 3 to Totally Stubby Area	0.5
	<ul style="list-style-type: none">• Prefix Summarization<ul style="list-style-type: none">- Exercise 15 – Configure and Verify Prefix Summarization	0.75
	<ul style="list-style-type: none">• OSPFv3 Originate Default<ul style="list-style-type: none">- Exercise 16 – Configure and Verify Originate Default Routes	0.75



Exercises for QoS Fundamentals on SmartEdge



LZU 108 8093 R1A

Description

Exercises for QoS fundamentals, available for students who attended overview and fundamentals modules for QoS technology as well as SmartEdge Fundamentals. This course module covers hands-on configuration for QoS on SEOS based systems. It provides multiple configuration tasks as well as verification and troubleshooting.

Theory to hands-on ratio of this course is 5/95

With the help of the training documentation provided in this course and the guidance of the instructors, the attendees will learn efficient ways of SmartEdge configuration, monitoring and troubleshooting.

Learning objectives

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

- 1 Understand QoS handling on SE platforms
- 2 Configure and verify Policy Metering / Policing
- 3 Configure and verify Policy Metering with Classes
- 4 Understand concept of Queuing on SE platforms
- 5 Configure and verify Priority Queuing (PQ)
- 6 Configure and verify congestion avoidance – Weighted Random Early Discard (WRED)
- 7 Understand concept of Weighted Fair Queuing (WFQ) on SE platforms
- 8 Configure and verify Priority Weighted Fair Queuing (PWFQ)
- 9 Understand concept of Hierarchical Scheduling – an Overview

Target audience

The target audience for this course is:

Network Design Engineers, Network Deployment Engineers, System Technicians, Service Technicians, System Engineers and Service Engineers





Prerequisites

Successful completion of the following courses:

The participants should be familiar with and have practical experience with IP networks as well as a solid understanding of general networking technologies.

Successful completion of the following courses:

- WBL: IP Overview & Fundamentals, LZU1088538
- WBL: IP Routing Overview & Fundamentals, LZU1088593
- WBL: IP-QoS Overview & Fundamentals, LZU1088528
- WBL: Ericsson SmartEdge Family Fundamentals, LZU1088933

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 Instructor Led Training.

It includes instructor-led lessons using power point presentations combined with hands-on labs and student test cases. Participants will have remote access to SmartEdge lab and will be able to configure and monitor SmartEdge system.



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	• Agenda, LAB environment, Management lab	40 mins
	• Introducing QoS on SE platforms	40 mins
	• TRANSMISSION RATE ENFORCEMENT	25 mins
	• QOS POLICY METERING / POLICING INTRODUCTION	20 mins
	• Building the Topology	60 mins
	QoS Policy Metering / Policing	45 mins
	• QoS Policy Metering with Classes	70 mins
	• Introduction with Queuing and Queue-mapping	45 mins
	• Scheduling: Priority Queuing (PQ) Introduction	60 mins
	2	• Introducing congestion
• Internal priority per class		60 mins
• PQ Scheduling, PQ with rate limitation		120 mins
• Congestion avoidance – Weighted Random Early Discard (WRED)		60 mins
• Scheduling: Weighted Fair Queuing (WFQ)		90 mins
• Scheduling: Priority Weighted Fair Queuing (PWFQ)		60 mins
• Hierarchical Scheduling: An Overview		20 mins

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Exercises for SSR Fundamentals: System Management Configuration (CLI)



LZU1088821 R2A

Description

This course module covers the hands-on part for SSR Fundamentals: System Management Configuration. You will learn the fundamentals of using the command line interface performing multiple configuration and verification tasks.

This course is 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 portion. Theory to hands-on ratio of this course is 15/85.

Learning objectives

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

- 1 Access SSR system both during initial startup and during normal operations
- 2 Perform basic CLI operations
- 3 Configure and verify administrator accounts and privileges
- 4 Configure contexts, move between contexts and recognize where you are in the CLI
- 5 Work with interfaces, ports, circuits and bindings and verify their status
- 6 Work with the file management in the system
- 7 Access system logs
- 8 Start system debug from different contexts and observe results
- 9 Perform basic chassis and card configuration and verification

Target audience

The target audience for this course is:

Network Design Engineer, Network Deployment Engineer, System Technician, System Engineer



**Prerequisites**

Successful completion of the following courses:

WBL: SSR Overview, LZU 108 8829

WBL: SSR Fundamentals: System Architecture, LZU 108 8854

WBL: SSR Fundamentals: Key Concepts, LZU 108 8855

WBL: SSR Fundamentals: System Management Configuration, LZU 108 8856

Duration and class size

The length of the course is 1 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, 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	Introduction	0.5
	Access SSR system both during initial startup and during normal operations Remote lab access Exercise 1: Access the SSR during initial start-up Exercise 2: Configure management access	1
	Operate CLI for operation and configuration The command syntax CLI help Command history Searching in the CLI Exercise 3: CLI tools, tips and tricks	1
	Administrator accounts and privileges - Exercise 4: Configure and verify administrator accounts and privileges	0.5

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Working with contexts Contexts in configuration mode Contexts in monitoring mode Move between contexts Exercise 5: Contexts	0.5
Working with interfaces, ports, circuits and bindings - Exercise 6: Interfaces, ports, circuits and bindings	0.5
File management in System configuration and transaction database Saving configuration Load a configuration File Management Commands Boot sequence and system configuration Start system with empty configuration Exercise 7: File management	1
System logs introduction System log commands Show log and time Exercise 8: System logs	0.5
System debug introduction System debug overview Debug relationship with context and function Debug commands Display debug output to screen Exercise 9: System debug	0.5
Basic SSR chassis and line cards configuration SSR chassis and cards: introduction List the installed line cards before provisioning Provisioning line cards Exercise 10: Provisioning line cards	0.5



Fixed Broadband Subscriber Management Overview



LZU 108 8524 R1A

Description

Fixed Broadband Subscriber Management is a method to identify individual subscribers and provide differentiated services. This module gives an introduction into subscriber management for fixed broadband access. It identifies why service providers need subscriber management and discusses the associated deployment scenarios and technology options. It ends with a knowledge assessment

Learning objectives

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

- 1 Understand basics of subscriber management for fixed broadband
- 2 Understand typical deployment scenarios and technologies used

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

There are no prerequisites for this course

Duration and class size

The length of the course is 0.25 hours.

Learning situation

This is a self paced web based course



**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)
	Trends and Drivers	
	What is Fixed Broadband Subscriber Management	
	Deployment Scenarios and Technology Options	
	Summary	



IP Multicast Overview & Fundamentals



LZU 108 8529 R1A

Description

IP Multicast Overview & Fundamentals is a combination of 2 modules: Multicast Overview and Multicast Fundamentals.

Both parts end with a Knowledge Assessment.

Multicast Overview module describes on a high level, what Multicast is and the benefits it has over other types of data transmission. It also explains what applications are possible with Multicasting.

Multicast Fundamentals module describes what Multicast is, why we use it and how it works. It describes the functionality of Multicast and the benefits associated. It also describes in detail all components of the multicast architecture

Learning objectives

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

- 1 Describe what Multicasting is
- 2 Understand the benefits Multicast has over Unicast and Broadcast
- 3 Explain when Multicast should and should not be used
- 4 Outline why ISP's need IP multicast technologies
- 5 Discuss the ways in which real-time applications use Multicast technology
- 6 Explain the IP multicast model and its applications
- 7 Understand the Multicast architecture
- 8 Explain Multicast addressing
- 9 Outline Multicasting at Layer 2
- 10 Discuss the concept of a Multicast distribution tree
- 11 Explain how multicast routing is different from Unicast routing
- 12 Detail all actions of a router when it receives a multicast packet
- 13 Understand the role of TTL thresholds





- 14 Explain Internet Group Management Protocol
- 15 Describe IGMP Snooping
- 16 List the different Multicast Routing Protocols Categories

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

IP Overview & Fundamentals	LZU 108 8538
IP Routing Overview & Fundamentals	LZU 108 8593

Duration and class size

The length of the course is appr. 2 hours.

Learning situation

This is a self-paced web based course



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	What is IP Multicast? IP Transmission Types Advantages of Multicast Disadvantages with Multicast Multicast Applications IP Multicast Model Multicast Architecture Multicast Addressing IGMP Multicast Distribution Trees Multicast Routing Reverse Path Forwarding TTL Thresholds	



IP Overview & Fundamentals



LZU 108 8538 R1A

Description

This course contains of two parts: Overview and Fundamentals. Both ends with knowledge assessments.

The first part gives an introduction into IP. It gives a short historic perspective. It explains the business drivers behind IP, how the networks are evolving to "all-IP", and how IP packet networks are different from circuit based telephony networks.

The second part is made for people who want more technical detail. Fundamentals presents the main concepts behind the IP protocol.

