

CDMA2000 R4 Core Network Training Programs

Catalog of Course Descriptions

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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.

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">• Fixed Network Connections: Access Networks	1 hour
1	<ul style="list-style-type: none">• Connecting While Travelling: Mobile Access	1 hour 30 min

APG40 Installation and Configuration

LZU 1085871 R1A

Description

This course will prepare participants for installation and configuration tasks on the APG40. After the course the students will be able to install and put an APG40 into operation.

Learning objectives

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

- 1 Start up and Test the APG40
 - 1.1 Follow the Test Instruction, Start up and Test of APG40 to install and configure the APG40 for operation
 - 1.2 Change the site parameters
- 2 Understand the domain concept and know how a MUD can be set up and used
 - 2.1 Use the User manager for domains to Add trusts between domains
- 3 Add user accounts to the system
 - 3.1 Add users with different access rights to the APG40 and to the CP
- 4 Know about the different restore procedures
 - 4.1 Understand when to use single node restore, cluster restore or Disaster Recovery and how a Node Change can be performed
- 5 Migrate to APG40 from IOG20
 - 5.1 Undefine the IOG20 and move all operations to APG40
- 6 Configure the Antivirus for APG40
 - 6.1 Schedule Virus scans and update the virus definitions

Target audience

The target audience for this course are personnel working with Network Maintenance, Network Operation, Network Development and System Administration.

Prerequisites

The participants should be familiar with Windows NT and have AXE knowledge equal to the following courses:

AXE Survey, LZU 108775

APG 40 Operation and Maintenance, LZU 108 5870

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.

APG40 Operation and Maintenance

LZU 1085870 R1A

Description

This course will introduce students to operation as well as maintenance issues on the APG40 platform. After attending the course the students will be able to work practically with common APG40 handling tasks.

Learning objectives

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

- 1 Describe the APG40 Hardware and Software on an overview level
 - 1.1 Know the characteristics of all hardware boards and connections
 - 1.2 Understand how the APG40 is built up
- 2 Be able to use different interfaces to connect to the APG40 platform
 - 2.1 Connect to the APG40 using Telnet, WinFiol or pcANYWHERE
- 3 Describe the Alarm System on an overview level
 - 3.1 Understand how the AEH, ALH, and PRC co-operates to raise alarms
- 4 Use the GOH to send data
 - 4.1 Use the CDH, AFP and DBO for transfer of data to remote systems
- 5 Collect statistics using STS
 - 5.1 Configure the STS on AP to request counter data from the CP
- 6 Have a basic understanding of the concept AD-devices
 - 6.1 Be able to use AD-devices for command input and for routing of printouts
- 7 Load the CP from the APG40
 - 7.1 Use CPT to perform an initial load of the AXE-CP
- 8 Perform backup and restore of the APG40 platform
 - 8.1 Use burbackup and burrestore commands according to OPIs
- 9 Upgrade the APG40 system
 - 9.1 Use Hard Function Change and Soft Function Change to install new software and/or update parameters

Target audience

The target audience for this course are personnel working with Network Maintenance, Network Operation, Network Development and System Administration.

Prerequisites

The participants should be familiar with Windows NT and have AXE knowledge equal to the following course:

AXE Survey LZU 108775

Duration and class size

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

Learning situation

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

APZ 212 30/33 Delta

LZU 108 1446 R1A

Description

This course describes the differences between APZ 212 20 and APZ 212 30/33 Central Processor hardware and functionality from the operations and maintenance perspective. The course is designed for delivery to students who already possess a good knowledge of APZ, and are interested in the differences between the above mentioned processors.

Learning objectives

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

- 1 Describe the differences in the hardware structure between APZ 212 20 and 212 30/33
- 2 Describe the hardware structure of APZ 212 33C
- 3 Describe the new store structure of APZ 212 30/33 CP's
- 4 List the new commands introduced with the APZ 212 30/33 CP's
- 5 Perform Operation & Maintenance activities on APZ 212 30/33 CP's

Target audience

The target audience for this course is all technical staff working on operation and maintenance activities on the different variants of the APZ 212 Central Processor.

Prerequisites

The participant should be familiar with handling of older APZ 212 versions.

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.

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none">• Chapters 1,2 and 3 Exercise 1,2 and 3(if time permits)	All Day

ATM & IP over ATM (ILT or VCT)

LZU 108 6129 R1A

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

Time schedule

The time required always depends on the knowledge of the attending participants and the hours stated below can be used as estimate. For the VCT version it is recommended to instruct several sessions of a maximum duration of 3 hours.

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

AXE 810 Data Transcript

LZU 1086134 R1A

Description

This course will develop the student's current knowledge and understanding of exchange data to a point where he/she will be able to interpret exchange requirements and write the data transcript for an AXE 810.

The student will have the opportunity for discussion about data transcript production, inputs, flow and ideas. Generally, theoretical lessons will be followed by practical work giving the student the opportunity to write data transcript from exchange requirements.

Learning objectives

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

- 1 Explain the inputs and outputs of the Data Transcript (DT) process
- 2 Perform a Size Alteration
- 3 Define A-number Analysis
- 4 Define Pre B-Number Analysis
- 5 Define Access-Barring Analysis
- 6 Define Time-Supervision Analysis
- 7 Define B-Number Analysis
- 8 Define Route Data
- 9 Define Routing Case Analysis
- 10 Define End-of-Selection Analysis
- 11 Define Equal Access
- 12 Define Charging Data
- 13 Define Subscriber Data

Target audience

The target audience for this course is personnel in the network planning or network configuration in the area of Data Transcript. The target audience is represented by:

- Core Network Engineer
- Core Network Specialists
- Core Network Planning Engineers

Prerequisites

Successful completion of the following courses:

For the CDMA2000 customer

- CDMA2000 MSC Operation and Configuration FAB 102 1558

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.

CDMA2000 CNM Operation

LZU 108 5909 R1A

Description

This course provides the student with competence in the CDMA2000 CNM Operation. It enables the participant to perform the basic operational tasks on Circuit Switched Network Nodes (AXE10, AXE810) and Home Location Register/Authentication (HLR/AC) using the graphical user interfaces of the Circuit Switched Network Manager.

