



# Broadband Access Solutions Training Programs

## Course Descriptions





# Table of Content

<b>ACCESS NETWORKS, AN OVERVIEW .....</b>	<b>1</b>
<b>ATM &amp; IP OVER ATM (VCT) .....</b>	<b>3</b>
<b>ATM &amp; IP OVER ATM.....</b>	<b>8</b>
<b>ATM ESSENTIALS (MBL).....</b>	<b>13</b>
<b>CORE NETWORKS, AN OVERVIEW.....</b>	<b>14</b>
<b>CUSTOMER CARE PROFESSIONALISM .....</b>	<b>16</b>
<b>DATACOM NETWORKING .....</b>	<b>18</b>
<b>EDA OVERVIEW .....</b>	<b>19</b>
<b>EDA NETWORK AND SYSTEM ADMINISTRATION.....</b>	<b>21</b>
<b>EDA USER AND SERVICE ADMINISTRATION .....</b>	<b>24</b>
<b>ERICSSON AXI 520/580 INTERNET ENGINEER .....</b>	<b>26</b>
<b>ERX CONFIGURATION WORKSHOP .....</b>	<b>28</b>
<b>FEA USER AND NETWORK ADMINISTRATION.....</b>	<b>30</b>
<b>FEA TECHNICAL OVERVIEW .....</b>	<b>32</b>
<b>IP NETWORKING .....</b>	<b>34</b>
<b>IP NETWORKING AND INTERNETWORKING.....</b>	<b>37</b>
<b>IP NETWORK APPLICATIONS.....</b>	<b>39</b>



<b>IPV6 ADVANCED FEATURES .....</b>	<b>41</b>
<b>IPV6 AND TRANSITION FROM IPV4 TO IPV6.....</b>	<b>44</b>
<b>IPV6 AND TRANSITION FROM IPV4 TO IPV6, HANDS-ON.....</b>	<b>46</b>
<b>IPV6 ROUTING PROTOCOLS .....</b>	<b>49</b>
<b>ISP ROUTING .....</b>	<b>52</b>
<b>MSED INSTALLATION AND CONFIGURATION.....</b>	<b>53</b>
<b>MSED OVERVIEW.....</b>	<b>55</b>
<b>NETWORKING AND ETHERNET STANDARDS .....</b>	<b>57</b>
<b>NETWORKING BASICS, AN OVERVIEW .....</b>	<b>59</b>
<b>THE COMPLETE TEAM LEADER COURSE .....</b>	<b>61</b>
<b>VPN &amp; IP SECURITY .....</b>	<b>63</b>

## Access Networks, An Overview

LZU 108 5944 R1A

### Description

This course provides a comprehensive introduction to the basic concepts and technologies in both fixed and mobile access networks.

### Learning objectives

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

- 1 Understand fixed network connections: access networks
  - 1.1 Outline basic concepts, bandwidth and technologies in access networks
  - 1.2 Describe access based on telephone networks (analogue and digital)
  - 1.3 Outline other access network technologies, such as, cable TV, fiber optics and microwave
  
- 2 Understand the basic concepts of mobile access
  - 2.1 Outline different mobile access (GSM, GPRS and UMTS)
  - 2.2 Explain GSM architecture and outline a basic traffic case
  - 2.3 Explain GPRS architecture and outline a basic traffic case
  - 2.4 Explain UMTS architecture and outline a basic traffic case
  - 2.5 Define mobile IP for IPv4 and IPv6

### Target audience

The target audience for this course is anybody wishing to gain a basic understanding of modern access network technologies.

The course focuses on modern standard technologies and does not contain any Ericsson specific product material.

### Prerequisites

There are no prerequisites for this course.

### Duration

The length of the course is 2 hours 30 mins.



### 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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• Fixed Network Connections: Access Networks</li></ul>	1 hour
1	<ul style="list-style-type: none"><li>• Connecting While Travelling: Mobile Access</li></ul>	1 hour 30 min

## ATM & IP over ATM (VCT)

LZU 108 6129/9 R1A

### Description

This course covers the purpose and principles of Asynchronous Transfer Mode (ATM). From cell format over circuits and connections to ATM network traffic and ATM internetworking, this course explores the evolution and trends of ATM networking. It contrasts alternative technologies including IP and Frame Relay and discusses multi-service traffic types and quality of service (QoS). The latter part of the course focuses on IP over ATM.

### Learning objectives

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

- 1 Describe basic ATM concepts
  - 1.1 Understand the basic ATM concepts
  - 1.2 List some reasons for implementing an ATM service
  - 1.3 Describe the general format of the ATM cell structure
  - 1.4 Understand the basic concept of virtual circuits
  - 1.5 Describe ATM's handling of different traffic types
- 2 Describe ATM Standardisation
  - 2.1 List the ATM standards bodies
  - 2.2 Outline the responsibilities of the ATM forum
  - 2.3 Describe briefly the history of ATM
  - 2.4 Outline the major ATM standards
  - 2.5 Describe the ATM protocol layers
- 3 Describe the physical layer
  - 3.1 Define the physical layer
  - 3.2 Explain how the physical layer interacts with other layers
  - 3.3 Describe Synchronous Digital Hierarchy (SDH) and Synchronous Optical Network (SONET)
  - 3.4 Understand Dense Wavelength Division Multiplexing (DWDM)
- 4 Describe the ATM layer
  - 4.1 Understand the ATM header information and how it is used
  - 4.2 Outline the UNI and NNI cell headers
  - 4.3 Describe the functions of the ATM layer
- 5 Describe the ATM Adaptation Layers (AAL 1, 2, 5 and 0)
  - 5.1 Describe the ATM Adaptation Layer
  - 5.2 Describe quality of service (QoS) categories
  - 5.3 Outline the function of the different AAL types and sublayers
- 6 Describe circuit emulation
  - 6.1 Outline current trends and requirements of voice networks



- 6.2 Describe the concept of Circuit Emulation
- 6.3 Describe structured and unstructured Circuit Emulation
  
- 7 Understand signalling and addressing
  - 7.1 Describe signalling functions and signalling control functions
  - 7.2 Outline address formats
  - 7.3 Describe signalling for point-to-point and point-to-multipoint calls
  
- 8 Understand UNI signalling
  - 8.1 Describe UNI signalling functions and signalling control functions
  - 8.2 Outline the format of a UNI signalling message
  
- 9 Understand PNNI routing and signalling
  - 9.1 Outline where PNNI is used
  - 9.2 Outline how PNNI groups are formed
  - 9.3 Describe how PNNI transit lists work
  
- 10 Understand Other signalling protocols—AAL2, B-ICI, AINI and IISP
  - 10.1 Describe the use of AAL2, B-ICI, AINI and IISP within a network
  - 10.2 Describe AAL2
  - 10.3 Understand Broadband-Intercarrier Interface (B-ICI)
  - 10.4 Understand ATM Internetworking Interface (AINI)
  - 10.5 Understand Interim Inter-switch Signalling Protocol (IISP)
  
- 11 Understand network management
  - 11.1 Describe how ATM switches are managed
  - 11.2 Outline the differences between SNMP and ILMI
  - 11.3 Outline the capabilities of ILMI
  
- 12 Understand ATM Traffic Descriptors
  - 12.1 Understand ATM Traffic Descriptors
  - 12.2 Outline which Traffic Descriptors are required for each Service Category
  
- 13 Describe quality of Service parameters
  - 13.1 Define the quality of service (QoS) parameters used in ATM
  - 13.2 Distinguish between negotiable and non-negotiable QoS parameters
  
- 14 Describe traffic control
  - 14.1 Describe what is meant by connection admission control
  - 14.2 Define virtual bandwidth
  - 14.3 Define traffic shaping
  - 14.4 Define traffic policing
  
- 15 Understand the ATM switch architecture
  - 15.1 Outline the basic structure of a switching node
  - 15.2 Outline different fabric types
  - 15.3 Outline the function of the switch map, or routing table