Learning objectives

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

- 1 Learn about the business drivers for IP
- 2 Learn about the historical background
- 3 Learn about how the industry is going towards all-IP
- 4 Learn about packet switching versus circuit switching
- 5 Understand what is TCP/IP
- 6 Know the IPv4 Packet Structure
- 7 Know the IPv4 Address Schema
- 8 Know about classless IP addressing
- 9 Learn about the life of an IP Packet

Target audience

The target audience for this course is:

Fundamentals



**Prerequisites**

Successful completion of the following courses:

There are no prerequisites for this course

Duration and class size

The length of the course is 1.25 hours

Learning situation

This is a self-paced web-based course

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	Business drivers for IP Historical background of IP How is the industry going towards all-IP? Packet switching versus circuit switching approach What is IP? What id TCP/IP? OSI Model IPv4 Package structure 32-bit address scheme of IPv4 IP addressing	



IP Routing Overview & Fundamentals



LZU 108 8593 R1A

Description

This course consists of two modules, IP Routing Overview and IP Routing Fundamentals. The IP Routing Overview module describes what IP Routing is, why we use it and how it works. It describes the different types of routing available. It also describes the difference between switching and routing

The IP Routing Fundamentals module describes how IP packets are transmitted in an IP network. Provides information about how Routing Table is populated with route data. The purpose and main functionalities of Dynamic Routing protocols. It also presents techniques to reduce the size of Routing Tables

Learning objectives

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

- 1 Know the basics of IP routing
- 2 Describe how IP addresses and subnet masks used
- 3 Understand the differences between routing and switching
- 4 Know what routers and routing tables are
- 5 Compare static versus dynamic routing protocols
- 6 Understand the difference between interior and exterior routing protocols
- 7 Describe what IP routing is
- 8 Understand how IP packets are transmitted
- 9 Know the purpose and main characteristics of dynamic routing protocols
- 10 Compare Distance Vector and Link State Advertisement routing protocols
- 11 Understand the function of a Default Gateway router
- 12 Define what is Route summarization
- 13 Tell how does Administrative Distance influence route selection
- 14 Describe the importance of Convergence Time





IP-QoS Overview & Fundamentals



LZU 108 8528 R1A

Description

The overview module describes what IP QoS is, why we use it and on a very high-level what are the requirements and how it works. It compares IP QoS to a road network and uses this analogy to explain certain topics. It also describes briefly about DiffServ and QoS marking

The Fundamentals module describes what IP QoS is, why we use it and how it works. It reviews a few concepts related to QoS, including throughput, delay, jitter and loss. It examines how IP Precedence is used and how this evolved to Differentiated Services. It describes the different roles and functions of all components that make up a DiffServ. It also describes congestion avoidance mechanisms and how IP QoS is mapped into layer 2 headers

Learning objectives

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

- 1 Know why we use QoS
- 2 Understand congestion avoidance
- 3 Explain the benefits of QoS to a service provider
- 4 Identify the benefits of QoS to an end user
- 5 Understand some typical deployment scenarios
- 6 Understand why previously used best-effort approach was sufficient but is now unsuitable for triple play services.
- 7 Revise the concepts of throughput, delay, jitter and loss.
- 8 Describe Integrated Services.
- 9 Understand per-hop processing.
- 10 Understand how IP Precedence is used.
- 11 Know how IP Precedence evolved to Differentiated Services (DS).
- 12 Be aware of the different DS components.

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- 13 Explain the different DiffServ functions like classification, marking, policing, queuing and scheduling.
- 14 Describe how the concept of the Token Bucket works.
- 15 Identify and explain different congestion avoidance mechanisms like RED and WRED.
- 16 Understand where the IP QoS marking is mapped into Layer 2 headers

Target audience

The target audience for this course is:
Fundamentals

Prerequisites

Successful completion of the following courses:

IP Overview & Fundamentals	LZU 108 8538
IP Routing Overview & Fundamentals	LZU 108 8593

Duration and class size

The length of the course is appr. 1.75 hours.

Learning situation

This is a self-paced web based course



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	Why QoS Congestion Avoidance Benefits of QoS to the Service Provider Benefits of QoS to the End User Typical Deployment Scenarios Network Requirements Addressing QoS Requirements IP Precedence Differentiated Services DS Components DiffServ Functions Congestion Avoidance IP QoS in Layer 2	

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IPv6 Overview & Fundamentals



LZU 108 8537 R1A

Description

This course contains two parts: IPv6 Overview and IPv6 Fundamentals.

The first part gives an introduction into IPv6. It identifies the current problem with running out of IPv4 addresses and it is focused on explaining what is IPv6 and why we need it.

The second part is a follow through from the IPv6 Overview. It presents the need for IPv6, the technical concepts behind IPv6, such as: Major changes compared to IPv4, the address model, packet structure and service protocol. Also some transition options from IPv4 to IPv6 are explored

Learning objectives

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

- 1 Understand why a new IP protocol is needed
- 2 Understand what is IPv6
- 3 List some benefits of IPv6
- 4 Compare the addresses used in IPv4 to IPv6
- 5 Understand that migration to IPv6 will take time
- 6 Identify the need of IPv6?
- 7 Classify major changes made in TCP/IPv6 compared to IPv4.
- 8 Be familiar with the address model
- 9 Know the Packet structure
- 10 Be familiar with Service Protocols
- 11 Transition Options from IPv4 to IPv6

Target audience

The target audience for this course is:





Fundamentals

Prerequisites

Successful completion of the following courses:

IP Overview & Fundamentals	LZU 108 8538
IP Routing Overview & Fundamentals	LZU 108 8593

Duration and class size

The length of the course is appr. 2.33 hours

Learning situation

This is a self-paced web based course

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	The Growth of the Internet Running out of IPv4 addresses What is IPv6? Comparing IPv4 to IPv6 addresses Migration Trends Major changes made in TCP/IPv6 compared to TCP/IPv4? IPv6 Address Model IPv6 Packet Structure IPv6 Service Protocols Transition options available from IPv4 to IPv6	



IPv6 Transition Mechanisms Fundamentals



LZU 108 8531 R1A

Description

In this fundamentals course, we will cover the following topics:
Firstly we are going to explore why we need IPv6 Transition Mechanisms.
After that we will see that IPv6 was designed, at the beginning, with transition in mind: no D day. Hence, we will outline the three main types of IPv6 transition mechanisms.
We will then describe in detail the Dual Stack, Tunneling and Translation mechanisms.
This will bring us on to look at the migration trends from IPv4 to IPv6 over the upcoming years and explore some top approaches to IPv6 Transition.
Finally, we will wrap this module up with a short summary

Learning objectives

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

- 1 Outline three main types of transition mechanisms
- 2 Describe dual stack, tunneling and transition mechanisms
- 3 Explain the migrations trends from IPv4 to IPv6

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

There are no prerequisites for this course

Duration and class size

The length of the course is 1 hour.





Learning situation

This is a self paced web based course

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)
	Why we need IPv6 Transition Mechanisms	
	Outline the tree main types of IPv6 Transition Mechanisms	
	Describe in detail the Dual Stack, Tunneling and Translation Mechanisms	
	Explore some top approaches to IPv6 transition	
	Summary	



IS-IS Overview & Fundamentals



LZU 108 8534 R1A

Description

This course consists of two parts: one overview and one fundamentals.

The Overview part provides introduction to the topic on a high level.

It provides a high level introduction to Intermediate System to Intermediate System (IS-IS). It explains ISIS role in Internet Protocol (IP) and Open Systems Interconnection (OSI) environments.

The Fundamentals part provides the essential information about the topic one must know prior to moving into the more detailed information of the topic.

Fundamentals are addressing the pre-requisite elements of the topic.

The Fundamentals part covers technology background of Intermediate System to Intermediate System (IS-IS) protocol.

It provides the essential information about ISIS.

Learning objectives

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

- 1 Understanding Intermediate System to Intermediate System (ISIS) role in data networks
- 2 Understanding key concepts of Intermediate System to Intermediate System (ISIS)

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

IP Overview & Fundamentals	LZU 108 8538
IP Routing Overview & Fundamentals	LZU 108 8593



**Duration and class size**

The length of the course is appr. 0.83 hour.

Learning situation

This is a self-paced web based course

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	IS-IS Concepts Link State Database – Building common network view – Creating network topology – Topology of a broadcast network – Calculating best paths Neighbor Discovery Area Concept – Finding way out of L1 area – Suboptimal routing between areas IP Prefix Redistribution into IS-IS OSI addressing schema	



MINI-LINK SP R1 Fundamentals



LZU1088872 R1A

Description

Are you about to include the all indoor Ethernet aggregation node MINI-LINK SP R1 into your network? Or perhaps you are interested in the functionality and what benefits it can give to your transport network. Regardless of which, this is the course to take as it will explain the building practice and functionality of MINI-LINK SP R1.