Learning objectives

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

- 1 Describe the Circuit Switched Network Manager technical overview
 - 1.1 Describe the Ericsson Operation, Administration, Maintenance and Provisioning strategy for CDMA2000 networks.
 - 1.2 Describe the Network connections between CNM and the MSC's.
 - 1.3 Describe the Common Management Framework (CMF) and identify where it is positioned in the network.
 - 1.4 Describe the CNM5.0 software applications used for managing the Circuit Switched Network nodes (AXE10, AXE810) and Home Location Register/Authentication Center (HLR/AC).
 - 1.5 Identify the CNM Core/Premium features applications.
 - 1.6 Describe the MSC element managements, such as WinFIOL and other tools.
 - 1.7 Describe the use of the ONE application.
 - 1.8 Describe the use of Online User Documentation

- 2 Describe and use OSS Network Explorer
 - 2.1 Describe the use of OSS Network Explorer
 - 2.2 Describe the OSS Network Explorer Window
 - 2.3 Logging in to the OSS Network Explorer
 - 2.4 Perform standard activities available from the OSS Network Explorer
 - 2.5 Access on line Ericsson documentation from Help menu in the OSS Network Explorer
 - 2.6 Logging out from the OSS Network Explorer

- 3 Fault Management
 - 3.1 Describe the Fault Management Application
 - 3.2 Launch the Fault Management application from the alarm menu in ONE
 - 3.3 Get and overview of the current problem situation in the network by using the Object Status Viewer application
 - 3.4 Display the problems related to one or several managed objects in the network by using the Problem List Viewer application.
 - 3.5 Describe and use the Problem Log Browser.

- 4 Element Management Tools
 - 4.1 Work with the Command Handler (WinFIOL)
 - 4.2 Use the Command Log Search

- 4.3 Use the Spontaneous Report Manager
- 4.4 Work with Activity Manager

- 5 Software and Hardware Management (SMO/NIO)
 - 5.1 Describe the Software Management Organizer (SMO) application.
 - 5.2 Use the SMO Graphical User Interface

- 6 Performance Management
 - 6.1 Describe the main functionalities related to Performance Management.
 - 6.2 Describe and use the Performance Management Date Mediation (PDM) to schedule and collect STS measurement data on the APG30/APG40.
 - 6.3 Know how to handle the initiation and collection of HLR/AC measurement statistics.
 - 6.4 Know how to transfer the HLR performance data to CNM Server.
 - 6.5 Describe the user of MSC Performance Dashboard

- 7 CNM Premium Package
 - 7.1 The AXE Number Analysis Manager (NAM) to optimize the administration of B-number analysis table.
 - 7.2 Describe the use of Ericsson Node Reporter (ENR).

Target audience

The target audience for this course is the Circuit Switched Network Manager (CNM) operators (i.e. core network operators and other personnel who will use any of the CNM components) .

Prerequisites

The participants should be familiar with CDMA2000 network and have some knowledge in AXE nodes and HLR/AC nodes.

Duration and class size

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

Learning situation

The course is based on instructor-led lessons and practical exercises in the classroom. Practical exercises will be performed on client terminals in the classroom which are connected to a dedicated training Circuit-Switched Network Manager. Participants will utilize provided reference documentation in the performance of the practical exercises.

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	• Introduction	0.5 hours
	• CNM Technical Overview	2.5 hours
	• OSS Network Explorer	1 hours
	• CNM Fault Management	2 hours
	• Element Management Tools	2 hours
2	• Daily Review	0.5 hours
	• Software and Hardware Management	2 hours
	• Performance Management	2 hours
	• CNM Premium Package	2 hours
	• Course Review	0.5 hours
	• Final Test	1 hours

CDMA2000 CNM System Administration

LZU 108 6319 R1A

Description

This course will give the student basic knowledge about administration of the CNM system. After the course the students will be able to handle network element connections, administration of the applications and both standard and corrective maintenance of the system. The student will gain knowledge about how to manage processes, errors and authority issues in the CNM system.

Learning objectives

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

1. Describe the overall structure of a CNM system
 - 1.1. Explain how the CNM is located in an Intergrate Sub-Network Manager system.
 - 1.2. List platform and common components in CNM system
 - 1.3. List Hardware components in CNM system
 - 1.4. Use the online documentation to find out how to perform system administrator tasks
2. Handle Authority Administration in the CNM system
 - 2.1. Add new users to the OSS system
 - 2.2. Describe the structure of the Administrative Model
 - 2.3. Use Security Management tool to administer users, targets and activities
 - 2.4. Use TSS Password Administration
3. Remote Access Management
 - 3.1. Identify Citrix MetaFrame Features
 - 3.2. Describe Citrix MetaFrame Features
 - 3.3. Set up Citrix Clients
4. Handle Backup and Restore in the system
 - 4.1. Describe and use included tools for file system and database backup and restore
 - 4.2. Perform full and partial backup and restore of file systems and databases
 - 4.3. Overview of VERITAS NetBackup
5. Log and Data File Management
 - 5.1. Identify Different type of CNM Log files
 - 5.2. Describe CNM Log and Data File management
 - 5.3. Describe the flow of statistical measurement files from the network elements
 - 5.4. Verify the setup of statistical measurements
6. Perform regular maintenance in the CNM system
 - 6.1. Perform system maintenance
 - 6.2. Handle the scripts scheduling in the crontab

7. Manage processes in the CNM system
 - 7.1. Identify CNM processes
 - 7.2. Use CIF interfaces for process and error management

8. Handle network element connections
 - 8.1. Describe the different network element connection cases for the CNM
 - 8.2. Setup connections in the CNM AXE/APG-40 and HLR
 - 8.3. Handle routing AXE/APG-40 and HLR for alarms and files

9. Troubleshooting
 - 9.1. Describe and use troubleshooting tools in CNM, UNIX and Sybase
 - 9.2. Isolate problems and retrieve information about problems in the system
 - 9.3. Describe the most common problem areas in the CNM system
 - 9.4. Perform troubleshooting on common problem areas in the CNM system

Target audience

The target audience for this course is CNM administrators who need to know the CNM system and how to perform standard and corrective maintenance in the system.

Prerequisites

Successful completion of the following courses or equivalent knowledge:

CDMA2000 SNM System Administration Basics (FAB 102 1570)

General knowledge of TCP/IP and SNMP.