- 15.4 Define Input and output buffers
- 15.5 Define Blocking
  
- 16 Understand ATM networks
  - 16.1 Outline how networks are created
  - 16.2 Describe how different network types interwork
  - 16.3 Define Public and private networks
  - 16.4 Outline the location of UNI and PNNI
  
- 17 Describe IP over ATM fundamentals
  - 17.1 Describe why ATM is widely used to carry IP traffic
  - 17.2 List some of the issues encountered when internetworking IP and ATM
  - 17.3 List the standards bodies involved in the development of the IP over ATM specifications
  
- 18 Describe Multiprotocol Encapsulation over AAL5
  - 18.1 Define RFC 1483
  - 18.2 Describe logical link control (LLC) encapsulation
  - 18.3 Describe VC multiplexing
  - 18.4 State when both methods are used
  
- 19 Describe Classical IP over ATM
  - 19.1 Describe Classical IP over ATM (CLIP)
  - 19.2 Describe the function of an ATMARP server
  - 19.3 Define a logical IP subnet (LIS)
  - 19.4 Describe the format of an ATMARP packet
  
- 20 Describe Multiprotocol Label Switching (MPLS)
  - 20.1 Describe the concept of MPLS
  - 20.2 List some advantages of MPLS
  - 20.3 Describe the structure of an MPLS network
  - 20.4 Describe how a Label Switched Path (LSP) is set up

### Target audience

The target audience for this course is not limited and may be taken by anyone that has a need to learn about ATM and IP over ATM; for example, Network Operations, Network Development and System Administration staff.

### Prerequisites

The participants should be familiar with datacommunications and telecommunications and should have successfully completed the Datacom Networking course (LZU 102 371) or the Introduction to IP Networks (FAB 102 1313) Web Based Learning course flow, or have equivalent experience.



**Duration and class size**

The length of the course is 3 days and the maximum number of participants is 16.

**Learning situation**

This is a theoretical course given in a virtual classroom over the net by an instructor. The course contains modules like slide presentations, exercises, self-paced study and tests. LZU 102 6129 is the same course delivered in a classroom.



## 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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• Welcome</li></ul>	0.25 hours
1	<ul style="list-style-type: none"><li>• Chapter 1: Introduction</li></ul>	1.5 hours
1	<ul style="list-style-type: none"><li>• Chapter 2: Standardisation</li></ul>	0.5 hours
1	<ul style="list-style-type: none"><li>• Chapter 3: The Physical Layer</li></ul>	1 hour
1	<ul style="list-style-type: none"><li>• Chapter 4: The ATM Layer</li></ul>	1.25 hours
1	<ul style="list-style-type: none"><li>• Chapter 5: The ATM Adaptation Layer</li></ul>	1.5 hours
2	<ul style="list-style-type: none"><li>• Chapter 6: Circuit Emulation</li></ul>	0.5 hours
2	<ul style="list-style-type: none"><li>• Chapter 7: Signalling</li></ul>	0.5 hours
2	<ul style="list-style-type: none"><li>• Chapter 8: UNI Signalling</li></ul>	1 hour
2	<ul style="list-style-type: none"><li>• Chapter 9: PNNI</li></ul>	1 hour
2	<ul style="list-style-type: none"><li>• Chapter 10: AAL2, B-ICI, AINI, IISP</li></ul>	0.5 hours
3	<ul style="list-style-type: none"><li>• Chapter 11: Network Management</li></ul>	0.5 hours
	<ul style="list-style-type: none"><li>• Chapter 12: ATM Traffic Descriptors</li></ul>	1 hour
	<ul style="list-style-type: none"><li>• Chapter 13: Quality of Service Parameters 5.5</li></ul>	1 hour
2	<ul style="list-style-type: none"><li>• Chapter 14: Traffic Control</li></ul>	0.5 hours
	<ul style="list-style-type: none"><li>• Chapter 15: ATM Switch Architecture</li></ul>	0.5 hours
	<ul style="list-style-type: none"><li>• Chapter 16: Building ATM Networks</li></ul>	0.5 hours
	<ul style="list-style-type: none"><li>• Chapter 17: IP over ATM Fundamentals</li></ul>	0.5 hours
	<ul style="list-style-type: none"><li>• Chapter 18: Multiprotocol Encapsulation over AAL5</li></ul>	0.5 hours
	<ul style="list-style-type: none"><li>• Chapter 19: Classical IP over ATM</li></ul>	1 hour
	<ul style="list-style-type: none"><li>• Chapter 20: MPLS</li></ul>	2.5 hours

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## ATM & IP over ATM

ProductNumber ProductRevision

### Description

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  - 5.1 Describe the ATM Adaptation Layer
  - 5.2 Describe quality of service (QoS) categories
  - 5.3 Outline the function of the different AAL types and sublayers



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  - 6.1 Outline current trends and requirements of voice networks
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### Target audience

The target audience for this course is not limited and may be taken by anyone that has a need to learn about ATM and IP over ATM; for example, Network Operations, Network Development and System Administration staff.

### Prerequisites

The participants should be familiar with datacommunications and telecommunications and should have successfully completed the Datacom Networking course (LZU 102 371) or the Introduction to IP Networks (FAB 102 1313) Web Based Learning course, or have equivalent experience.



**Duration and class size**

The length of the course is 3 days and the maximum number of participants is 16.

**Learning situation**

This course is based on theoretical instructor-led lessons given in a classroom environment. LZU 1026129/9 is the same course delivered via VCT (Virtual Classroom Training) over the Internet.



### 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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• Welcome</li></ul>	0.25 hours
1	<ul style="list-style-type: none"><li>• Chapter 1: Introduction</li></ul>	1.5 hours
1	<ul style="list-style-type: none"><li>• Chapter 2: Standardisation</li></ul>	0.5 hours
1	<ul style="list-style-type: none"><li>• Chapter 3: The Physical Layer</li></ul>	1 hour
1	<ul style="list-style-type: none"><li>• Chapter 4: The ATM Layer</li></ul>	1.25 hours
1	<ul style="list-style-type: none"><li>• Chapter 5: The ATM Adaptation Layer</li></ul>	1.5 hours
2	<ul style="list-style-type: none"><li>• Chapter 6: Circuit Emulation</li></ul>	0.5 hours
2	<ul style="list-style-type: none"><li>• Chapter 7: Signalling</li></ul>	0.5 hours
2	<ul style="list-style-type: none"><li>• Chapter 8: UNI Signalling</li></ul>	1 hour
2	<ul style="list-style-type: none"><li>• Chapter 9: PNNI</li></ul>	1 hour
2	<ul style="list-style-type: none"><li>• Chapter 10: AAL2, B-ICI, AINI, IISP</li></ul>	0.5 hours
3	<ul style="list-style-type: none"><li>• Chapter 11: Network Management</li></ul>	0.5 hours
	<ul style="list-style-type: none"><li>• Chapter 12: ATM Traffic Descriptors</li></ul>	1 hour
	<ul style="list-style-type: none"><li>• Chapter 13: Quality of Service Parameters 5.5</li></ul>	1 hour
2	<ul style="list-style-type: none"><li>• Chapter 14: Traffic Control</li></ul>	0.5 hours
	<ul style="list-style-type: none"><li>• Chapter 15: ATM Switch Architecture</li></ul>	0.5 hours
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	<ul style="list-style-type: none"><li>• Chapter 17: IP over ATM Fundamentals</li></ul>	0.5 hours
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	<ul style="list-style-type: none"><li>• Chapter 19: Classical IP over ATM</li></ul>	1 hour
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## ATM Essentials (MBL)

LZU 108 1459

### Description

This course introduces the participants to the fundamentals of ATM.

### Objectives

After the course, participants will be able to explain the merging of telecom and datacom, including:

- 1 The meaning and use of ATM and B-ISDN concepts
- 2 How ATM, SDH and PDH interact
- 3 The characteristics of ATM
- 4 The applications of ATM and how ATM is used for the services it supports
- 5 How an ATM network functions.