Learning objectives

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

- 1 Describe the building practice of MINI-LINK SP R1.
 - 1.1 Indoor components.
- 2 Describe the main features of MINI-LINK SP R1.
 - 2.1 Ethernet traffic handling.
 - 2.2 Protection.
 - 2.3 Network synchronization.
 - 2.4 Connection to the Management Network.
 - 2.5 Feature Licenses.
- 3 Describe the basics of the Software Architecture and Local Management Tools
 - 3.1 Software upgrade.
 - 3.2 Configuration handling.

Target audience

The target audience for this course is:

Fundamentals





Prerequisites

Successful completion of the following courses:
WBL Microwave Networks Overview, LZU1088322

Duration and class size

The length of the course is 1 hour.

Learning situation

This is a web-based interactive training course with multimedia content.

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	<ul style="list-style-type: none">• MINI-LINK SP R1 System Architecture• MINI-LINK SP R1 Hardware Architecture• MINI-LINK SP R1 Software Architecture• MINI-LINK SP R1 Key Features••••	1 hour



MPLS L2VPN Overview & Fundamentals



LZU 108 8513 R1A

Description

L2VPN Overview & Fundamentals is a combination of 2 modules, the overview course and the fundamentals course. Both courses end with a Knowledge Assessment.

MPLS VPN's Overview module describes what MPLS VPN's are, why we use them and on a very high-level what are the requirements and how they work. It describes the different models for a VPN Service. It also describes briefly about MPLS VPN's.

MPLS L2VPN Fundamentals module describes what MPLS L2VPN is, why we use it and how it works. It describes the different roles and functions of all components that make up a MPLS L2VPN Service. It also describes in detail the different MPLS L2VPN services

Learning objectives

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

- 1 Know what a Virtual Private Network is (VPN).
- 2 Understand the business drivers for VPN's.
- 3 Explain the requirements of a VPN service.
- 4 Identify different VPN models.
- 5 Understand what an MPLS L3VPN is.
- 6 Understand what an MPLS L2VPN is.
- 7 Define the benefits of using MPLS VPN's.
- 8 Know why L2VPNs are used
- 9 Understand the how MPLS is used to setup L2VPNs
- 10 Revise MPLS and label switching
- 11 Describe the signaling that occurs to set up a L2VPN network
- 12 Understand the different L2VPN services – VPWS and VPLS
- 13 Understand the PWE3 Framework
- 14 Know the PW parameters and how they are exchanged





- 15 Be aware of the PW protocol stack, PW Control Word and O&M
- 16 Explain the difference between Ethernet, ATM and TDM (SAToP) carried over PWs
- 17 Describe how bridging works in VPLS, how loops are prevented and understand H-VPLS

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

IP Overview & Fundamentals	LZU 108 8538
IP Routing Overview & Fundamentals	LZU 108 8593
OSPF <u>or</u> IS-IS Overview & Fundamentals	LZU 108 8536 <u>or</u> LZU 108 8534
MPLS Overview & Fundamentals	LZU 108 8517

Duration and class size

The length of the course is appr. 1.5 hours.

Learning situation

This is a self-paced web based course



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	What is a VPN Service? Business drivers for VPN's VPN Requirements VPN Models MPLS L3VPN MPLS L2VPN Benefits of MPLS VPN's Why L2VPN What is MPLS L2VPN Different L2VPN Services Virtual Private Wire Service Virtual Private LAN Service	



MPLS L3VPN Overview & Fundamentals



LZU 108 8514 R1A

Description

MPLS L3VPN Overview & Fundamentals is a combination of 2 modules, the overview course and the fundamentals module. Both courses end with a Knowledge Assessment.

MPLS VPN's Overview module describes what MPLS VPN's are, why we use them and on a very high-level what are the requirements and how they work. It describes the different models for a VPN Service. It also describes briefly about MPLS VPN's.

L3VPN Fundamentals module describes what L3VPN is, why we use it and how it works. It describes the different roles and functions of all components that make up a L3VPN Service. It also describes in detail the signaling and forwarding processes that make up a VPN service.

Learning objectives

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

- 1 Know what a Virtual Private Network is (VPN)
- 2 Understand the business drivers for VPN's
- 3 Explain the requirements of a VPN service
- 4 Identify different VPN models
- 5 Understand what an MPLS L3VPN is
- 6 Understand what an MPLS L2VPN is
- 7 Define the benefits of using MPLS VPN's
- 8 Know what is Layer Three Virtual Private Network is (L3VPN) is
- 9 Understand the business drivers behind L3VPN
- 10 Describe the signaling that occurs to set up a L3VPN network
- 11 Revise MPLS and label switching
- 12 Understand the different roles that a router can have in an MPLS backbone (PE, P etc.)
- 13 Understand the function of the Route Distinguisher, Route Target and Inner label





- 14 Know how customer prefixes are exchanged
- 15 Be aware of the different types of routing, from CE to PE and across the backbone
- 16 Explain the MPLS label stacking and what each label represents
- 17 Describe the end-to-end packet walk through

Target audience

The target audience for this course is:
Fundamentals

Prerequisites

Successful completion of the following courses:

IP Overview & Fundamentals	LZU 108 8538
IP Routing Overview & Fundamentals	LZU 108 8593
OSPF <u>or</u> IS-IS Overview & Fundamentals	LZU 108 8536 <u>or</u> LZU 108 8534
MPLS Overview & Fundamentals	LZU 108 8517
BGP Overview & Fundamentals	LZU 108 8532

Duration and class size

The length of the course is appr. 1.25 hours.

Learning situation

This is a self-paced web based course



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	What's a VPN service? Business drivers for VPN's VPN Requirements VPN Models MPLS L3VPN Concepts Benefits of MPLS VPN's L3VPN Layout Putting things into place – Signaling Putting things into place – Forwarding Summary	



MPLS Overview & Fundamentals



LZU 108 8517 R1A

Description

This course contains of two modules.

The first module, the Overview, gives an introduction into MPLS (Multiprotocol Label Switching). It explains the need for MPLS in a world evolving to "all-IP". It describes how networks are evolving, based on MPLS, what MPLS offers and on a very high level how MPLS works.

The second module, the Fundamentals, web based learning module. This module describes what MPLS is, why we use it and how it works. It describes the different roles and functions of all components that make up MPLS. It also describes in detail the label switching and distribution process and how these can be used to create VPNs (Virtual Private Network)."

Both modules end with a Knowledge Assessment

Learning objectives

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

- 1 Understand the importance of MPLS (Multiprotocol Label Switching) for next generation telecommunication networks.
- 2 Understand the basics of MPLS (Multiprotocol Label Switching).
- 3 Know what is Multi-Protocol Label Switching (MPLS) is
- 4 Understand why operators need to use MPLS
- 5 Describe how MPLS works
- 6 Compare MPLS to the OSI (Open Systems Interconnection) model
- 7 Understand the different roles that a router can have in an MPLS backbone (LER (Label Edge Router), LSR (Label Switch Router) etc.)
- 8 Explain the MPLS header and what each field means
- 9 Know the typical deployment scenarios for MPLS and how they are created – LSPs (Label Switched Path), FEC's (Forwarding Equivalence Class), label binding etc.
- 10 Describe the different label distribution and control modes
- 11 Explain how LDP (Label Switched Path) works, the message setup, LDP (Label





- Distribution Protocol) ID etc.
- 12 Understand how MPLS VPN's work and are setup

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

IP Overview & Fundamentals LZU 108 8538
IP Routing Overview & Fundamentals LZU 108 8593
OSPF or IS-IS Overview & Fundamentals LZU 108 8536 or LZU 108 8534

Duration and class size

The length of the course is appr.1.5 hours.

Learning situation

This is a self-paced web based course

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	MPLS Concepts Why MPLS What is MPLS MPLS Functions and Roles Label Switching and Distribution MPLS Virtual Private Networks	



OSPF Overview & Fundamentals



LZU 108 8536 R1A

Description

This course gives a high level overview of the IP Routing protocol called Open Shortest Path First (OSPF).

It explains the role of this routing protocol in an IP Network.

This course also presents the main concepts behind the IP Routing protocol called Open Shortest Path First (OSPF).

Learning objectives

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

- 1 Understand the role of OSPF(Open Shortest Path First) in IP networks
- 2 Understand the main concepts of OSPF

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

IP Overview & Fundamentals	LZU 108 8538
IP Routing Overview & Fundamentals	LZU 108 8593

Duration and class size

The length of the course is appr. 0.92 hour.

Learning situation

This is a self-paced web based course





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	OSPF Concept Link State Database – Building common network view – Creating network topology – Topology of a broadcast network – Calculating best paths LSA Flooding Introduction to concept of area	Self-paced



OSPFv3 Fundamentals



LZU 108 8535 R1A

Description

This course will provide information about dynamic routing protocol for IPv6 - OSPFv3. It points out the differences and similarities between OSPFv3 and OSPFv2 used for IPv4 and ends with a knowledge assessment

Learning objectives

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

- 1 Understand the reasons why OSPFv3 was developed
- 2 List the differences from OSPFv2
- 3 List the similarities between OSPFv2 and OSPFv3
- 4 Understand OSPFv3 LSDB (Link State Database)

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

There are no prerequisites for this course

Duration and class size

The length of the course is 1 hour.