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	Topics in the course	Estimated time
1	• System administration introduction	0,5
	• CNM system structure	2
	• User administration	2,5
	• Remote Access and Citrix Metaframe	1
2	• Backup and Restore I	2
	• Log Management	1
	• Regular Maintenance	2
	• CNM Process Management	1
3	• Backup and Restore II	2
	• Network Element Connection	2
	• Troubleshooting	2

CDMA 2000 Data Transcript

LZU 108 5709 R2A

Description

This course provides information to identify the most important commands and parameters used to define the exchange data for a AXE 810 switch, focusing in MSC-BSC connection, SS7 definition and traffic cases including mobility management.

Learning objectives

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

- 1 Understand the Data Transcript in the context of the Global Telephony network enabling them to write data transcript for a realistic network from exchange requirements for the MSC/VLR
Describe Traffic Cases
 - 1.1 Describe the main parts of Ericsson's CDMA network
 - 1.2 Explain and list CDMA identities and briefly describe the functions of each
- 2 Define S7/C7 Signaling Networks
- 3 Define connection of Speech and Signaling Circuits
 - 3.1 Identify the signaling protocols used between the different nodes
 - 3.2 Describe the procedure of different type of registration
- 4 Describe a mobile originating call
 - 4.1 List the various types of analysis used for routing mobile originating calls and explain the major parameters
 - 4.2 Write MML supporting a call from an MS by interpreting exchange requirements.
- 5 Describe a mobile terminated call
 - 5.1 List the analysis functions required when considering the traffic case: call to a mobile, and explain the purpose of the main parameters.
 - 5.2 Write the MML supporting a call to a mobile by interpreting exchange requirements.
- 6 Describe different cases of handoff
 - 6.1 Get the basic information about different kinds off handoff and master the Exchange Data definition for Inter-MSC handoff.
 - 6.2 Describe the procedure of SMS
- 7 Write the Data Transcript for SCCP communication between the VLR and HLR for registration, by interpreting the exchange requirements.
- 8 Define Cellular Connection functions
 - 8.1 Define Base Station Controller data
 - 8.2 Define Location Area data
 - 8.3 Define Cell data
 - 8.4 Define Signaling to BSC (MALT) E1/T1
- 9 Define Telecommunication Service Analysis for CDMA

- 10 Understand the basic knowledge of LBS and OTAPA
- 11 Know the basic procedure of LBS and OTAPA
- 12 Define the relative Exchange Data for LBS and OTAPA

Target audience

The target audience for this course are part of the configuration or Network planning organization and are in charge of the writing of Data transcript. The target group is represented by:

- Core Network Engineers
- Core Network Specialists
- Core Network Planning Engineers for Data Transcript

Prerequisites

Successful completion of the following courses (or equivalent knowledge or experience):

AXE 810 Data Transcript LZU 108 6134

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.

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	• Introduction to CDMA	2 h
	• Traffic Cases	4 h
2	• Traffic Cases	1 h
	• IMSI Analysis and Interrogation	2 ½ h
	• SS7 Signaling Networks	2 ½ h
3	• SS7 Signaling Networks	4 h
	• Roaming	3 h
4	• BSC Connections	6 h
5	• Announcements	3 h
	• Connection of BL devices	3 h

CDMA2000 MSC Configuration

LZU 108 6277 P1A

Description

This course provides knowledge and specific abilities for the configuration of a CDMA2000 MSC/VLR functional application. It provides students with the ability to configure various Traffic Cases in a MSC exchange. It deals with the operation of the CDMA2000 Mobile Services Switching Center (MSC) and Visitor Location Register(VLR) functional applications.

The CDMA2000 MSC Operation and Configuration working area is the main focus of this course.

Learning objectives

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

- 1 List and explain the basic traffic cases in a CDMA2000 network
 - 1.1 Describe the main parts of Ericsson's CDMA2000 network
 - 1.2 Explain and list the CDMA2000 identities and briefly describe the function of each

- 2 Set up MTP and SCCP definitions in exchange data
 - 2.1 Explain which items are necessary in an MTP network and briefly describe their functions
 - 2.2 Use MML printout commands to obtain a view of the MTP configuration and use the Active Library Explorer to interpret the results
 - 2.3 Define an MTP network using the Active Library Explorer and a work order
 - 2.4 Explain the function of High Speed Signaling Links (RPP)
 - 2.5 Explain the sequence for a signaling message in the SCCP
 - 2.6 Use MML printout commands to obtain a view of the SCCP configuration and use the Active Library Explorer to interpret the results
 - 2.7 Define an SCCP network using the Active Library Explorer and a work order

- 3 Insert BSC data using online documentation
 - 3.1 Define Base Station Controller data
 - 3.2 Define Location Area data
 - 3.3 Define Cell data
 - 3.4 Define Signaling to BSC (MALT) E1/T1

- 4 Configure the exchange data for Location Updating in MSC using online documentation
 - 4.1 Explain the different location updating procedures at node level.
 - 4.2 Explain how Location Updating is handled in the MSC/VLR.
 - 4.3 Define the exchange data in the MSC that is necessary to allow Location Updating.
 - 4.4 Describe the CDMA2000 authentication

- 5 Configure the exchange data for a call from the PSTN/ISDN to the Mobile Subscriber in the MSC using online documentation
 - 5.1 Describe how an PSTN/ISDN call is handled in each of the functional applications: GMSC and MSC/VLR
 - 5.2 Define exchange data for the GMSC, HLR, and MSC/VLR to allow a mobile terminating call

- 6 Configure the exchange data for a Mobile Subscriber originated call in the MSC using online documentation
 - 6.1 Explain how a mobile originated call is analyzed
 - 6.2 Define exchange data in the MSC/VLR for a mobile originated call

- 6.3 Describe the different types of handoff at CDMA2000 node level.
- 7 Explain data fax calls and SMS
 - 7.1 Explain the SMS traffic cases
 - 7.2 Explain different traffic cases for CDMA2000 data calls using IWF equipment

Target audience

The target audience for this course is personnel with a general knowledge of the Operation of an AXE 810 switch, who require specific knowledge of the configuration of CDMA2000 MSC functions.