### Target Audience

This course is intended for:

- Technical staff who have little or no experience or familiarity with ATM
- Support staff (training and customer care staff) in organizations where ATM products and services are provided
- Customer Care and Marketing Staff working in telecoms
- Management and other non-technical staff who need an appreciation of the fundamentals of ATM technology

### Duration

The length of the course is 7 hours.

### Learning situation

Multimedia Based Learning

This is interactive CD-ROM based training that has a high multimedia content including graphics, animations and audio.

## Core Networks, An Overview

LZU 108 5945 R1A

### Description

This course provides a comprehensive introduction to the technologies in the core networks, core network architecture and network operation and maintenance.

### Learning objectives

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

- 1 Describe the technologies in the core network
  - 1.1 Explain how a physical network is built
  - 1.2 Outline different types of multiplexing (FDM, TDM and WDM)
  - 1.3 Describe transmission technologies such as SDH and SONET
  - 1.4 Describe optical ring architecture and the basics of ATM and MPLS
  
- 2 Define core network architectures
  - 2.1 Understand traffic trends and outline multiservice backbone requirements
  - 2.2 Explain resource allocation and quality of service
  - 2.3 Understand performance optimization
  - 2.4 Define IPsec and VPN technology
  
- 3 Understand network operation and maintenance
  - 3.1 Outline steps in network operation
  - 3.2 Understand network traffic and outline some network traffic situations
  - 3.3 Explain monitoring using SNMP and PING
  - 3.4 Define steps and routines for error handling

### Target audience

The target audience for this course is anybody wishing to gain a basic understanding of the technologies used in core networks, core network architecture and network operation and maintenance.

The course focuses on modern standard technologies and does not contain any Ericsson specific product material.

### Prerequisites

There are no prerequisites for this course.



### **Duration**

The length of the course is 3 hours.

### **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.

<b>Day</b>	<b>Short description of the topics in the course</b>	<b>Estimated time</b>
1	<ul style="list-style-type: none"><li>• Technologies in the Core Network</li></ul>	1 hour 15 min
1	<ul style="list-style-type: none"><li>• Core Network Architectures</li></ul>	1 hour
1	<ul style="list-style-type: none"><li>• Network Operation and Maintenance</li></ul>	45 min

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## Customer Care Professionalism

LZU 108 3214

### Description

This course will help employees in customer care organizations to answer any direct customer inquiry in a correct and professional manner. This course will help our customers to fulfill their goal, regarding “number of inquiries from customers solved at first contact”.

### Learning objectives

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

- 1 Answer any direct customer inquiry in a correct and professional manner
- 2 Explain and listen to the customer and assist in the best way possible
- 3 Handle difficult situations - and keep the customer satisfied.

### Target audience

The target group has been defined as two different groups:

- Customer Care organizations
- Distributors or Service providers

### Prerequisites

There are no prerequisites for this course.

### Duration and class size

The length of the course is 2 days 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	Short description of the topics in the course	Estimated Time
	<ul style="list-style-type: none"><li>• Module 1<ul style="list-style-type: none"><li>• Introduction to telecom</li></ul></li><li>• Module 2<ul style="list-style-type: none"><li>• Life of a Subscriber</li></ul></li><li>• Module 3<ul style="list-style-type: none"><li>• Quality Service and Professionalism</li></ul></li><li>• Module 4<ul style="list-style-type: none"><li>• Customer Care Professionalism</li><li>•</li><li>•</li><li>•</li><li>•</li></ul></li></ul>	

## Datacom Networking

LZU 102 371

### Description

Expert communication knowledge requires a solid foundation in data communications. From standards, physical media and network devices to transmission technologies, protocols, implementation and management this course guides novices effortlessly through modern data communication terminology and technologies and gives a comprehensive overview of underlying networking concepts.

### Learning Objectives

General interest in communications technologies and computer literacy is recommended. Having successfully completed this course, students will be able to describe:

- 1 Network Standards
- 2 Physical Media
- 3 LAN and WAN concepts
- 4 Transmission Technologies
- 5 Internet Protocol Suite
- 6 Internetworking

### Target Audience

Datacom Networking has been designed for seeking to acquire, refresh or improve knowledge of data technologies. The course is the entry point to Ericsson's datacom classes. This course prepares students for any advanced technology courses and basic product training.

### Prerequisites

General interest in communications technologies and computer literacy is recommended.

### Duration and class size

The length of the course is 4 days and the maximum number of participants is 16.

### Learning situation

This course is based on theoretical instructor-led lessons with study cases given in a classroom environment.

## EDA Overview

LZU 102 1161 R3A

### Description

This course provides the participants with an overview of the Ethernet DSL Access (EDA) solution including EDA management proxy (EMP) nodes and Ethernet gateways. The course also describes service provisioning, quality of service and security measures.

Furthermore, the course gives an introduction to the HP OpenView based Public Ethernet Manager (PEM) used for managing the EDA system.

### Learning objectives

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

- 1 Describe fundamental principles of the EDA solution
  - 1.1 Describe the EDA architecture
  - 1.2 Describe the main characteristics of the EDA system
  - 1.3 Describe EDA data, video, and telephony scenarios
- 2 Describe the EDA components
  - 2.1 List the network components in the EDA system
  - 2.2 Describe the functionality of each network component
- 3 Describe service provisioning, QoS and security measures
  - 3.1 Describe services supported by EDA
  - 3.2 Describe how quality of service is ensured
  - 3.3 Describe end-user and network security measures
- 4 Describe the PEM management system
  - 4.1 Describe the concept of the EDA management system
  - 4.2 Describe how PEM supports unbundling
  - 4.3 Describe the main tasks of the PEM managers

### Target audience

The target audience for this course is customers who need a technical overview of the EDA system.

Typical target audience would be managers, marketing, installation, operating and maintenance personnel.



### **Prerequisites**

Successful completion of the following course:

IP Networking, LZU 102 397, or equivalent qualifications.

### **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.

<b>Day</b>	<b>Short description of the topics in the course</b>	<b>Estimated time</b>
1	<ul style="list-style-type: none"><li>• System overview</li><li>• Components</li><li>• Services and security</li><li>• Management overview</li></ul>	2 hours 1 hour 1 hour 2 hours

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## EDA Network and System Administration

LZU 102 1201 R2B

### Description

This course provides the participants with the skills necessary to create the EDA access network, register and configure IP DSLAMs, FE-E1s and Ethernet switches.

The course also enables the participants to perform security management, fault management and performance management.

Furthermore, the course enables the participants to perform system maintenance tasks and to configure collection stations and management stations.

### Learning objectives

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

- 1 Create the access network
  - 1.1 Create IP subnet topologies
  - 1.2 Assign network elements to IP subnets
  - 1.3 Assign MDFs to IP subnets
- 2 Install network elements
  - 2.1 Register network elements
  - 2.2 Configure network elements
- 3 Perform system maintenance
  - 3.1 Upgrade IP DSLAM, FE-E1 and switch software
  - 3.2 Describe PEM software upgrade procedures
  - 3.3 Backup PEM and Sybase SQL
- 4 Perform security management
  - 4.1 Create PEM user groups and users
- 5 Perform fault management
  - 5.1 Describe the event system and event correlation
  - 5.2 Configure events
  - 5.3 Configure the alarm browser
- 6 Perform performance management
  - 6.1 Monitor network activity
  - 6.2 Create data collection reports
  - 6.3 Test connectivity
- 7 Use filters and configure distributed networks
  - 7.1 Apply discovery and map filters



## 7.2 Define collection stations and management stations

### **Target audience**

The course is intended for customers who need to configure and administrate the EDA network and management system.

Typical target audience would be operating and maintenance personnel, network or system administrator personnel.