**Learning situation**

This is a self paced web based course

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)
	The reasons why OSPFv3 was developed Differences from OSPFv2 Similarities between OSPFv2 and OSPFv3 OSPFv3 LSDB Summary	



SmartEdge R12 System Administration and Security



LZU1089315 R3A

Description

This course module describes administrative and security functions on the SmartEdge system. It shows how to enable services and administrative privileges. In addition it shows how to configure connection to external servers for authentication and accounting of administrators.

Learning objectives

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

- 1 Understand and configure management access during initial startup and normal operations
- 2 Understand the difference between Administrator accounts in different contexts
- 3 Verify and enable specific services within context
- 4 Understand administrative privileges and command privilege levels
- 5 Configure AAA using TACACS+ server for administrator sessions
- 6 Configure administrative access control lists
- 7 Configure and verify system logging
- 8 Perform password recovery

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:

The participants should have operational experience managing the SmartEdge platform as well as a solid understanding of general networking technologies.





Successful completion of the following courses:

- Ericsson SmartEdge Family System Fundamentals, LZU 108 8933

Duration and class size

The length of the course is 1 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	Fundamental Concepts	0.5
	Management Access Access During the Initial Startup Access During Normal Operations Security for Management access Telnet and SSH access Exercise 1: Management configuration Exercise2, Quiz 1: Management access	1.5
	Services within context Security and Access Exercise 3: Telnet server service & Quiz 2	1
	Privilege levels Administrators and CLI Commands Exercise 4: Privilege Levels	1
	TACACS+ Exercise 5: TACACS+	0.5

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	Administrative access control lists Exercise 6: Admin ACLs	0.5
	Logging & Syslog Exercise 7: Logging & Syslog	0.5
	Password recovery Exercise 8: Password Recovery	0.5



SmartEdge R12 System Operation and Maintenance



LZU1089313 R3A

Description

This course introduces the main tasks for system operation and maintenance of the SmartEdge platform. It includes the chassis, traffic cards, controller cards (XCRP) and fan/alarm and shows how to identify hardware failures, replace cards and components and perform software upgrades. Hands-on exercises allow participants to work with the SmartEdge CLI focusing on operations and maintenance related commands and tools.

Theory to hands-on ratio of this course is 40/60.

Learning objectives

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

- 1 Perform full release SmartEdge OS (SEOS) upgrade
- 2 Understand module patch upgrade
- 3 Understand SEOS roll-back procedure
- 4 Provision traffic cards
- 5 Perform hardware diagnostics routines on traffic cards, and XCRP cards
- 6 Describe chassis format and layout
- 7 Identify layout of traffic cards and XCRP cards
- 8 Identify LEDs and alarms with operational states of the chassis, traffic cards and XCRP cards
- 9 Handle hardware replacement of traffic cards, XCRP cards and related components
- 10 Handle replacement of Fan/Alarm unit and air filter
- 11 Perform password recovery

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:

The participants should have operational experience managing the SmartEdge platform as well as a solid understanding of general networking technologies.

Successful completion of the following courses:

- Ericsson SmartEdge System Fundamentals, LZU 108 8933

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	Review Fundamental Concepts	0.5
	Lab environment and Management Connection Exercise 1: Management configuration	1
	Software Upgrade (SEOS) Full Release Upgrade Exercise 2: Software Upgrade	1.5
	Software Modular Upgrade	0.5
	Restore System to Previous Software Image	0.5
	Enabling the Traffic Cards Exercise 3: Enabling traffic cards	1

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	Diagnostics	
	Power On Diagnostics (POD) Exercise 4: POD	0.5
	On Demand Diagnostics (ODD) Exercise 5: ODD on traffic cards Exercise 6: ODD on the Standby XCRP Results from Diagnostics Routine Exercise 7, Quiz 1: ODD	1
2	Chassis LEDs and Alarms Exercise 8, Quiz 2: Chassis	0.5
	Controller card LEDs and Alarms Exercise 9, Quiz 3: XCRP	0.5
	Traffic Card LEDs and Alarms Exercise 10, Quiz 4: Traffic Cards	0.5
	Port Alarm severity and impact Exercise 11, Quiz 5: Port Alarms	0.5
	Hardware Replacement procedures Safety & ESD Replacing a Traffic Card Add/Replace an controller Card Replacing the Fan/Alarm Unit Replacing the Fan/Alarm Unit Replacing the Air Filter Replacing the external compact flash memory on an XCRP	2
	Password Recovery Exercise 12: Password Recovery	0.5



SmartEdge R12 System Troubleshooting



LZU1089314 R3A

Description

This course outlines troubleshooting of the SmartEdge system including ways to verify operational health, the traffic flow through the system, the XCRPs, debugging and where to find logs to do investigation on cause of the failure. Hands-on exercises allow participants to understand SmartEdge CLI syntax for practical system troubleshooting related commands.

Theory to hands-on ratio of this course is 30/70.

Learning objectives

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

- 1 Use CLI tools for troubleshooting
- 2 Confirm operational health of the SmartEdge system
- 3 Run route cause analysis routines
- 4 Understand fundamental of processes architecture on the system
- 5 Work with core dumps of faulty processes
- 6 Perform troubleshooting for traffic flow through ports, circuits and interfaces
- 7 Understand the use and impact of debugging on the SmartEdge system
- 8 Use the bootrom environment to recover from OS failure
- 9 Investigate active and history logs

Target audience

The target audience for this course is:

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





Prerequisites

Successful completion of the following courses:

The participants should have operational experience managing the SmartEdge platform as well as a solid understanding of general networking technologies.

Successful completion of the following courses:

- Ericsson SmartEdge Family System Fundamentals, LZU 108 8933

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	Review Fundamental Concepts	0.5
	Lab environment	0.5
	Exercise 1: Management configuration	0.5
	Troubleshooting Preparation Commands & Tools <ul style="list-style-type: none"> - Troubleshooting by searching and limiting the output - Regular expressions, Aliases and Macros - Exercise 2: Searching and Filtering 	1.5
	System hardware health check	1
	System processes <ul style="list-style-type: none"> - Process architecture - Handling process crashes - Exercise 3: System Processes 	1
	Analyzing problems of active XCRP <ul style="list-style-type: none"> - Basic XCRP checks - Process Health Check - Exercise 4: Process Health Check - Investigating redundancy issues Analyzing problems on standby XCRP 	1
2	XCRP Failover Management	0.5
	XCRP boot problems <ul style="list-style-type: none"> - Exercise 5: Recover from XCRP boot problems 	2
	System logging	0.5
	Debugging on SmartEdge	0.5
	General Connectivity Troubleshooting <ul style="list-style-type: none"> - Basic checks - Exercise 6: Traffic troubleshooting - Exercise 7: Traffic Mirroring 	1.5

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SSR Fundamentals: Key Concepts



LZU 108 8855 R1A

Description

This module explains fundamental concepts of the SSR design. The key concepts explained are Contexts, Interfaces, and Bindings

Learning objectives

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

- 1 Explain the concept of Contexts as a Virtual Router in the SSR
- 2 Understand the single-context and multiple-context configuration
- 3 Explain the difference between Context local and a non-local context
- 4 Understand the concept of Interfaces and how this is not the same as a physical port
- 5 Understand the importance and role of Bindings to allow traffic to flow
- 6 Explain the different privilege levels for administrator accounts for context local compared to non-local contexts

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

SSR Overview LZU 108 8829

Duration and class size

The length of the course is 0.17 hours

**Learning situation**

This is a self phased web based course

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)
	Introduction	
	What is Context	
	Terminologies	
	Closer look at bindings	
	Administrator Accounts and Context	
	Summary	



SSR Fundamentals: System Architecture



LZU 108 8854 R1A

Description

This e-learning provides detailed view of the SSR distributed and modular system design. It explains both hardware and software architecture

Learning objectives

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

- 1 Describe the various capacity platforms in the SSR 8000 Family
- 2 Describe the SSR Hardware Architecture, including the role of the control cards, line cards and smart services cards
- 3 Understand the process of a Route Processor Control Card Failover
- 4 Understand the Forward Plane Architecture, including the Packet Forward Engine function and Fabric Forwarding function
- 5 Understand the data packet flow for unicast and multicast packets
- 6 Describe the Distributed Switch Fabric Architecture, including the redundant and load-share protection of the switch fabric
- 7 Describe the Control Plane Architecture, including the role of the Local Processors on the line cards
- 8 Understand the Software Architecture of the SSR Operating System
- 9 Understand what happens during a software process failure
- 10 Understand the different ways control packets may be handled

Target audience

The target audience for this course is:

Fundamentals



**Prerequisites**

Successful completion of the following courses:

SSR Overview LZU 108 8829

Duration and class size

The length of the course is 0.42 hours.