Prerequisites

Successful completion of the following courses:

CDMA2000 System Survey – LZU 108 5839

CDMA2000 MSC/AXE810 Operation – LZU 108 6163

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 (ILT) given in both classroom and in a technical environment using equipment and tools, which can also be accessed remotely.

The course CDMA2000 MSC Configuration can be instructed on a training exchange as well as on an emulator.

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
1	• Introduction	2
	• MTP	2
	• Exercises	2
2	• SCCP	3
	• Exercises	3
3	• MSC-BSC Connection	3
	• Location Update	3
4	• Call from a mobile station	3
	• Call to a mobile	3
5	• CDMA2000 handoff	3
	• SMS FAX and Data Calls	3

CDMA2000 MSC/AXE 810 Maintenance

LZU 108 6171 R1B

Description

The course focuses on more advanced training for Maintenance staff. After the course the student will have a deeper understanding of the maintenance activities in an AXE exchange. The practical part must be performed in a real exchange with realistic exercises.

If students are scheduled on both the Operation course LZU 108 6163 and the Maintenance course LZU 108 6171 then the duration of the Maintenance course could be shortened to 5 days as the topics MML, Winfiol, IO Systems, APZ 212 33, Group Switch, Clocks/ Synchronization, SNT/DIP, Route/Device Data and Signaling # 7 are treated in both courses on theory level.

Learning objectives

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

- 1 Have a general knowledge of the system to be able to perform maintenance activities.
 - 1.1 Be able to describe the System structure.
 - 1.2 Know how to use the AXE library and it's documents.
 - 1.3 Know how to use WinFiol to manage the AXE.
- 2 Perform basic maintenance activities in AXE.
 - 2.1 Describe what is meant by Maintenance activities in the AXE system.
 - 2.2 Describe the labeling and cabling in AXE system.
 - 2.3 Describe the main structure of power supply and distribution system.
 - 2.4 Keep records of all serious problems, activities and routines in a logbook.
 - 2.5 Issue a trouble report of a corrective action taken.
- 3 Handle alarms in a correct manner.
 - 3.1 Be able to print and interpret the information found in the AXE alarm list.
 - 3.2 Be able to find the correct OPI to handle the alarm.
 - 3.3 Take appropriate actions according to the OPI.
- 4 Perform maintenance on IO.
 - 4.1 Be able to perform repair sequences on IO (IOG 20 / APG 40) hardware elements.
 - 4.2 Determine IO system status, using the visible indicators on IO hardware.
 - 4.3 Be able to save a system backup copy on removable media.
 - 4.4 Be able to test load a system backup copy.
- 5 Perform maintenance on APZ 212.
 - 5.1 Identify the OPI required for each type of error.
 - 5.2 Understand the supervision principles of APZ hardware and software.
 - 5.3 Know how to identify and repair faults in APZ.
 - 5.4 Be able to work with maintenance activities of APZ 212.
 - 5.5 Perform repair sequences on GDM / GEM hardware elements (RPs, EMs).
- 6 Perform maintenance on group switch.
 - 6.1 Identify the OPI required for each type of error.
 - 6.2 Interpret and repair GS supervision alarms with help of the correct OPI.
 - 6.3 Interpret and repair Network Synchronisation alarms.
 - 6.4 Interpret and repair SNT and DIP alarms.

- 7 Perform maintenance on trunks.
 - 7.1 Identify the OPI required for each type of error.
 - 7.2 Interpret and repair trunk supervision alarms with help of the correct OPI.

- 8 Perform maintenance on Signaling system No. 7.
 - 8.1 Describe the concept of signaling in general.
 - 8.2 Describe the basic terms and concepts used in Signaling System Number 7.
 - 8.3 Be able to perform maintenance activities on the Signaling System No. 7.

- 9 Be able to check the system status.
 - 9.1 Generate printouts of system status and hardware elements.

Target audience

The target audience for this course are mainly field maintenance staff. Other personnel interested in AXE maintenance activities can also attend the course.

Prerequisites

The participants should be familiar with the AXE structure and have a general understanding of the functionalities of the system.

Successful completion of the following course:

CDMA2000 System Survey – LZU 108 5839 R3A

Duration and class size

The length of the course is eight 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">• Introduction• MML and WinFIOL	6,5 h
2 – 3	<ul style="list-style-type: none">• I/O Systems – Fault and repair	8 h
3 – 6	<ul style="list-style-type: none">• I/O Systems - Backup• APZ 212 33	24,5 h
7 – 8	<ul style="list-style-type: none">• Group Switch• Clock and synchronization• SNT & DIP	9 h
8	<ul style="list-style-type: none">• Signalling in AXE• System Status• Final Evaluation	4 h

CDMA2000 MSC/AXE 810 Operation

LZU 108 6163 R1B

Description

This course will give more advanced theoretical and practical training for Operational staff as well as other personnel working with configuring the system. After the course the students will have a deeper understanding of operation and configuration activities in AXE exchanges.

The practical parts will be performed in a real exchange, or on SEA environment or in a Remote Lab (RTL) with realistic exercises.

If students are scheduled on both the Operation course LZU 108 6163 and the Maintenance course LZU 108 6171 then the duration of the Maintenance course could be shortened to 5 days as the topics MML, Winfiol, IO Systems, APZ 212 33, Group Switch, Clocks/ Synchronization, SNT/DIP, Route/Device Data and Signaling # 7 are treated in both courses on theory level.

Learning objectives

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

- 1 Understand the AXE structure.
- 2 Know the different parts of AXE (APZ/APT/Subsystems).
- 3 Use tools to handle the system.
- 4 Use MML commands.
- 5 Use WinFiol to handle the system.
- 6 Use command files to configure the system.
- 7 Use the AXE library as an aid (COD/POD/OPI/Application Information/etc.).
- 8 Know the different I/O systems delivered from Ericsson.
- 9 Have a basic understanding of the APG40 product.
- 10 Handle the APZ 212 33 on a basic level.
- 11 Operate the APZ 212 33.
- 12 Handle System Backup functions.
- 13 Handle the RPs.
- 14 Know how to configure the RPs.
- 15 Use database commands to change database tables.
- 16 Handle the group switch.
- 17 Configure the different parts of the group switch.
- 18 Configure synchronization.
- 19 Configure SNTs and DIPs.
- 20 Configure trunks and signaling.
- 21 Define trunks (ETC5 and ET155).
- 22 Define signaling system no. 7.
- 23 Define BSC, LAI and Cells.
- 24 Define signaling and route data to BSC.
- 25 Handle the basic exchange data.
- 26 Define and change data in the B-Number Analysis table and check the result.
- 27 Define or change data in the Route Analysis table and check the result.
- 28 Define or change data in the End-of-Selection Analysis table using command files
- 29 Define or change data in Charging Analysis
- 30 Retrieve statistics data from OMS

31 Troubleshoot an APT / APZ alarm

Target audience

The target audience for this course are operator's personnel working with operation and configuration activities and others needing a thorough practical knowledge of the AXE system.