### **Prerequisites**

Successful completion of the following courses:

- 1 IP Networking, LZU 102 397, or equivalent qualifications
- 2 EDA Overview, LZU 102 1161

### **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 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	Short description of the topics in the course	Estimated time
1	Access network creation	4 hours
	Network element installation	2 hours
2	Network element installation (continued)	3 hours
	System maintenance	2 hour
	Security management	1 hour
3	Fault management	2 hours
	Performance management	2 hours
	Filters and distributed networks	2 hours

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## EDA User and Service Administration

LZU 102 1163 R3A

### Description

This course provides the participants with the skills necessary to configure end-user lines, create service configurations and connect end-users.

### Learning objectives

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

- 1 Configure end-user lines
  - 1.1 Describe key ADSL configuration parameters
  - 1.2 Create alarm and line configurations
- 2 Create services
  - 2.1 Describe key ATM configuration parameters
  - 2.2 Create filter configurations
  - 2.3 Create services and assign bandwidths to services
- 3 Create and connect end-users
  - 3.1 Create and change end-user profiles
  - 3.2 Perform bulk configurations
  - 3.3 Connect end-users

### Target audience

The target audience for this course is Ericsson personnel and external customers who need to configure end-user lines, create services and connect end-users.

Typical target audience would be operating and maintenance personnel, network or system administrative personnel.

### Prerequisites

Successful completion of the following courses:

- 1 IP Networking, LZU 102 397, or equivalent qualifications
- 2 EDA Overview, LZU 102 1161



### **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.

### **Time schedule**

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

<b>Day</b>	<b>Short description of the topics in the course</b>	<b>Estimated time</b>
1	<ul style="list-style-type: none"><li>• Line configuration</li><li>• Service configuration</li><li>• End-user configuration</li></ul>	2 hours 2 hours 2 hours

## Ericsson AXI 520/580 Internet Engineer

LZU 102 631 R3A

### Description

This course will provide the participants with knowledge behind the various routers in the AXI 520/580/590-series. The Ericsson AXI 520/580 Internet Engineer course focuses upon the basic hardware architecture of the series and configuration of JUNOS software version 5.3, including: basic system management, Interior Gateway Protocols, Border Gateway Protocol, routing policy, Multiprotocol Label Switching, firewall filters, and multicast protocols.

### Learning objectives

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

- 1 Describe the hardware architecture and installation requirements of the AXI 520/580-series routers
- 2 Describe the JUNOS software architecture and upgrade process
- 3 Describe the JUNOS Command Line Interface and basic configuration
- 4 Configure Interior Gateway Protocols (RIP, OSPF, IS-IS)
- 5 Configure Border Gateway Protocol
- 6 Configure JUNOS Routing Policy
- 7 Configure Multi-protocol Label Switching and RSVP signaling protocol
- 8 Configure JUNOS firewall filters
- 9 Configure JUNOS supported multicast protocols

### Target audience

The target audience for this course includes Datacom Engineers, Technicians, and persons responsible for installing, configuring, and maintaining AXI 520/580 routers.

### Prerequisites

Successful completion of the following courses/flows:

IP Fundamentals	FAB 101 1314 (or equivalent knowledge)
ISP Routing	LZU 102 325 (or equivalent knowledge)

### Duration and class size

The length of the course is 5 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 can be accessed remotely. Numerous hands-on configuration exercises reinforce the complex topics presented.

### 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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• AXI 520/580-series Hardware Architecture</li></ul>	1 hr
1	<ul style="list-style-type: none"><li>• AXI 520/580-series Software Architecture</li></ul>	1 hr
1	<ul style="list-style-type: none"><li>• JUNOS Command Line Interface</li></ul>	1 hr 30 mins
1	<ul style="list-style-type: none"><li>• AXI 520/580-series Installation and Initial Configuration</li></ul>	2 hrs
1	<ul style="list-style-type: none"><li>• AXI 520/580-series Interface Troubleshooting</li></ul>	30 mins
2	<ul style="list-style-type: none"><li>• JUNOS Protocol Independent Routing properties</li></ul>	1 hr
2	<ul style="list-style-type: none"><li>• Routing Information Protocol</li></ul>	2 hrs
2	<ul style="list-style-type: none"><li>• JUNOS Routing Policy configuration</li></ul>	3 hrs
3	<ul style="list-style-type: none"><li>• OSPF Operation, Configuration, and Troubleshooting</li></ul>	2 hrs
3	<ul style="list-style-type: none"><li>• IS-IS Operation, Configuration, and Troubleshooting</li></ul>	2 hrs
3	<ul style="list-style-type: none"><li>• BGP Operation, Configuration, and Troubleshooting</li></ul>	2 hrs
4	<ul style="list-style-type: none"><li>• Traffic Engineering and MPLS Overview</li></ul>	1 hr
4	<ul style="list-style-type: none"><li>• Static Label Switched Paths</li></ul>	1 hr
4	<ul style="list-style-type: none"><li>• Signaled LSPs</li></ul>	2 hrs
4	<ul style="list-style-type: none"><li>• MPLS and Routing Table Integration</li></ul>	1 hr
4	<ul style="list-style-type: none"><li>• Named-Path and LSP Constraints</li></ul>	1 hr
5	<ul style="list-style-type: none"><li>• Firewall Filters</li></ul>	2 hrs
5	<ul style="list-style-type: none"><li>• Multicast Operational Theory</li></ul>	2 hrs
5	<ul style="list-style-type: none"><li>• Multicast Configuration and Monitoring</li></ul>	2 hrs

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## ERX Configuration Workshop

LZU 108 6182 R1A

### Description

This workshop will consist of three days of hands-on configuration scenarios to familiarize the students with deploying Juniper E-series (ERX) routers. The students will perform configuration exercises on ERX 1400 and 1440 routers positioned as edge devices on an active Juniper core network. After attending this course students will be able to configure ERX routers as edge aggregation devices in a production network.

### Learning objectives

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

- 1 Build a baseline configuration for an ERX router
  - 1.1 Configure passwords, Telnet, and loopback interfaces as the initial steps of installation and node protection
  - 1.2 Configure timing Sources (pri, sec, ter), VRRP, and system Logging for data stream and node protection
- 2 Configure Interfaces for communication with other network nodes
  - 2.1 Configure IP Interfaces and associated physical and logical properties
  - 2.2 Configure ATM Interfaces and associated physical and logical properties
  - 2.3 Configure IP over ATM (Routed 1483), and PPP over ATM
- 3 Enable Routing Protocols
  - 3.1 Configure static routing, RIP, OSPF, and ISIS protocols
- 4 Configure Virtual Routers for separation of customer traffic
- 5 Configure BRAS Functionality
  - 5.1 Configure Routing Policy, Access Control Lists, and Classifier Lists for control and support of remote access users
  - 5.2 Configure Radius Authentication and Rate Limiting for authentication and control of remote access users
- 6 Configure Other Services for customer traffic security
  - 6.1 Configure IPSec Authentication Header and GRE Tunnel Services

### Target audience

The target audience for this course is engineers who will install, configure, and support the Juniper Networks E-Series family of routers and the Ericsson IP Service Engine.



### Prerequisites

The participants should be familiar with TCP/ IP and routing. This is a hands-on workshop with minimal time devoted to lecture. As such it requires previous hands-on experience with router equipment. Successful completion of the following courses is recommended:

- Introduction to IP Networks, FAB 102 1313
- IP Networking, LZU 102 397

### Duration and class size

The length of the course is 3 days and the maximum number of participants is 8.