Learning situation

This is a self phased web based course

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)
	SSR 8000 Product Family	
	SSR Hardware Architecture	
	SSR Forward Plane Architecture	
	SSR Control Plane Architecture	
	SSR Software Architecture	



SSR Fundamentals: System Management Configuration



LZU 108 8856 R1A

Description

This course provides the fundamentals for system management configuration of the SSR platform. It provides key information required to work with the SSR command line interface

Learning objectives

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

- 1 Accessing SSR system both during initial startup and during normal operations
- 2 Operating CLI for operation and configuration
- 3 The administrator accounts and privileges
- 4 How to configure contexts, move between contexts and recognize where you are in the CLI
- 5 Working with interfaces, ports, circuits and bindings and how to verify their status
- 6 The file management in the system
- 7 Accessing system logs
- 8 System debug introduction
- 9 Basic chassis and card configuration and verification

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

SSR Product Overview LZU 108 8829





SSR Fundamentals - System Architecture LZU 108 8854

SSR Fundamentals - Key Concepts LZU 108 8855

Duration and class size

The length of the course is 1 hour.

Learning situation

This is a self phased web based course

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)
	SSR System Access	
	The SSR CLI	
	Administrator accounts and privilege	
	Working with context	
	Working with interfaces, ports, circuits and bindings	
	File management	
	System logs intro	
	System debug intro	
	Basic SSR chassis and line cards configuration	

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SSR Overview



LZU 108 8829 R1A

Description

This module gives a high level overview of the Smart Service Router (SSR). It describes trends, place in the network, deployment scenarios and it introduces the product family

Learning objectives

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

- 1 Understand the Trends and Drivers in the market
- 2 Understand the Position in the Network and its main functions
- 3 Understand some of the most common Deployment Scenarios, Applications and Solutions, followed by the underlying technologies and architectures
- 4 List the Members of the product family
- 5 Describe the key differentiators

Target audience

The target audience for this course is:

Fundamentals

Prerequisites

Successful completion of the following courses:

There are no prerequisites for this course

Duration and class size

The length of the course is 0.53 hours.



**Learning situation**

This course is a self phased web based course

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)
	Introduction	
	Objectives	
	Functionality	
	Deployment Scenarios	
	Product Family	
	Summary	



BNG Overview and Fundamentals



LZU1089743 R1A

Description

This course consists of two parts. The first part will discuss the features of BNG like AAA, QoS, PPPoE and DHCP Clips in the network on an overview level. The second part covers the fundamentals of Broadband Network Gateway (BNG). It includes the main functionalities in BNG such PPP, PPPoE, AAA, RADIUS, DHCP and CLIPS. The course explains some details of the BNG related features.

Learning objectives

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

- 1 Understand the Broadband Network trends
 - 1.1 Recognize the impact of broadband network growth
 - 1.2 Understand the services in broadband networks
- 2 Understand the Broadband Network Gateway
 - 2.1 Explain the access technologies in brief
 - 2.2 Explain the role of BNG
- 3 Understand basics of Broadband Network Gateway features
 - 3.1 Explain the main devices and features in the broadband networks
 - 3.2 Explain the main protocols for subscriber management
 - 3.3 Explain overview of AAA
 - 3.4 Explain QoS in BNG
 - 3.5 Understand the other BNG related features in brief
- 4 Understand the basic functions of the BNG
 - 4.1 Introduction to the basic functions of the BNG
- 5 Understand PPP
 - 5.1 PPP phases
 - 5.2 PPP LCP
 - 5.3 PPP NCP





- 6 Understand PPPoE
 - 6.1 PPPoE PADx
 - 6.2 PPPoE stages
- 7 Explain AAA in BNG
 - 7.1 AAA protocols
 - 7.2 Authentication and Authorization
 - 7.3 Accounting
- 8 Understand RADIUS main functions
 - 8.1 RADIUS basics
 - 8.2 RADIUS Authentication and Authorization
 - 8.3 RADIUS Accounting
- 9 Explain DHCP and CLIPS
 - 9.1 DHCP functions
 - 9.2 CLIPS functions

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, System Administrator, Fundamentals

Prerequisites

Successful completion of the following courses:

General IP networking knowledge.

Duration and class size

The length of the course is 1 hour

Learning situation

This is a web-based interactive training course with multimedia content.

Ericsson AB

Global Services

SE-164 80 Stockholm

Telephone: +46 10 719 0000



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)
	Broadband Access Network Trends	
	BNG Introduction	
	Broadband Network Devices and Features	
	Protocols	
	AAA	
	QoS in BNG	
	PPP	
	PPPoE	
	Radius	
	DHCP	
	CLIPS	



Exercises for Ethernet Transport Fundamentals on SSR



LZU1088828 R1A

Description

This course module covers hands-on configuration and verification for Ethernet Transport on IPOS based systems (SSR). It provides multiple configuration and verification tasks as well as verification and troubleshooting commands.

Theory to hands-on ratio of this course is 40/60

This course is 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 portion.

Learning objectives

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

- 6 Understand Ethernet concepts in SSR systems
 - 6.1 Review of SSR fundamentals
 - 6.2 Build a basic Bridged Network
 - 6.3 Hands-on Context, bindings and Circuits
 - 6.4 Verification commands
- 7 Understand the effect of Loops in bridged networks
 - 7.1 What is loop and why it occurs
- 8 Understanding Mac Move Detection
 - 8.1 Mac Move detection concept
 - 8.2 RSTP
- 9 Link aggregation Concepts and Configuration
 - 9.1 Why aggregation is required?
 - 9.2 what is the benefits of LA
 - 9.3 Configure LAGs
 - 9.4 Verification of LAGs

Target audience

The target audience for this course is:



Network Design Engineer, Network Deployment Engineer, System Engineer, Service Engineer

Prerequisites

Successful completion of the following courses:

- WBL: Ethernet Transport Overview and Fundamentals, LZU1088519

Duration and class size

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

Learning situation

Instructor Led Training



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	• Introduction, Review basic concepts, Agenda & LAB setup	2.0
	• Management interface	1.0
	• Bridging Overview	1.5
	• Building basic bridged network in SSR system • Creating bridge • Forwarding rules for trunk and tributary circuits • Gratuitous ARP	1.5
• 2	• Building topology reference network	2.0
	• Loops in bridged networks	1.0
	• MAC move detection and RSTP	
	• Configuring and monitoring network LAG groups	1.5
	• Configuring Link Aggregation Control Protocol	1.5



Exercises for Subscriber Management on Broadband Network Gateway (BNG)



LZU1082488 R1A

Description

This course introduces practical exercises for subscriber management on Ericsson IPOS based platform supporting BNG (Broadband Network Gateway) such as Ericsson SSR 8000, Router 8801, EVR and SmartEdge Family. It covers PPP, PPPoE, DHCP, DHCPv6, IPoE and CLIPS based IPv4 and IPv6 subscriber management. It also covers RADIUS. It includes configuration, verification and troubleshooting tasks.

Theory to hands-on ratio of this course is 20/80.

Learning objectives

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

- 1 Discuss the concepts and features in Broadband Network Gateway
 - 1.1 Identify Ericsson BNG products and offerings
 - 1.2 Identify the concepts of PPP and PPPoE
 - 1.3 Recognize the PPP phases
 - 1.4 Define the PPPoE session establishment
 - 1.5 Identify the concepts of PPP and PPPoE for IPv6 subscribers
 - 1.6 Compare IPv4 and IPv6 PPP subscriber management
 - 1.7 Identify dynamic bindings and the binding architecture
- 2 Configure and verify PPPoE Subscriber Management
 - 2.1 Configure and verify PPPoE over tagged or untagged Ethernet connections
 - 2.2 Configure and verify PPPoE Dual Stack Subscriber Management
- 3 Identify role of RADIUS for subscriber management
 - 3.1 Configure PPPoE subscriber with RADIUS
 - 3.2 Verification of Subscriber activity with RADIUS
- 4 Define the DHCP and DHCPv6 concepts with subscriber management
 - 4.1 Configure DHCP local server
 - 4.2 Configure DHCP proxy server with static bindings
 - 4.3 Verify subscriber device connection using DHCP
 - 4.4 Debug DHCP with subscriber
 - 4.5 Configure DHCPv6 PD local server
- 5 Define the CLIPS/IPoE concepts with subscriber management



- 5.1 Configure dynamic CLIPS for IPv4 and DS subscribers
- 5.2 Verify CLIPS subscriber device connection
- 6 Discuss CLIPS with RADIUS
- 6.1 Configure and verify CLIPS with RADIUS

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, Field Technician, System Administrator

Prerequisites

Successful completion of the following courses:

IP Overview & Fundamentals, LZU1088538

IP Routing Overview & Fundamentals, LZU1088593

BNG Overview, LZU1089744

Fixed Broadband Subscriber Management Overview, LZU1088524

BNG Fundamentals, LZU089743

SSR Fundamentals: System Management Configuration, LZU 1088856

Exercise for SSR Fundamentals: System Management Configuration, CLI, LZU1088821

IPv6 overview and fundamentals

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.