Prerequisites

The participants should be familiar with the AXE structure and have a general understanding of the functionalities of the system.

Successful completion of the following course:

LZU 108 5839 R3A, CDMA2000 System Survey

Duration and class size

The length of the course is ten 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">• Introduction• MML and WinFIOL	6,5 h
2	<ul style="list-style-type: none">• I/O System	6,5 h
3 – 4	<ul style="list-style-type: none">• APZ 212 33	10 h
4 – 5	<ul style="list-style-type: none">• Group Switch• Clock and synchronization• SNT & DIP	3,5 h 3 h 3 h
6 - 7	<ul style="list-style-type: none">• Route and Device Data• Signaling in AXE	4 h 4 h
7 – 9	<ul style="list-style-type: none">• BSC Connection• Analysis in AXE	3 h 15 h
10	<ul style="list-style-type: none">• Traffic Measurements• Final Evaluation	6,5 h

CDMA2000 PCN Operation and Configuration

LZU 108 5919 R1A

Description

The overall course objective is to provide the student with core knowledge of PCN nodes capabilities and operation, and the skill needed to configure, operate, and troubleshoot the CPP Router, PDSN and HA nodes based on the Connectivity Packet Platform (CPP).

This course delivery is based on the modules combination as listed below. The proposal of the modules combination is to offer the necessary training in agreement with the nodes acquired by the customer.

Options of modules combination:

1. CDMA2000 PCN Operation and Configuration
 - CPP + PDSN 4.1 – 2 days
2. CDMA2000 PCN Operation and Configuration
 - CPP + HA 4.1 – 2 days
3. CDMA2000 PCN Operation and Configuration
 - CPP + PDSN 4.1 + HA 4.1 – 3 days

Concerning the WSN 3.1 part, please refer to the course CDMA2000 PCN Operation and Maintenance – LZU 108 5918.

The WSN 3.1 module can be delivered as optional module together the CDMA2000 Operation and Configuration course – LZU 108 5919.

Learning objectives

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

1. PCN 4.1 CPP Module:

- 1 Provide an overview of the PCN 4.1 system architecture.
 - 1.1 Describe an overview of the CPP architecture.
 - 1.2 Describe the CPP hardware architecture.
 - 1.3 Describe the PCN 4.1 layered distributed architecture.
 - 1.4 Describe the scalability and dimensioning.
- 2 Provide an overview of the installation and configuration of the PCN 4.1 CPP Router.
 - 2.1 Describe the procedures to start up a node.
 - 2.2 List the Connectivity Command Line Interface (COLI).
 - 2.3 Describe PCN software installation and configuration.
 - 2.4 Describe the configuration back-up procedure.
 - 2.5 Explain the reasons for software upgrade.

- 3 Provide the knowledge for the hardware maintenance of the PCN 4.1 CPP.
- 3.1 Describe the CPP Router troubleshooting.
- 3.2 Describe the Element Management Applications and Support (EMAS).
- 3.3 Describe how to remove and install a board.
- 3.4 Describe how to procedure when power and fan cooling failure.

2. PDSN 4.1 Module:

- 4 Provide the necessary knowledge of the operation and configuration of the PCN 4.1 CPP PDSN Application.
- 4.1 Describe how to manage the PDSN.
- 4.2 Describe the PDSN's CLI.
- 4.3 Describe the CPP Router Mode.
- 4.4 Describe the PDSN Commissioning.
- 4.5 Describe the Troubleshooting and Performance.
- 4.6 Describe the Software alarms and events.

3. HA 4.1 Module:

- 5 Provide the necessary knowledge of the operation and configuration of the PCN 4.1 CPP HA Application.
- 5.1 Describe how to manage the HA.
- 5.2 Describe the HA's CLI.
- 5.3 Describe the CPP Router Mode.
- 5.4 Describe the HA Commissioning.
- 5.5 Describe the Troubleshooting and Performance.
- 5.6 Describe the Software alarms and events.

Target audience

The course is designed for Customers or Ericsson technical personnel who are interested in learning how to operate and configure the PCN 4.1 nodes based on the Connectivity Packet Platform (CPP) for CDMA2000 Network.

Prerequisites

The participants should have successfully completed the following courses:

- CDMA2000 PCN Overview (LZU 108 5917 R2A)

The participants should have deep knowledge about TCP/IP, Routing and VPN or have been attending the following courses:

- TCP/IP (LZU 102 318)
- IP ROUTING & BRIDGING (LZU 102 319)
- VPN & IP SECURITY (LZU 102 323)

Duration and class size

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

Options of modules combination:

1. CDMA2000 PCN Operation and Configuration
 - CPP + PDSN 4.1 – 2 days
2. CDMA2000 PCN Operation and Configuration
 - CPP + HA 4.1 – 2 days
3. CDMA2000 PCN Operation and Configuration
 - CPP + PDSN 4.1 + HA 4.1

Learning situation

The recommended learning format for this course a Task-Oriented Learning course (TOL).