### Learning situation

This is a workshop based on interactive training sessions in a technical environment using equipment and tools. Minimal time will be devoted to instructor lecture. The majority of classroom time will be spent configuring ERX routers as edge aggregation devices in a simulated production network with a live internet feed

### Time schedule

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

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• Workshop Orientation and Hardware Overview</li></ul>	1 hrs
1	<ul style="list-style-type: none"><li>• Baseline Configuration</li></ul>	1 hrs
1	<ul style="list-style-type: none"><li>• Ethernet Interface Configuration</li></ul>	2 hrs
1	<ul style="list-style-type: none"><li>• ATM Interface Configuration</li></ul>	2 hrs
2	<ul style="list-style-type: none"><li>• Routing Protocols</li></ul>	3 hrs
2	<ul style="list-style-type: none"><li>• Routing Instances / Virtual Routers</li></ul>	3 hrs
3	<ul style="list-style-type: none"><li>• BRAS Configuration</li></ul>	2 hrs
3	<ul style="list-style-type: none"><li>• IPSec Encryption</li></ul>	2 hrs
3	<ul style="list-style-type: none"><li>• GRE Tunnel Configuration</li></ul>	2 hrs

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## FEA User and Network Administration

LZU 102 776 R2A

This course gives the students the knowledge and practical skills required for daily operation and maintenance of a FEA network

The course also explains the connections to service providers and northbound management systems together with the service and security aspects supported by the FEA solution.

Furthermore, the course describes procedures for periodic maintenance.

### Learning objectives

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

- 1 Perform security management
  - 1.1 Create PEM user groups and users
- 2 Perform end-user and service administration
  - 2.1 Create end-users in PEM
  - 2.2 Create end-user services in PEM
  - 2.3 Assign services to end-users
- 3 Perform network administration
  - 3.1 Configure end-user and security specific settings in the ELN
  - 3.2 Configure service VLANs in the network
  - 3.3 Configure IP routing, access and forwarding lists in the ECN
- 4 Perform fault management
  - 4.1 Modify and maintain network maps in the network node manager
  - 4.2 Monitor alarms, create and maintain event filters
  - 4.3 Handle alarms and event logs
- 5 Perform backup and software installation management
  - 5.1 Manage backup and restore of system configuration data
  - 5.2 Handle software upgrade
- 6 Perform performance management
  - 6.1 Handle traffic measurements
  - 6.2 Creating traffic reports

### Target audience

Technical personnel working with operation and maintenance of FEA networks.

Typical students would be Ericsson support personnel, operator support personnel, and maintenance personnel.



### Prerequisites

Successful completion of the following courses:

- 3 FEA Technical Overview, LZU 102 530
- 4 IP Networking, LZU 102 397, or equivalent qualifications

### 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 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	Short description of the topics in the course	Estimated time
1	Security management	2 hours
	User and service administration	4 hours
2	User and service administration, cont.	2 hours
	Network administration	4 hours
3	Fault management	3 hours
	Backup and software upgrade	2 hours
	Performance management	1 hour

## FEA Technical Overview

LZU 102 530 R2A

### Description

This course gives an overview of the Fiber Ethernet Access (FEA) solution and the FEA components. The course also describes the quality of service and security aspects supported by FEA.

Furthermore, the course gives an introduction to the HP OpenView based Public Ethernet Manager (PEM) used for managing the FEA system.

### Learning objectives

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

- 1 Describe fundamental principles of the FEA solution
  - 1.1 Describe the FEA architecture
  - 1.2 Describe the main features of the FEA system
  - 1.3 Describe the FEA role in broadband solutions
  - 1.4 Describe the advantages and disadvantages by using fiber and copper as transmissions links
  
- 2 Describe the FEA components
  - 2.1 List the network components in the FEA system
  - 2.2 List the main function of each network component
  - 2.3 List the major specifications and capacity of the network components
  
- 3 Describe the FEA quality of service and security aspects
  - 3.1 Describe how quality of service is ensured within the FEA solution
  - 3.2 Describe the DIAC DHCP proxy functionality
  - 3.3 List end-user services that can be carried by the FEA network
  - 3.4 Describe the end-user and network security aspects
  
- 4 Describe the PEM management system
  - 4.1 Describe the concept of the PEM management system
  - 4.2 Describe the individual management clients referring to the FCAPS model
  - 4.3 Describe the interconnection to a centralized network management system (NMS)
  
- 5 Describe the functionalities of a basic FEA network
  - 5.1 Describe some basic FEA network examples
  - 5.2 Describe some routing and call scenarios in typical FEA networks



### Target audience

The target audience for this course is technical and non-technical personnel requiring a general knowledge of the FEA solution.

Typical target audience would be managers, marketing personnel, administrative personnel or people who need this course as a prerequisite to the FEA User and Network Administration course, LZU 102 776.

### Prerequisites

Successful completion of the following course:

IP Networking, LZU 102 397, or equivalent qualifications.

### Duration and class size

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

### Learning situation

The 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	Short description of the topics in the course	Estimated time
1	System overview	2 hours
	Components	1 hour
	Services and security	1 hour
	Management overview	1 hour
	Summary and exercises	1 hour

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## IP Networking

LZU 102 397 R1A

### Description

This course will give the students an insight and understanding of the TCP / IP protocol stack from the physical layer to the application layer. The students will learn the operation of different protocols within the TCP / IP suite such as TCP, UDP, ICMP, HTTP, FTP, SMTP, ARP, DNS and DHCP. Students will learn about IP addresses, both classful and classless (CIDR) and how subnetting / aggregation operates. Students will learn about different network devices and will get a detailed understanding of Bridging, LAN Switching, Routing and Routing protocols. Throughout the course hands-on labs and analysers are used to pinpoint important aspects of theory sessions.

- 1 Learning objectives
  - 1.1 On completion of this course the participants will be able to:
  - 1.2 Describe IPv4 and IPv6 protocol, addressing and subnetting / aggregation
- 2 Describe the functions of the different bodies involved in IP standards / RFCs
  - 2.1 Describe IPv4 packet structure, protocol header and features
  - 2.2 Describe and perform exercises on IPv4 addresses, CIDR, subnetting and aggregation
  - 2.3 Describe IPv6 packet structure, protocol header, features and the different types of IPv6 addresses
- 3 Describe the purpose and operation of different protocols such as TCP, UDP, ICMP, SMTP, POP3, IMAP, ARP, DNS and DHCP
  - 3.1 Describe the OSI reference model and how it relates to the TCP / IP stack
  - 3.2 Describe the TCP and UDP protocol structures, headers and functionality
  - 3.3 Describe and perform exercises and analysis on the operation of different protocols / applications (ARP, DHCP, DNS, HTTP, FTP, SMTP, POP3, IMAP, etc.)
- 4 Describe the purpose and operation of different network devices and routing protocols used in IP networking
  - 4.1 Describe the operation of Hubs, Bridges and Switches
  - 4.2 Describe and perform exercises and analysis on the operation of Spanning Tree Protocol (STP)
  - 4.3 Describe and perform exercises and analysis on the operation of Static and Dynamic routing protocols
  - 4.4 Describe and perform exercises and analysis on RIP routing protocol
  - 4.5 Describe and perform exercises and analysis on OSPF routing protocol
  - 4.6 Describe IS-IS and BGP routing protocol.



### **Target audience**

The target audience for this course is Ericsson Customers who are involved in IP networking or those who require more knowledge on IP addressing, application and routing protocols.

### **Prerequisites**

The participants should be familiar with Datacom fundamentals and data transmission principles or successful completion of some of the following courses or equivalent:

Datacom Networking - LZU 102 371 – 4 days ILT

And/or

Introduction to IP Networking, WBL – FAB 102 1313

### **Duration and class size**

The length of the course is 4 days and the maximum number of participants is 12.

### **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.

PCs with Ethernet analysers, hubs and routers are required for practical exercises in the classroom.

One server providing HTTP, FTP, DHCP, DNS, Email (SMTP, POP3, IMAP) and Telnet access for exercises.