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	<ul style="list-style-type: none">• Discuss the concepts and features in Broadband Network Gateway• Identify Ericsson BNG products and offerings• Identify the concepts of PPP and PPPoE• Recognize the PPP phases• Define the PPPoE session establishment• Exercise 1 Management Configuration	2.0
	<ul style="list-style-type: none">• Identify the concepts of PPP and PPPoE for IPv6 subscribers• Identify dynamic bindings and the binding architecture• Exercise 2 PPPoE with static IP	1.0
	<ul style="list-style-type: none">• Describe the concept of DS for subscriber• Exercise 3 PPPoE with static DS• Exercise 4 PPPoE with IPv4 pool (untagged)	2.0
	<ul style="list-style-type: none">• PPPoE with Dot1Q• Exercise 5 PPPoE with IPv4 pool (tagged)• Exercise 6 PPPoE with IPv6 pool	1.0
2	<ul style="list-style-type: none">• Debug PPP sessions• Exercise 7 Debug PPP Sessions	1.0



	<ul style="list-style-type: none">• Identify role of RADIUS for subscriber management• Configure PPPoE subscriber with RADIUS• Verification of Subscriber activity with RADIUS• Exercise 8 Context specific RADIUS	4.0
	<ul style="list-style-type: none">• Subscriber management with global RADIUS• Exercise 9 Global RADIUS	1.0
3	<ul style="list-style-type: none">• Define the DHCP and DHCPv6 concepts with subscriber management	1.0
	<ul style="list-style-type: none">• Configure DHCP local server• Exercise 10 Configure DHCP local server	1.0
	<ul style="list-style-type: none">• Configure DHCP proxy server with static bindings• Verify subscriber device connection using DHCP• Exercise 11 DHCP Proxy – static binding• Exercise 12 Configure DHCP Proxy – static subscriber binding	2.0
	<ul style="list-style-type: none">• Debug DHCP with subscriber• Exercise 13 DHCP Debug	1.0
	<ul style="list-style-type: none">• Configure DHCPv6 PD local server• Exercise 14 DHCPv6 local server – static subscriber binding	1.0



4	<ul style="list-style-type: none">• Define the CLIPS/IPoE concepts with subscriber management• Configure dynamic CLIPS for subscribers• Verify CLIPS subscriber device connection• Exercise 15 Dynamic CLIPS	2.0
	<ul style="list-style-type: none">• Configure dynamic CLIPS for IPv4 and DS subscribers• Verify CLIPS subscriber device connection• Exercise 16 Dynamic CLIPS DS	1.0
	<ul style="list-style-type: none">• CLIPs with context specific RADIUS• Exercise 17 RADIUS for CLIPS	2.0
	<ul style="list-style-type: none">• CLIPs with global RADIUS• Exercise 18 Global RADIUS for CLIPS	1.0





Ericsson SSR 8000 4.0 System Administration and Security



LZU1082577 R1A

Description

Do you need the skills and knowledge to administer and configure security functions on the Ericsson Smart Service Router in your network?

With rapid expansion of the Internet and a surge in data traffic—connected devices, bandwidth, and multimedia (data, voice, and video)—security has become an important aspect. An SSR router deployed at the edge of the network is directly exposed to various types of security attacks. The comprehensive security features of Ericsson IP Operating System help protect the SSR router and other nodes in the core network.

This course module describes administrative and security functions on the Ericsson Smart Service Router – SSR system. It covers several features related to system level administration and security in theory and also using hands-on exercises. In addition it also covers how to configure connection to external servers for authentication and accounting of administrators.

Learning objectives

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

- 1 Describe and configure management access during initial startup and normal operations
 - 1.1 Describe the Access during initial start-up
 - 1.2 Identify the Access during normal operations
 - 1.3 Describe the Security for Management access
- 2 Understand the different between local and non-local contexts Admin account
 - 2.1 Understanding and configuring connection via context local
 - 2.2 Describe and configuring Connection via non-local context
 - 2.3 Compare and contrast local and non-local context Connection
- 3 Describe the specific services within context
 - 3.1 Understanding the concept of Services in SSR
 - 3.2 Enable Application-Level Services in Nonlocal Contexts
 - 3.3 Verify specific services within context (local and non-local)
- 4 Understand administrative privileges and command privilege levels





- 4.1 Describe the Privilege Level for an Administrator Account
- 4.2 Modify the Privilege Level in an Active Session
- 4.3 Configure a Password to Enable a Privilege Level
- 5 Configure AAA using TACACS+ server for administrator sessions
 - 5.1 Describe the method of authenticating the users
 - 5.2 Understanding the TACACS+ Server
 - 5.3 Describe the setup of a TACACS+ Server
 - 5.4 Configure a TACACS+ Server for a context
 - 5.5 Configure TACACS+ Timers and Counters for a Context
- 6 Understanding the concept of Access Control Lists in SSR
 - 6.1 Describe the concept of Access Control List
 - 6.2 Describe the type of ACL
 - 6.3 Understand the filtering of traffic to a specific host
 - 6.4 Configuring the administrative Access Control Lists
- 7 Describe the log in SSR
 - 7.1 Describe the different type of logs in SSR
 - 7.2 Understanding the communication with Syslog Server
 - 7.3 Describe the concept of communication with Syslog Server
 - 7.4 Configure communication to a Syslog server
- 8 Describe the procedure of password recovery
 - 8.1 Understand password recovery
 - 8.2 Perform the administrator and Privilege Level Passwords

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:

- WBL: Smart Services Router (SSR) Product Overview, LZU1088829 R1A
- WBL: SSR Fundamentals - Key Concepts, LZU1022072 R1A
- WBL: SSR Fundamentals - System Architecture, LZU1021776 R1A
- WBL: SSR Fundamentals - System Management Configuration, LZU1022074
- ILT/WS: Exercises for SSR Fundamentals - System Management Configuration, LZU1088821 R2A
- ILT/WS: Ericsson SSR 8000 4.0 System Operation and Maintenance



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 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	Describe and configure management access during initial startup and normal operations <ul style="list-style-type: none">Describe the Access during initial start-upIdentify the Access during normal operationsDescribe the Security for Management accessHands-on 1	0.5
	Understand the different between local and non-local contexts Admin account <ul style="list-style-type: none">Understanding and configuring connection via context localDescribe and configuring Connection via non-local contextCompare and contrast local and non-local context ConnectionHands-on 2	1.0
	Describe the specific services within context <ul style="list-style-type: none">Understanding the concept of Services in SSREnable Application-Level Services in Nonlocal ContextsVerify specific services within context (local and non-local)Hands-on 3	1.0



<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 4	0.5
<p>Configure AAA using TACACS+ server for administrator sessions</p> <ul style="list-style-type: none">• Describe the method of authenticating the users• Understanding 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 5	1.0
<p>Understanding the concept of Access Control Lists in SSR</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 6	0.5
<p>Describe the log in SSR</p> <ul style="list-style-type: none">• Describe the different type of logs in SSR• Understanding the communication with Syslog Server• Describe the concept of communication with Syslog Server• Configure communication to a Syslog server• Hands-on 7	1.0
<p>Describe the procedure of password recovery</p> <ul style="list-style-type: none">• Understand password recovery• Perform the administrator and Privilege Level Passwords• Hands-on 8	0.5



Ericsson SSR 8000 4.0 System Operation and Maintenance



LZU1082578 R1A

Description

The Smart Services Router (SSR) is positioned as the platform of choice by Ericsson for its IP based offerings. This platform will be used by wireline and wireless service providers, carriers to build their network infrastructure.

Do you need the skills and knowledge to operate and configure the Ericsson Smart Service Router (SSR) in your network?

This course will allow the participants to focus on the Operation and Configuration of the Ericsson Smart Service Router Family. The course describes the chassis, traffic cards, controller cards and fan/alarm and shows how to identify hardware failures, replace cards and components and perform software upgrades. Hands-on exercises allow participants to work with the SSR CLI focusing on operations and maintenance related commands and tools.