Time schedule

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none"> • PCN 4.1 CPP Module 	
	<ul style="list-style-type: none"> • Provide an overview of the installation and configuration of the PCN 4.1 CPP Router. 	1.5 hour
	<ul style="list-style-type: none"> • Provide an overview of the installation and configuration of the PCN 4.1 CPP Router. 	3 hour
	<ul style="list-style-type: none"> • Provide the knowledge for the hardware maintenance of the PCN 4.1 CPP. 	2 hour
2	<ul style="list-style-type: none"> • PDSN 4.1 Module 	
	<ul style="list-style-type: none"> • Provide the necessary knowledge of the operation and configuration of the PCN 4.1 CPP PDSN Application. 	6.5 hour
3	<ul style="list-style-type: none"> • HA 4.1 Module 	
	<ul style="list-style-type: none"> • Provide the necessary knowledge of the operation and configuration of the PCN 4.1 CPP HA Application. 	6.5 hour

CDMA2000 PCN Operation and Maintenance

LZU 108 5918 R2A

Description

The purpose of the PCN Operation and Maintenance course is to provide the skills needed for those that will operate with the PCN network surveillance, the statistics, the basic configuration and for those that will maintain the corrective and preventive maintenance for all supported network equipment. This course provides core knowledge to operate and to maintain the CPP Router, PDSN, HA and WSN nodes based on the Connectivity Packet Platform (CPP) and according to the offered IS-835 services.

The proposal of this course is to offer 4 modules of training in order to the customer define the necessary modules of training according to their nodes acquired.

Options for combination of modules:

1. CDMA2000 PCN Operation and Maintenance
 - CPP + PDSN 3.1 – 2 days
2. CDMA2000 PCN Operation and Maintenance
 - CPP + HA 3.1 – 2 days
3. CDMA2000 PCN Operation and Maintenance
 - CPP + PDSN 3.1 + HA 3.1 – 3 days
4. CDMA2000 PCN Operation and Maintenance
 - CPP + WSN 3.1 – 2 days
5. CDMA2000 PCN Operation and Maintenance
 - CPP + PDSN 3.1 + WSN 3.1 – 3 days
6. CDMA2000 PCN Operation and Maintenance
 - CPP + HA 3.1 + WSN 3.1 – 3 days
7. CDMA2000 PCN Operation and Maintenance
 - CPP + PDSN 3.1 + HA 3.1 + WSN 3.1 – 4 days

Learning objectives

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

1. Module 1 – PCN 3.1 CPP:

- 1 Describe an overview of the installation and configuration of the PCN 3.1 CPP Router.
 - 1.1 Provide an overview of the PCN 3.1 system architecture.
 - 1.2 Describe PCN hardware installation and configuration.
 - 1.3 List the Connectivity Command Line Interface (COLI).

- 1.4 Describe PCN software installation and configuration.
 - 1.5 Describe the configuration back-up procedure.
 - 1.6 Identify the reasons for software upgrade.
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- 2 Provide the necessary knowledge for the hardware maintenance of the PCN 3.1 CPP.
 - 2.1 Describe the basic CPP Router troubleshooting
 - 2.2 The Element Management Applications and Support (EMAS)
 - 2.3 Explain how to remove and install a board.
 - 2.4 Explain how to procedure when power and fan cooling failure.

2. Module 2 – PDSN 3.1:

- 3 Provide the necessary knowledge for the operation and maintenance of the PCN 3.1 CPP PDSN Application.
 - 3.1 Describe how to manage the PDSN.
 - 3.2 List the basic CLI of the PDSN application.
 - 3.3 List the PDSN display commands.
 - 3.4 Describe the PDSN trap messages.
 - 3.5 Describe the call path tracing.

3. Module 3 – HA 3.1:

- 4 Provide the necessary knowledge for the operation and maintenance of the PCN 3.1 CPP HA Application.
 - 4.1 Describe how to manage the HA.
 - 4.2 List the basic CLI of the HA application.
 - 4.3 List the HA display commands.
 - 4.4 Describe the HA trap messages.
 - 4.5 Describe the call path tracing.

4. Module 4 – WSN 3.1:

- 5 Provide the necessary knowledge for the operation and maintenance of the PCN 3.1 CPP WSN Application.
 - 5.1 Describe how to manage the WSN.
 - 5.2 List the basic CLI of the WSN application.
 - 5.3 List the WSN display commands.
 - 5.4 Describe the WSN trap messages.
 - 5.5 Describe the WSN Performance Optimization
 - 5.6 Describe the Ad Hoc Access Server

Target audience

The course is designed for Customers or Ericsson technical personnel who are interested in learning how to operate and maintain the PCN 3.1 nodes based on the Connectivity Packet Platform (CPP) for CDMA2000 Network.

Prerequisites

The participants should have successfully completed the following courses:

CDMA2000 PCN Overview (LZU 108 5917)

Duration and class size

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

Options for combination of modules:

1. CDMA2000 PCN Operation and Maintenance
 - CPP + PDSN 3.1 – 2 days
2. CDMA2000 PCN Operation and Maintenance
 - CPP + HA 3.1 – 2 days
3. CDMA2000 PCN Operation and Maintenance
 - CPP + PDSN 3.1 + HA 3.1 – 3 days
4. CDMA2000 PCN Operation and Maintenance
 - CPP + WSN 3.1 – 2 days
5. CDMA2000 PCN Operation and Maintenance
 - CPP + PDSN 3.1 + WSN 3.1 – 3 days
6. CDMA2000 PCN Operation and Maintenance
 - CPP + HA 3.1 + WSN 3.1 – 3 days
7. CDMA2000 PCN Operation and Maintenance
 - CPP + PDSN 3.1 + HA 3.1 + WSN 3.1 – 4 days

Learning situation

The recommended learning format for this course a Task-Oriented Learning course (TOL).

Time schedule

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none">Module 1 – PCN 3.1 CPP	
	<ul style="list-style-type: none">Describe an overview of the installation and configuration of the PCN 3.1 Solution based on the CPP Router.	3.5 hour
	<ul style="list-style-type: none">Provide the necessary knowledge for the hardware maintenance of the PCN 3.1 CPP.	3 hour
2	<ul style="list-style-type: none">Module 2 – PDSN 3.1	
	<ul style="list-style-type: none">Provide the necessary knowledge for the operation and maintenance of the PCN 3.1 CPP PDSN Application.	6.5 hour
3	<ul style="list-style-type: none">Module 3 – HA 3.1	
	<ul style="list-style-type: none">Provide the necessary knowledge for the operation and maintenance of the PCN 3.1 CPP HA Application.	6.5 hour
4	<ul style="list-style-type: none">Module 4 – WSN 3.1	
	<ul style="list-style-type: none">Provide the necessary knowledge for the operation and maintenance of the PCN 3.1 CPP WSN Application.	6.5 hour

CDMA2000 PCN Overview

LZU 108 5917 R2A

Description

The overall course objective is to provide the student with basic knowledge of the PCN 4.1 solution based on the Connectivity Packet Platform (CPP), PCN standardization and types of services based on the IS-835, PCN nodes platform and functionalities.