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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	Short description of the topics in the course	Estimated time
1	• Describe the functions of the different bodies involved in IP standards / RFCs	1.0
	• Describe IPv4 packet structure, protocol header and features	1.0
	• Describe IPv4 addresses, CIDR and subnetting and aggregation	1.5
	• Describe IPv6 packet structure, protocol header, features, different types of IPv6 addresses	1.5
	• Perform exercise on IP addressing and subnetting	1.5
2	• Describe the OSI reference model and how it relates to the TCP / IP stack	0.5
	• Describe the TCP and UDP protocol structures, headers and functionality	1.0
	• Describe the operation of different applications (ARP, DHCP, DNS, HTTP, FTP, SMTP, POP3, IMAP, etc.)	2.0
	• Perform exercise on ARP, DHCP, DNS, HTTP, FTP, TFTP, Telnet, SMTP, POP3, IMAP, etc.	3.0
3	• Describe the operation of Hubs, Bridges, Switches, Collision Domains and Broadcast domains	1.0
	• Describe the operation of Spanning Tree Protocol (STP)	1.0
	• Describe the operation of Static and Dynamic routing protocols	1.0
	• Describe RIP routing protocol	1.5
	• Perform exercises and analysis of protocols on Bridges, STP and Static routing	2.0
4	• Describe OSPF routing protocol	1.5
	• Perform exercises and analysis of RIP protocol	1.5
	• Perform exercises and analysis of OSPF protocol (Areas, aggregation, authentication)	2.0
	• Describe the operation of IS-IS and BGP routing protocols	1.5

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# IP Networking and Internetworking

LZU 108 5942 R1A

## Description

This course provides an introduction to the principles of IP networking and internetworking.

## Learning objectives

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

- 1 Describe the basic concepts of IP networking
  - 1.1 Define virtual address and explain how to communicate between networks
  - 1.2 Outline the difference between IPv4 and IPv6 addressing
  - 1.3 Outline how to configure the hosts in LAN (IP address, subnet mask, default gateway)
  - 1.4 Understand Internet domains and how the Domain Name System works
  - 1.5 Describe how to leave the local network using a Router
- 2 Describe the basic concepts of IP internetworking
  - 2.1 Describe the Internet (transit, regional and ISP networks)
  - 2.2 Understand routing domains and usage of two routing protocols (RIP and OSPF)
  - 2.3 Discover networks using two useful utilities PING and Traceroute

## Target audience

The target audience for this course is anybody wishing to gain a basic understanding of modern datacom networking technologies.

The course focuses on modern standard technologies and does not contain any Ericsson specific product material.

## Prerequisites

There are no prerequisites for this course.

## Duration

The length of the course is 3 hours.



### 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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• IP Networking</li></ul>	2 hours
1	<ul style="list-style-type: none"><li>• IP Internetworking</li></ul>	1 hour

# IP Network Applications

LZU 108 5943 R1A

## Description

This course provides an introduction to IP network applications and TCP/IP data communications.

## Learning objectives

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

- 1 Describe how to use the network and describe IP network applications
  - 1.1 Explain how Internet applications are addressed in a data packet
  - 1.2 Understand application models (Client/Server and Peer-to-Peer)
  - 1.3 Describe how a Web browser works and how Web pages are constructed using HTML
  - 1.4 Explain Web architecture and connecting to a Web server
  - 1.5 Explain how to send and receive Internet E-mail and outline the protocols used
  - 1.6 Understand IP telephony architecture
  
- 2 Explain the TCP/IP data communications architecture
  - 2.1 Describe TCP/IP layered approach to networking
  - 2.2 List the layers in the TCP/IP protocol stack
  - 2.3 List the Internet organizations (ISOC, IETF and ICANN)
  - 2.4 Explain IP addressing and routing and some important fields in an IP packet
  - 2.5 Outline how the Transmission Control Protocol (TCP) works

## Target audience

The target audience for this course is anybody wishing to gain an understanding of IP network applications and TCP/IP data communications.

The course focuses on modern standard technologies and does not contain any Ericsson specific product material.

## Prerequisites

There are no prerequisites for this course.

## Duration

The length of the course is 3 hours.



### 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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>Using the network - IP Network Applications</li></ul>	2 hours
1	<ul style="list-style-type: none"><li>The TCP/IP Data Communications Architecture</li></ul>	1 hour

## IPv6 Advanced Features

LZU 102 797 R1A

### Description

This course is a profound technical presentation of the Internet protocol IPv6, Transitions Mechanisms from IPv4 to IPv6 and of the advanced features related to IPv6: QoS (DiffServ, RSVP / IntServ) and IPsec. IPv6 and these features are essential in a 3G/UMTS cellular network.

These subjects will be discussed and related to examples in real life.

The participants will learn how to configure the advanced features on an IPv6 router. Examples of how to configure a host in an IPv6 network will be presented.

### Learning objectives

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

- 1 Describe the protocol IPv6 on an advanced level.
- 2 Describe and configure the Transition Mechanisms between IPv4 and IPv6.
- 3 Understand how QoS (DiffServ, RSVP / IntServ) and IPsec are working.
- 4 Configure these mechanisms and features on a router.
- 5 Configure a host in an IPv6 network.

### Target audience

The target audience for this course is anyone who needs technical knowledge within this area, such as Network Designers and Network Engineers.

### Prerequisites

Successful completion of the following courses:

The flow

IP Fundamentals, FAB 102 1314,

ending with the course

VPN & IP Security, LZU 102 323

### 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. Included in the topics are practical exercises.

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• <b>Introduction</b><ul style="list-style-type: none"><li>• Welcome</li><li>• Presentation</li><li>• Training Schedule</li></ul></li><li>• <b>IPv6 and Mobile Internet</b><ul style="list-style-type: none"><li>• Increased Address Space</li><li>• Built in Security</li><li>• Quality of Service (QoS) for Real Time Services</li><li>• Simple Routing for Scalability</li></ul></li><li>• <b>IPv6</b><ul style="list-style-type: none"><li>• IPv6 Header</li><li>• Address Architecture</li><li>• Unicast, Multicast and Anycast</li><li>• Auto-configuration</li><li>• Neighbor Discovery</li><li>• ICMPv6Dual Stack Model DNS</li><li>• DHCP</li></ul></li></ul>	1 h  1 h  6 h
2	<ul style="list-style-type: none"><li>• <b>QoS</b><ul style="list-style-type: none"><li>• DiffServ</li><li>• IntServ (RSVP)</li><li>• MPLS</li><li>• Policy</li><li>• Policing</li><li>• Traffic Conditioning</li><li>• Metering</li><li>• Scheduler</li><li>• Shaper</li><li>• Queue Management (RED)</li></ul></li></ul>	4 h

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- 3
  - **IPSec** 4 h
    - Security Threats
    - Basic Security Concepts
    - Security Associations
    - Crypto Primitives
    - Authentication Header
    - Encapsulating Security Payload (ESP)
    - Internet Key Exchange
    - Deployment
  - **Tunneling** 5 h
    - Introduction
    - Connecting IPv6 islands
    - Configured tunnels
    - IPv6 to IPv4 (6to 4)
    - ISATAP
    - Teredo
    - Other Tunnel Mechanisms
    - Automatic Tunnels
    - Tunnel Broker
    - IPv6 over IPv4 (6over4)
    - Routing IPv6 on the internet
- 4
  - **Translation** 3 h
    - Introduction
    - DSTM
    - Header Translation
    - NAT-PT
    - FTP-ALG
    - DNS-ALG
    - SIIT
    - BIS
    - Socks64
    - TCP/UDP Relay

## IPv6 and Transition from IPv4 to IPv6

LZU 102 801 R1A

### Description

This course gives a profound technical presentation of the Internet protocol IPv6. The course will also discuss different IPv4-IPv6 transition mechanisms.

After this course it will be clear how IPv6 will function in a network and how IPv6 can co-exist with IPv4.

### Learning objectives

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

- 1 Describe the protocol IPv6 on an advanced level.
- 2 Describe some of the important Transition Mechanisms between IPv4 and IPv6.
- 3 Get an overview of how the Transition Mechanisms work when setting up an IPv6 network.

### Target audience

The target audience for this course is anyone who needs technical knowledge within this area, such as Technicians and Designers.