Learning objectives

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

- 1 Describe the SSR 8000 Family Overview
 - 1.1 Explain the SSR 8000 Family Product Overview
 - 1.2 Explain the features and its function
 - 1.3 Describe the Use Cases of SSR
- 2 Describe the SSR Hardware Platform Architecture
 - 2.1 Explain the hardware architecture of SSR
 - 2.2 List the different components of SSR
 - 2.3 Identify the different SSR chassis models
- 3 Describe the SSR Software Architecture
 - 3.1 Describe the Key Concepts in SSR IPOS Environment
 - 3.2 Explain the terminologies such as context, interface and bindings architecture
 - 3.3 Discuss the SSR Command Line Interface and working with interfaces and its type, ports and circuits
 - 3.4 Describe the Binding Concept and its type
- 4 Managing Configuration file in SSR
 - 4.1 Discuss the Software Storage Organization
 - 4.2 Understanding the Configuration Files





- 4.3 Explain the Managing of Configuration Files
- 5 Upgrade the New Ericsson IPOS Release Image
 - 5.1 Explain the release upgrade procedure of Ericsson IPOS
 - 5.2 Discuss upgrading from different release
 - 5.3 Ericsson IPOS roll-back procedure
 - 5.4 Restore System to Previous Image
- 6 Describe the Type of Cards in SSR
 - 6.1 Discuss the different type of Cards in SSR
 - 6.2 Identify the types of Cards in SSR
 - 6.3 Explain the Layout of traffic cards and controller cards
 - 6.4 Performing Line Cards Configuration and Provisioning
- 7 Hardware diagnostics (POD & OSD)
 - 7.1 Discuss the Hardware diagnostics routines on traffic cards and controller cards
 - 7.2 Explain the purpose of POD and OSD
 - 7.3 Discuss the OSD versus POD
 - 7.4 Explain the typical Use Cases for OSD
- 8 Describe the LEDs and alarms in SSR
 - 8.1 Discuss the different LEDs and alarms in SSR
 - 8.2 Explain the LEDs and alarms with operational states of the chassis, traffic cards and controller cards
 - 8.3 Identify the RPSW Card Components and RPSW LEDs
 - 8.4 Explain the Smart Services Card LEDs and Alarms
- 9 Describe the HW Management in SSR
 - 9.1 Describe the Hardware replacement of traffic cards, controller cards and related components
 - 9.2 Install/Replace Controller Cards (switch card)
 - 9.3 Managing the USB Flash Drive
- 10 Describe the process of Password Recovery
 - 10.1 Explain the Process of Password Recovery
 - 10.2 Describe the Reset of Administrator Password

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:



- WBL: Smart Services Router (SSR) Product Overview, LZU1088829 R1A
- WBL: SSR Fundamentals - Key Concepts, LZU1022072 R1A
- WBL: SSR Fundamentals - System Architecture, LZU1021776 R1A
- WBL: SSR Fundamentals - System Management Configuration, LZU1022074
- ILT/WS: Exercises for SSR Fundamentals - System Management Configuration, LZU1088821 R2A
- Exercises for IPv6 Fundamentals on SE/SSR - LZU1089357

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.

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 SSR 8000 Family Overview <ul style="list-style-type: none">• Explain the SSR 8000 Family Product Overview• Explain the features and its function• Describe the Use Cases of SSR	0.5
	Describe the SSR Hardware Platform Architecture <ul style="list-style-type: none">• Explain the hardware architecture of SSR• List the different component of SSR• Identify the different SSR chassis model	0.5
	Describe the SSR Software Architecture <ul style="list-style-type: none">• Describe the Key Concepts in SSR IPOS Environment• Explain the terminologies such as context, interface and bindings architecture• Discuss the SSR Command Line Interface and working with interfaces and its type, ports and circuits• Describe the Binding Concept and its type• Hands-on 1	1.5



	<p>Managing Configuration file in SSR</p> <ul style="list-style-type: none">• Discuss the Software Storage Organization• Understanding the Configuration Files• Explain the Managing of Configuration Files	1.0
	<p>Upgrade the New Ericsson IPOS Release Image</p> <ul style="list-style-type: none">• Explain the release upgrade procedure of Ericsson IPOS• Discuss upgrading from different release• Ericsson IPOS roll-back procedure• Restore System to Previous Image• Hands-on 2	2.5
2	<p>Describe the Type of Cards in SSR</p> <ul style="list-style-type: none">• Describe the different type of Cards in SSR• Identify the types of Cards in SSR• Explain the Layout of traffic cards and controller cards• Performing Line Cards Configuration and Provisioning• Hands-on 3	1.5
	<p>Hardware diagnostics (POD & OSD)</p> <ul style="list-style-type: none">• Explain the Hardware diagnostics routines on traffic cards and controller cards• Explain the purpose of POD and OSD• Describe the OSD versus POD• Explain the typical Use Cases for OSD• Hands-on 4	1.5
	<p>Describe the LEDs and alarms in SSR</p> <ul style="list-style-type: none">• Describe the different LEDs and alarms in SSR• Explain the LEDs and alarms with operational states of the chassis, traffic cards and controller cards• Identify the RPSW Card Components and RPSW LEDs• Explain the Smart Services Card LEDs and Alarms	1.0
	<p>Describe the HW Management in SSR</p> <ul style="list-style-type: none">• Describe the Hardware replacement of traffic cards, controller cards and related components• Install/Replace Controller Cards (switch card)• Managing the USB Flash Drive	1.0



	<p>Describe the process of Password Recovery</p> <ul style="list-style-type: none">• Explain the Process of Password Recovery• Describe the Reset of Administrator Password• Hands-on 5	1.0
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Ericsson SSR 8000 4.0 System Troubleshooting



LZU1082579 R1A

Description

While configuring and operating a SSR system, what are the usual faults, how are they detected and solved the system nodes? How does Ericsson local/field support enable and collect logs from a SSR system ?

This course will help the participants to troubleshooting of the SSR system including ways to verify operational health, the traffic flow through the system. It also gives an overview on how to detect the fault and logs are collected to do the investigation on cause of the failure. This training is useful for operation and maintenance personnel to get an understanding of the different logs in the system. Hands-on exercises allow participants to understand SSR CLI syntax for practical system troubleshooting related commands.

Learning objectives

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

- 1 Describe the CLI Tools for Troubleshooting
 - 1.1 Describe the grep and its Options
 - 1.2 Understand the use of CLI Command Aliases as Shortcuts
 - 1.3 Using CLI Command macros to Execute Multiple Command with Single Command
- 2 Understanding the Operational Health of the SSR System
 - 2.1 Describe the basic RPSW health checks
 - 2.2 Explain the details of control plane interface
 - 2.3 Understand system storage
- 3 Describe the Fundamental Concept of Processes Architecture on the System
 - 3.1 Describe the SSR software architecture and system processes
 - 3.2 Understanding the concept of manual core dump
 - 3.3 Identify the different types of processes in SSR
 - 3.4 Work with Core Dumps of Faulty Processes
- 4 Describe the SSR System Redundancy Issues
 - 4.1 Explain the redundancy on active RP
 - 4.2 Analyze problems of standby RP
 - 4.3 Understand RP Failover Management
- 5 Discuss the issues related with Boot Problem
 - 5.1 Understanding the booting in SSR





- 5.2 Identify the issue related with booting in SSR
- 6 Explain the Active and History Logs
 - 6.1 Discuss the different type of logs in SSR
 - 6.2 Understanding the communication with Syslog Server
 - 6.3 Discuss the concept of communication with Syslog Server
 - 6.4 Configure communication to a Syslog server
- 7 Use and Impact of Debugging on the SSR System
 - 7.1 Understand the SSR system debug structure
 - 7.2 Identify the SSR debug process
- 8 Troubleshooting for Traffic Flow through Ports, Circuits and Interfaces
 - 8.1 Explain the traffic flow in SSR System
 - 8.2 Identify the Connectivity Issue and Troubleshooting

Target audience

The target audience for this course is:

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

Prerequisites

Successful completion of the following courses:

- WBL: Smart Services Router (SSR) Product Overview, LZU1088829 R1A
- WBL: SSR Fundamentals - Key Concepts, LZU1022072 R1A
- WBL: SSR Fundamentals - System Architecture, LZU1021776 R1A
- WBL: SSR Fundamentals - System Management Configuration, LZU1022074
- ILT/WS: Exercises for SSR Fundamentals - System Management Configuration, LZU1088821 R2A
- ILT/WS: Ericsson SSR 4.0 System Operation & Maintenance, LZU108xxxx
- Ericsson SSR 4.0 System Administration & Security, LZU108xxxx

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 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	Describe the CLI Tools for Troubleshooting <ul style="list-style-type: none">• Describe the grep and its Options• Understand the use of CLI Command Aliases as Shortcuts• Using CLI Command macros to Execute Multiple Command with Single Command• Hands-on 1	1.5
	Understanding the Operational Health of the SSR System <ul style="list-style-type: none">• Describe the basic RPSW health checks• Explain the details of control plane interface• Understand system storage• Hands-on 2	2.0
	Describe the Fundamental Concept of Processes Architecture on the System <ul style="list-style-type: none">• Describe the SSR software architecture and system processes• Understanding the concept of manual core dump• Identify the different types of processes in SSR• Work with Core Dumps of Faulty Processes• Hands-on 3	1.5
	Describe the SSR System Redundancy Issues <ul style="list-style-type: none">• Explain the redundancy on active RP• Analyze problems of standby RP• Understand RP Failover Management• Hands-on 4	1.0



2	<p>Describe the issues related with Boot Problem</p> <ul style="list-style-type: none">• Understanding the booting in SSR• Identify the issue related with booting in SSR• Hands-on 5	1.0
	<p>Explain the Active and History Logs</p> <ul style="list-style-type: none">• Explain the different type of logs in SSR• Understanding the communication with Syslog Server• Discuss the concept of communication with Syslog Server• Configure communication to a Syslog server• Hands-on 6	2.0
	<p>Use and Impact of Debugging on the SSR System</p> <ul style="list-style-type: none">• Understand the SSR system debug structure• Identify the SSR debug process• Hands-on 7	1.0
	<p>Troubleshooting for Traffic Flow through Ports, Circuits and Interfaces</p> <ul style="list-style-type: none">• Explain the traffic flow in SSR System• Identify the Connectivity Issue and Troubleshooting• Hands-on 8	2.0



Subscriber Management on virtual Broadband Network Gateway (vBNG)



LZU1082599 R1A

Description

This course introduces practical exercises for subscriber management on Ericsson virtual BNG (Broadband Network Gateway). It introduces the BNG on Ericsson virtual Routing Engine. It covers PPP, PPPoE, DHCP, DHCPv6, IPoE and CLIPS based IPv4 and IPv6 subscriber management. It also covers RADIUS and includes configuration, verification and troubleshooting tasks.