Learning objectives

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

- 1 Describe the CDMA2000 Migration and the objective of PCN for CDMA R4.
 - 1.1 Explain the CDMA2000 migration.
 - 1.2 Describe briefly the objective of PCN for CDMA R4.
 - 1.3 Describe briefly the Connectivity Packet Platform (CPP).

- 2 Describe an overview of the PDSN 4.1 node.
 - 2.1 Describe the platform used in the PDSN 4.1.
 - 2.2 Explain the functions of the PDSN.
 - 2.3 Explain the Simple IP Access.

- 3 Describe an overview of the HA 4.1 node.
 - 3.1 Explain the platform used in the HA 4.1.
 - 3.2 Explain the functions of the HA.
 - 3.3 Explain the Mobile IP Access.

- 4 Describe an overview of the WSN 3.1 node.
 - 4.1 Describe the platform used in the WSN.
 - 4.2 Explain the functions of the WSN.
 - 4.3 Identify the functionalities offered by the WSN.
 - 4.4 Identify the features offered by the WSN.

- 5 Describe an overview of the AAA nodes.
 - 5.1 Identify and explain the types of AAA nodes.
 - 5.2 Describe the E-AAA Node Architecture.
 - 5.3 Describe the E-AAA Platform.

- 6 Describe an overview of the PNM 4.1.
 - 6.1 Explain the PNM functions.
 - 6.2 Describe the PDSN and HA element management.
 - 6.3 Describe the AAA element management.

Target audience

The course is designed for Customers or Ericsson technical personnel who are interested in learning the PCN 4.1 solution based on the Connectivity Packet Platform (CPP) for CDMA2000 Network.

Prerequisites

The participants should have successfully completed the following courses:

- CDMA2000 System Survey – LZU 108 5839
- Datacom Networking – LZU 102 371

Duration and class size

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

Learning situation

The recommended learning format for this course is instructor-led training (ILT) using a Power Point presentation with lecture and theoretical exercises.

Time schedule

Day	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none">• Describe the CDMA2000 Migration and the objective of PCN for CDMA R4.	1.5 hour
1	<ul style="list-style-type: none">• Describe an overview of the PDSN 4.1 node.	1 hour
1	<ul style="list-style-type: none">• Describe an overview of the HA 4.1 node.	1 hour
1	<ul style="list-style-type: none">• Describe an overview of the WSN 3.1 node.	1 hour
1	<ul style="list-style-type: none">• Describe an overview of the AAA nodes.	1 hour
1	<ul style="list-style-type: none">• Describe an overview of the PNM 4.1.	1 hour

CDMA2000 System Survey

LZU 108 5839 R3A

Description

The CDMA2000 System Survey course provides a high level view of the CMX^{3G} hardware and function, the nodes in the Service Node Network as well as BSC 1120, RBS 1127, RBS 1130 hardware and functions as used in the CDMA2000 network. An overview of the CDMA2000 access technology and the CMS 11 network is followed with a closer look at the CMX^{3G} hardware and functionality, a description of the nodes that comprise the Service Node Network, a description of the functions and components of the Packet Core Network (PCN) and IP MultiMedia (IPMM) Network. The next section describes the Base Station Controller (BSC) 1120 and the Radio Base Stations (RBSs) 1127 and 1130. The course closes with a high level discussion regarding system capacity and call paths.

Learning objectives

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

- 1 List the techniques used in multiple access systems
- 2 Describe the steps to generate a CDMA signal
- 3 List the purpose for each channel in a CDMA system
- 4 Describe a typical call setup process
- 5 Describe the purpose of frequency reuse
- 6 Describe the purpose for power control
- 7 Describe the type of handoffs in CDMA
- 8 Describe key benefits of CDMA2000 over cdmaOne
- 9 List the features enabled by the UIM (User Interface Module)
- 10 Describe 1xEV-DO
- 11 Describe the architecture of the PLMN
- 12 Explain the functions of the Public Switched Telephone Network (PSTN)
- 13 Explain the functions of the Mobile Switching Center (MSC)
- 14 Explain the functions of the Base Station Controller (BSC)
- 15 Explain the functions of the Radio Base Station (RBS)
- 16 Explain the functions of the Mobile Subscriber (MS)
- 17 Describe Network Management
- 18 Describe the Network Management Solution (NMS)
- 19 Describe Sun-Network Management (SNM)
- 20 Describe Integrated Sun-Network Management (ISNM)
- 21 Describe Integrated Sun-Network Management (ISNM) platforms
- 22 Describe the different communication links
- 23 Describe CCS/SS7/C7 signaling
- 24 Describe Network Interfaces
- 25 Describe the functions of the Circuit Core Network
- 26 Describe the CMX^{3G} MSC functions
- 27 Describe the CMX^{3G} MSC hardware
- 28 Describe the Circuit Core Network Manager
- 29 Describe the Network Server Platform functions