### Prerequisites

Successful completion of the following courses:

The flow

IP Fundamentals, FAB 102 1314,

ending with the course

VPN & IP Security, LZU 102 323

### 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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• <b>Introduction</b></li><li>• Welcome</li><li>• Presentation</li><li>• Training Schedule</li><li>• Course outline</li></ul>	1 h
	<ul style="list-style-type: none"><li>• <b>IPv6</b></li><li>• IPv6 Header</li><li>• Address Architecture</li><li>• Unicast, Multicast and Anycast</li><li>• Auto-configuration</li><li>• Neighbor Discovery</li><li>• ICMPv6</li><li>• Making an IPv6 NetworkConnecting IPv6 islandsDual Stack Model DNS</li><li>• DHCP</li></ul>	3 h
	<ul style="list-style-type: none"><li>• <b>Transition Mechanisms</b></li><li>• Configured tunnels</li><li>• IPv6 to IPv4 (6to 4)</li><li>• ISATAP</li><li>• Teredo</li><li>• SIIT NAT-PT</li><li>• Other Transition Mechanisms</li></ul>	2 h

## IPv6 and Transition from IPv4 to IPv6, Hands-on

LZU 102 798 R1A

### Description

This course gives a profound technical presentation of the Internet protocol IPv6 and of IPv4-IPv6 Transition Mechanisms. The change from IPv4 to IPv6 will not happen overnight.

The course gives a clear view of how the Transition Mechanisms function and how they are used to establish IPv6 networks in a world of IPv4 networks and to ensure connectivity between different IPv6 networks and between IPv6 and IPv4 networks.

Different challenges, problems and solutions concerning the transition from IPv4 to IPv6 networks will be discussed. The transition mechanisms will be configured in a network.

### Learning objectives

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

- 1 Describe the protocol IPv6 on an advanced level.
- 2 Describe and configure the Transition Mechanisms between IPv4 and IPv6.
- 3 Describe how The Transition Mechanisms work when setting up an IPv6 network.
- 4 Set up an IPv6 network configuring routers and hosts.

### Target audience

The target audience for this course is anyone who needs technical knowledge within this area, such as Technicians and Designers.

### Prerequisites

Successful completion of the following courses:

The flow

IP Fundamentals, FAB 102 1314,

ending with the course

VPN & IP Security, LZU 102 323

### 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.





- **Translation** 2 h
- Introduction
- DSTM
- Header Translation
- NAT-PT
- FTP-ALG
- DNS-ALG
- SIIT
- BIS
- Socks64
- TCP/UDP Relay

# IPv6 Routing Protocols

LZU 102 796 R1A

## Description

This course is a profound technical presentation of the routing protocols RIPng, OSPFv3, ISIS and BGP4+. The protocols and their different functions in the Internet will be discussed.

## Learning objectives

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

- 1 Know how the Routing Protocols are used in IPv6
- 2 Know how they are working on a router and the hosts of an IPv6 network

## Target audience

The target audience for this course is anyone who needs technical knowledge within this area, such as Technicians and Designers.

## Prerequisites

Successful completion of the following courses:

The flow

IP Fundamentals, FAB 102 1314,

ending with the course

VPN & IP Security, LZU 102 323

and

IPv6 and Transition from IPv4 to IPv6, Hands-on, LZU 102 798

or

IPv6 and Transition from IPv4 to IPv6, LZU 102 801

## 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.



## 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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• <b>Introduction</b></li><li>• Welcome</li><li>• Presentation</li><li>• Training Schedule</li></ul>	1 h
	<ul style="list-style-type: none"><li>• <b>RIPng</b></li><li>• The RIPng Header</li><li>• Distance Vector Algorithm</li><li>• Hop Counts</li><li>• Flooding</li><li>• Counting to Infinity</li><li>• Reverse Poisoning</li><li>• Split Horizon</li></ul>	3 h
	<ul style="list-style-type: none"><li>• <b>OSPFv3</b></li><li>• The OSPFng Header</li><li>• Link State Advertisements (LSAs)</li><li>• The Link-State Database</li><li>• Hello Packets</li><li>• Database Synchronization</li><li>• Flooding</li><li>• Routing Calculations</li><li>• SPF Algorithm</li><li>• External Routing Information</li><li>• OSPF Areas</li><li>• OSPF Range</li><li>• Stub Areas</li><li>• History</li><li>• Support on data link layer</li><li>• Hello packets</li><li>• Link State packets</li><li>• Sequence number packets</li><li>• Options</li><li>• Level 1 and Level 2 routers</li><li>• Designated router election</li><li>• Area reconfiguration</li><li>• Overload state</li><li>• Comparison with OSPFv3</li></ul>	5 h



2

- **ISIS**

1 h

- History
- Support on data link layer
- Hello packets
- Link State packets
- Sequence number packets
- Options
- Level 1 and Level 2 routers
- Designated router election
- Area reconfiguration
- Overload state
- Comparison with OSPFv3

- **BGP4+**

2 h

- The BGP Header
- BGP Sessions
- Attributes
- Keep-Alive Features
- Internal-External BGP
- Best Path Calculation
- Synchronizing with OSPFng
- Policy Routing – Multi-homing
- Explosion of routing tables

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## ISP Routing

LZU 102 325

### Description

This course provides a theoretic background in IS-IS and BGP routing. In extensive hands-on exercises, participants will learn to configure large IP-networks.

### Learning Objectives

After completing this course, participants will be able to:

- 1 Understand IS-IS routing and the concepts of the Border Gateway Protocol 4 (BGP4)
- 2 Design IP networks based on IS-IS and BGP 4
- 3 Configure IS-IS and BGP4 routes
- 4 Understand the difference between IS-IS BGP 4, EGP and OSP

### Target Audience

This course is primarily designed for network engineers who have to perform IS-IS configuration in IP core networks (AXI 520).

### Prerequisites

Successful completion of the following courses:

- IP Fundamentals, FAB 102 1314

### 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 a technical environment using equipment and tools.

## MSED Installation and Configuration

LZU 108 6206 R1A

### Description

This course will provide the students with the skills needed to install a MSED and its various network solutions, and to perform a basic configuration. The course involves lecture modules and hands-on lab exercises. The course is specifically intended to focus on the MSED installation and configuration.

### Learning objectives

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

- 1 Give a general description of MSED and its purpose
- 2 Perform tasks required for installing the MSED at operators and end-users locations.
- 3 Perform tasks required for configuration of the MSED to the operators network
- 4 Perform tasks required for configuration of the MSED to the end users
- 5 Perform tasks required for software upgrading of the MSED.
- 6 Test the some MSED scenarios.

### Target audience

The target audience for this course is Installation and Network Configuration personal.

### Prerequisites

Successful completion of the following courses:

- IP Networking, LZU 102 397
- ATM & IP over ATM, LZU 102 6129
- Voice over IP
- Basic router knowledge

Or equal knowledge.

### 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.

## MSED Overview

LZU 108 6205 R1A

LZU 108 6205/9 R1A

### Description

This course provides the participants with an overview of the Multi Service Edge Device (MSED) solution and the features included in the MSED solution.

### Learning objectives

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

- 1 Describe fundamental principles of the MSED solution
  - 1.1 Describe the MSED architecture
  - 1.2 Describe the main features of the MSED system
  - 1.3 Describe MSED data and QoS, firewalls scenarios.
  - 1.4 Describe MSED telephony scenarios.
  - 1.5 Describe MSED leased-lines scenarios.
- 2 Explain how the customer will benefit from investing in MSED.
  - 2.1 Describe Ericsson's strategy for introducing MSED into operators' and end-users networks.
- 3 Describe the MSED components.
  - 3.1 List the network components in the different network solution where MSED could be included.
  - 3.2 Describe the main function of each network component

### Target audience

The target audience for this course is personal needing MSED fundamental knowledge on a basic level.

### Prerequisites

The participants should have general telecommunication knowledge.

### 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.

Or

This is a theoretical course given in a virtual classroom over the net by an instructor. The course contains modules like slide presentations, exercises, self-paced study and tests.