Learning objectives

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

- 1 Describe the Concepts and Features of BNG on vRE
 - 1.1 Demonstrate Ericsson BNG Products and Offerings
 - 1.2 Explain vBNG Deployment on vRE
 - 1.3 Describe vBNG System Architecture
 - 1.4 Demonstrate vBNG Use Cases
- 2 Describe the Concepts of PPP and PPPoE
 - 2.1 Recognize the PPP phases
 - 2.2 Define the PPPoE session establishment
 - 2.3 Identify the concepts of PPP and PPPoE for IPv6 subscribers
 - 2.4 Compare IPv4 and IPv6 PPP subscriber management
 - 2.5 Identify dynamic bindings and the binding architecture
- 3 Describe PPPoE Subscriber Management
 - 3.1 Explain the Concept of PPPoE Subscriber Management
 - 3.2 Demonstrate PPPoE over tagged or untagged Ethernet connections
 - 3.3 Illustrate PPPoE Dual Stack Subscriber Management
- 4 Describe the role of RADIUS for Subscriber Management
 - 4.1 Explain the RADIUS Service for Subscriber Management
 - 4.2 Demonstrate PPPoE Subscriber with RADIUS
 - 4.3 Illustration of Subscriber Management with RADIUS
- 5 Describe DHCP/DHCPv6 Services with Subscriber Management
 - 5.1 Explain the Concept of DHCP and DHCPv6 Services with Subscriber Management
 - 5.2 Implement DHCP local server
 - 5.3 Explain Subscriber Device Connection using DHCP





- 5.4 Demonstrate Debug DHCP with Subscriber
- 5.5 Implement DHCPv6 PD local server
- 6 Describe CLIPS/IPoE with Subscriber Management
- 6.1 Explain the Concept of CLIPS/IPoE with Subscriber Management
- 6.2 Implement Dynamic CLIPS for IPv4 Subscribers
- 6.3 Demonstrate the Dual-Stack CLIPS
- 6.4 Verify CLIPS Subscriber Device Connection
- 7 Describe CLIPS with RADIUS
- 7.1 Demonstrate and Configure CLIPS with RADIUS
- 7.2 Verify CLIPS with RADIUS

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, Field Technician, System Administrator

Prerequisites

Successful completion of the following courses:

BNG Overview and Fundamentals, LZU1089743

Fixed Broadband Subscriber Management Overview, LZU1088524

Virtual Routing Engine and vBNG Fundamentals, LZU1082600

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.



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 Concepts and Features of BNG on vRE	1.5
	<ul style="list-style-type: none">• Demonstrate Ericsson BNG Products and Offerings• Explain vBNG Deployment on vRE• Describe vBNG System Architecture• Demonstrate vBNG Use Cases	
	Describe the Concepts of PPP and PPPoE	2.0
	<ul style="list-style-type: none">• Recognize the PPP phases• Define the PPPoE session establishment• Identify the concepts of PPP and PPPoE for IPv6 subscribers• Identify dynamic bindings and the binding architecture• Exercise 1 Management Configuration• Exercise 2 PPPoE with static IP	
	Describe the concept of DS for subscriber	1.5
	<ul style="list-style-type: none">• Exercise 3 PPPoE with static DS• Exercise 4 PPPoE with IPv4 pool (untagged)	
	Describe and Configure PPPoE with dot1Q	1.0
	<ul style="list-style-type: none">• Exercise 5 PPPoE with IPv4 pool (tagged)• Exercise 6 PPPoE with IPv6 pool	
	Describe and Perform Debug PPP sessions	1.0
	<ul style="list-style-type: none">• Exercise 7 Debug PPP Sessions	
2	Identify role of RADIUS for Subscriber Management	4.0
	<ul style="list-style-type: none">• Configure PPPoE subscriber with RADIUS• Verification of Subscriber activity with RADIUS• Exercise 8 Context specific RADIUS	
	Subscriber management with global RADIUS	1.0
	<ul style="list-style-type: none">• Exercise 9 Global RADIUS	
3	Define the DHCP and DHCPv6 concepts with Subscriber Management	2.0
	<ul style="list-style-type: none">• Configure DHCP local server• Exercise 10 Configure DHCP local server	



	Describe the role of DHCP proxy server with static bindings	1.0
	<ul style="list-style-type: none">• Explain the function of DHCP proxy• Explain the function of DHCP Relay Agent• Exercise 11 DHCP with static subscriber binding	
	Debug DHCP with subscriber	1.0
	<ul style="list-style-type: none">• Exercise 12 DHCP Debug	
	Describe and Configure DHCPv6 PD local server	2.0
	<ul style="list-style-type: none">• Exercise 13 DHCPv6 local server – static subscriber binding	
	Define the CLIPS/IPoE concepts with Subscriber Management	2.0
	<ul style="list-style-type: none">• Configure dynamic CLIPS for subscribers• Verify CLIPS subscriber device connection• Exercise 14 Dynamic CLIPS	
4	Configure dynamic CLIPS for IPv4 and DS Subscribers	2.0
	<ul style="list-style-type: none">• Verify CLIPS subscriber device connection• Exercise 15 Dynamic CLIPS DS	
	CLIPs with context specific RADIUS	2.0
	<ul style="list-style-type: none">• Exercise 16 RADIUS for CLIPS	



Virtual Routing Engine and vBNG Fundamentals



LZU1082600 R1A

Description

This course covers the concept and the architecture of Virtual Router Engine (vRE) and virtual Broadband Network Gateway (vBNG). It gives an overview of the features supported in vRE, specially the features for vBNG. It also presents VRE deployment and some use-cases.

It is a theoretical course intended to cover concepts related to vRE and vBNG.

Learning objectives

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

- 1 Discuss the general concepts of Virtual Routing Engine (vRE)
 - 1.1 Define vRE taxonomy
 - 1.2 Discuss vRE in Ericsson product portfolio
 - 1.3 Describe vRE components
 - 1.4 Describe vRE system architecture and functions
 - 1.5 Discuss Ericsson IPOS in vRE
 - 1.6 Recognize the vRE deployments
- 2 Explain vRE Use Cases.
 - 2.1 Discuss Virtual Route Reflector
 - 2.2 Discuss large Virtual CE
 - 2.3 Discuss vRE VPN solutions
- 3 Describe vBNG in vRE.
 - 3.1 Realize vBNG operation in vRE
 - 3.2 List vBNG features and functions
 - 3.3 Demonstrate vBNG scenarios

Target audience

The target audience for this course is:

Network operators, Network planners, System engineers, System Administrators, Service planning engineer, Service engineer





Prerequisites

Successful completion of the following courses:

BNG Overview and Fundamentals, LZU1089743

Fixed Broadband Subscriber Management Overview, LZU1088524

Duration and class size

The length of the course is 1 day and the maximum number of participants is 16.

Learning situation

This course is based on theoretical instructor-led lessons given 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	vRE general concepts <ul style="list-style-type: none">• Define vRE taxonomy• Discuss vRE in Ericsson product portfolio• Describe vRE Components• Describe vRE System Architecture and Functions	2.0
	Ericsson IPOS in vRE <ul style="list-style-type: none">• Context, Context vs Router, Multiple Context• Interface, Port & Circuit• Binding of an interface	0.5
	vRE Deployment <ul style="list-style-type: none">• Cloud deployment• Cloud-lite deployment• Virtual Appliance	0.5
	vRE Use Cases <ul style="list-style-type: none">• Discuss Virtual Route Reflector• Discuss Large Virtual CE• Discuss vRE VPN solutions	1.5
	vBNG in vRE <ul style="list-style-type: none">• Realize vBNG operation in vRE• List vBNG features and functions• Demonstrate vBNG scenarios	1.5