# Networking and Ethernet Standards

LZU 108 5941 R1A

## Description

This course provides a basic introduction to modern LAN and WAN technologies and concepts.

## Learning objectives

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

- 1 Describe Local Area Networks (LAN) and the Ethernet Standard
  - 1.1 Define the building blocks in a LAN
  - 1.2 Outline the different types of Ethernet standard
  - 1.3 Explain data transmission in an Ethernet LAN – Ethernet frame
  - 1.4 Understand Ethernet basics (CSMA/CD)
  - 1.5 Outline the difference between a Hub and a Switch
  - 1.6 Describe how to connect communication devices and design a LAN
- 2 Describe Wireless Local Area Networks (WLAN)
  - 2.1 Describe two basic types of Wireless LAN (Ad Hoc and Infrastructure mode)
  - 2.2 Outline the IEEE 802.11 standard and its applications
  - 2.3 Outline the HIPERLAN/2 standard and its applications and compare to IEEE 802.11
  - 2.4 Outline the properties of Home RF
  - 2.5 Understand Bluetooth drivers and communication models

## Target audience

The target audience for this course is anybody wishing to gain a basic understanding of modern datacom networking technologies.

The course focuses on modern standard technologies and does not contain any Ericsson specific product material.

## Prerequisites

There are no prerequisites for this course.

## Duration

The length of the course is 2.5 hours.



### 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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>Local Area Networks and the Ethernet Standard</li></ul>	1 hour 15 mins
1	<ul style="list-style-type: none"><li>Wireless Local Area Networks, WLAN</li></ul>	1 hour 15 mins

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## Networking Basics, An Overview

LZU 108 5940 R1A

### Description

This course provides information on basic networking principles and describes how a PC communicates with other devices and networks.

### Learning objectives

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

- 1 Explain the basics of networking
  - 1.1 Outline the input and output devices of a PC and how they are connected
  - 1.2 Describe the communication parameters necessary to understand connections
  - 1.3 Describe physical and logical network topologies
- 2 Describe how to connect a PC to a datacom network
  - 2.1 Identify and describe communication devices in a LAN (Hub, Switch and Router)
  - 2.2 Understand the different types of cables (UTP,STP and Fiber Optical)
  - 2.3 Explain how to connect computers to a LAN
  - 2.4 Explain the difference between Internet and Intranet
  - 2.5 Outline how to implement a Structured Cabling System (independent cabling system)

### Target audience

The target audience for this course is anybody wishing to gain a basic understanding of modern datacom networking technologies.

The course focuses on modern standard technologies and does not contain any Ericsson specific product material.

### Prerequisites

There are no prerequisites for this course.

### Duration

The length of the course is 2 hours.



### 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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"><li>• Networking Basics</li></ul>	1 hour
1	<ul style="list-style-type: none"><li>• Your PC and the Datacom Network</li></ul>	1 hour

## The Complete Team Leader Course

LZU 108 2049

### Description

The main idea with the Ericsson Customer Care Training Package is to provide the team leader with useful tools for handling his/her role as a team leader being aware of such as group dynamics, group processes, conflicts, the importance of coaching etc. Specific cases will be studied so that the participants interactively will be able to discuss how to handle eventual complications linking theory with practice.

### Learning objectives

This course will help a team leader at a call-center or another type of Customer Care Organization to handle his/her role as a team leader being aware of what influence a team, its well being and effectiveness. To achieve this objective the participant will learn about leadership styles, team development, team roles, communication skills, tools for handling conflicts, guidelines for coaching, measuring quality etc. This course also intends to upgrade the importance of the team leader and his/hers collaborators as being the ones facing the customer and therefore delivering Excellent Customer Service.

### Target audience

Team leaders and potential team leaders working at:

- GSM/ 3 G/ Fixed Operators' Customer Care organizations.
- Distributors or Service Providers

### Prerequisites

There are no prerequisites for this course.

### Duration and class size

The length of the course is 2 days 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	Short description of the topics in the course	Estimated Time
	<ul style="list-style-type: none"><li>• Module 1<ul style="list-style-type: none"><li>• The leaders' role, leadership styles.</li></ul></li><li>• Module 2<ul style="list-style-type: none"><li>• Team development</li></ul></li><li>• Module 3<ul style="list-style-type: none"><li>• Team roles</li></ul></li><li>• Module 4<ul style="list-style-type: none"><li>• Assessment</li></ul></li><li>• Module 5<ul style="list-style-type: none"><li>• Coaching- Points to consider</li></ul></li><li>• Module 6<ul style="list-style-type: none"><li>• Feedback- Why &amp; how</li></ul></li><li>• Module 7<ul style="list-style-type: none"><li>• Communication and handling conflicts</li></ul></li><li>• Module 8<ul style="list-style-type: none"><li>• Motivation</li></ul></li><li>• Module 9<ul style="list-style-type: none"><li>• To delegate</li></ul></li><li>• Module 10<ul style="list-style-type: none"><li>• Action plan</li></ul></li></ul>	

## VPN & IP Security

LZU 102 323 R1A

### Description

This course will give the students an insight and understanding of the security issues in IP networks. The students will learn about the threats and weaknesses in the TCP / IP suite and how to enable security within an IP network. The course covers such topics as encryption, cryptography, digital signatures and certificates. The course will also give the students an understanding of different VPN technologies and how different VPNs are implemented within the IP network. Throughout the course hands-on labs and analysers are used to pinpoint important aspects of theory sessions.

### Learning objectives

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

- 1 Describe the threats and security issues in the IP networks
  - 1.1 Describe the different security threats and weaknesses in TCP / IP suite
  - 1.2 Describe how to develop a security policy, how to respond to incidents and the different bodies involved in IP security
- 2 Describe the devices and services in building a secure network
  - 2.1 Describe and perform exercises and analysis on the operation of NAT and router filters / access lists, and how they are implemented
  - 2.2 Describe firewall solutions, and how to implement firewall security in a network
  - 2.3 Describe the operation of secure DNS, HTTPS, S/MIME and SSH
- 3 Describe Encryption technologies, security services and certificates
  - 3.1 Describe encryption, cryptography, and symmetric and asymmetric algorithms
  - 3.2 Describe the operation of message digest and digital signatures
  - 3.3 Describe operation of Certificate Authorities and how certificate are exchanged
  - 3.4 Describe the operation of other security devices such as Smart Cards
- 4 Describe the purpose and operation of IPSec VPNs
  - 4.1 Describe and perform exercises and analysis on the operation of L2TP
  - 4.2 Describe and perform exercises and analysis on the operation of IPSec Authentication tunnels
  - 4.3 Describe and perform exercises and analysis on the operation of IPSec ESP tunnels

### **Target audience**

The target audience for this course are Ericsson customers who are involved in IP networking and who need to know how to implement security in IP networks.

### **Prerequisites**

The participants should be familiar with IP networking, IP routing and different IP services and applications or successful completion of the following courses:

IP Networking - LZU 102 397 – 4 day ILT course

### **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	Short description of the topics in the course	Estimated time
1	• Describe the different security threats and weaknesses in TCP / IP suite	1.0
	• Describe how to develop a security policy, how to respond to incidents and the different bodies involved in IP security	1.0
	• Describe and perform exercises and analysis on the operation of NAT and router filters / access lists, and how they are implemented	2.0
	• Describe firewall solutions, and how to implement firewall security in a network	1.0
	• Describe the operation of secure DNS, HTTPS, S/MIME and SSH	0.5
	• Describe encryption, cryptography, and symmetric and asymmetric algorithms	1.0
2	• Describe the operation of message digest and digital signatures	1.0
	• Describe the operation of Certificate Authorities and how certificate are exchanged	1.0
	• Describe the operation of other security devices such as Smart Cards	0.5
	• Describe and perform exercises and analysis on the operation of L2TP and how it is implemented	1.0
	• Describe and perform exercises and analysis on the operation of IPSec Authentication tunnels	1.0
	• Describe and perform exercises and analysis on the operation of IPSec ESP tunnels	2.0