- 30 Describe the Network Server Platform hardware
- 31 Describe the Home Location Register (HLR)
- 32 Describe the Authentication Center (AC)
- 33 Describe the Service Control Point (SCP)
- 34 Describe the Mobile Positioning Service (MPS)
- 35 Describe the PrePaid Calling Service (PPCS)
- 36 Describe the Messaging over IP (MoIP)
- 37 Describe the Short Messaging Service Center (SMS-C)
- 38 Describe the Multimedia Messaging Service Center (MMS)
- 39 Describe the Mobile Internet Enabling Proxy (MIEP)
- 40 Describe the InterWorking Function (IWF)
- 41 Describe the functions of the PCN
- 42 Describe the different nodes of the PCN
- 43 Describe Simple IP
- 44 Describe Mobile IP
- 45 Describe the Packet Data Serving Node (PDSN)
- 46 Describe the Packet Data Serving Node (PDSN) hardware
- 47 Describe the Wireless LAN Serving Node (WSN)
- 48 Describe the Wireless LAN Serving Node (WSN) hardware
- 49 Describe the Home Agent (HA)
- 50 Describe the Home Agent (HA) hardware
- 51 Describe the Authentication, Authorization and Accounting Server (AAA)
- 52 Describe the E-AAA hardware
- 53 Describe the D-AAA hardware
- 54 Describe the Packet Core Network Manager (PNM)
- 55 Describe the functions of the IPMM
- 56 Describe the different nodes of the IPMM
- 57 Describe Instant Talk functionality
- 58 Describe the functions of the IP Multimedia Network
- 59 Describe the functionality of the Call Session Control Function (CSCF)
- 60 Describe the Call Session Control Function (CSCF) hardware
- 61 Describe the functionality of the Home Subscriber Server (HSS)
- 62 Describe the Home Subscriber Server (HSS) hardware
- 63 Describe the functionality of the Media Resource Function (MRF)
- 64 Describe the Media Resource Function (MRF) hardware
- 65 Describe the functions of the Radio Access Network
- 66 Describe the different nodes of the Radio Access Network
- 67 Describe the functions of the BSC 1120
- 68 Describe the BSC 1120 hardware
- 69 Describe the functions of the RBS 1127
- 70 Describe the RBS 1127 hardware
- 71 Describe the Radio Network Manager (RNM)
- 72 Describe EV-DO support in the RAN
- 73 State the capacities of the CMX^{3G}
- 74 State the capacities of the BSC 1120
- 75 State the capacities of the RBS 1127
- 76 State the capacities of the RBS 1130
- 77 State the capacities of the PDSN
- 78 State the capacities of the WSN

- 79 State the capacities of the HA
- 80 State the capacities of the AAA
- 81 State the redundancies of the CMX^{3G}
- 82 State the redundancies of the BSC 1120
- 83 State the redundancies of the RBS 1127
- 84 State the redundancies of the RBS 1130
- 85 Describe Softer handoffs
- 86 Describe Soft handoffs
- 87 Describe Inter-BSS Soft handoffs
- 88 Describe Intra-System Hard handoffs
- 89 Describe Intra-BSS Hard handoffs
- 90 Describe Inter-System Hard handoffs
- 91 Identify system communications links
- 92 Describe the process by which the SD registers with the system
- 93 Describe the path through the system that a voice call follows
- 94 Describe the path through the system that an IWF data call follows
- 95 Describe the path through the system that a PCN data call follows

Target audience

This course is designed for the Technical Professional needing an overview of the Ericsson total CDMA2000 solution, specifically the CMX^{3G}, Service Nodes, Packet Core Network, IP Multimedia Network, BSC 1120, and RBSs 1127 and 1130. This course also serves as a prerequisite for more advanced courses

Prerequisites

None

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 instructor led using Power Point animation throughout the course. The student text is reinforced with student exercises and with review questions at the end of each section.

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 (in hours)
1	<ul style="list-style-type: none"> Section 0: Introduction 	0.5
	<ul style="list-style-type: none"> Section 1: CDMA2000 Overview 	3
	<ul style="list-style-type: none"> Section 2: CMS 11 Overview 	2.5
2	<ul style="list-style-type: none"> Section 3: CCN Overview 	3
	<ul style="list-style-type: none"> Section 4: SNN Overview 	2
	<ul style="list-style-type: none"> Section 5: PCN Overview 	2
3	<ul style="list-style-type: none"> Section 6: IPMM Overview 	2
	<ul style="list-style-type: none"> Section 7: RAN Overview 	4
4	<ul style="list-style-type: none"> Section 8: Capacity and Handoffs 	2
	<ul style="list-style-type: none"> Section 9: Call Flows and Course Review 	1
	<ul style="list-style-type: none"> Final Exam and Exam Review 	1.0
	<ul style="list-style-type: none"> Certificates and Course Evaluations 	0.5

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.

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

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.

ENR 3.0 Operation

LZU 108 6234 R1A

Description

This course enables the students to explain the main functions and to operate the ENR (Ericsson Node Reporter), including the new feature Shared Group Profile and Job Scheduler.

Learning objectives

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

- 1 Explain the functionality of the Ericsson Node Reporter
 - 1.1 Name the main parts of ENR architecture
 - 1.2 List and explain the main functions and important features of the ENR 3.0
 - 1.3 Start ENR Main graphical user interface, recognize main fields and user administration

- 2 Explain and configure pre defined reports
 - 2.1 Explain and create HLR/AC subscriber reports.
 - 2.2 Explain and create JPA/OAM provisioning reports.
 - 2.3 Explain and create CPU/SS7 statistical reports

- 3 Explain and configure other reports
 - 3.1 Explain and create user defined reports.
 - 3.2 Explain and create recent reports.
 - 3.3 Explain and create data integrity reports
 - 3.4 Explain and create counter reports

- 4 Explain and Configure Shared Group Profile
 - 4.1 Describe and create Group Profiles
 - 4.2 Describe and create promotions

- 5 Explain ENR utilities and commands
 - 5.1 Describe all utilities windows and functions

- 6 Explain and configure the ENR Job Scheduler
 - 6.1 Understand Job Scheduler main window.
 - 6.2 Create scheduled report and backups.

Target audience

The target audience for this course is customers with a general knowledge of the Jambala HLR/AC, which requires specific knowledge of the operation of Ericsson Node Reporter 3.0 functions. This audience includes personnel in charge of the application operation of this network element.

For customers' personnel:

Network statistics Engineer

Network statistics Specialist

Prerequisites

Basic Knowledge of MySQL database and Unix commands

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	• ENR overview	½ h
	• Starting ENR main window	1 ½ h
	• Creating pre-defined reports	1 h
	• Creating user defined reports	1 ½ h
	• Exercises	1 ½ h
2	• ENR group profile and promotions	1 ½ h
	• ENR utilities and commands	1 ½ h
	• ENR Job Scheduler	1 ½ h
	• Exercises	1 ½ h

HLR/AC 4.0 Operation Delta

LZU 108 6233 R1A

Description

This course enables the students to complete their CDMA HLR/AC 3.0 application competence updating to HLR/AC 4.0 new features and operation and maintenance tools.

Learning objectives

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

- 1 HLR/AC 4.0 Overview
 - 1.1 HLR/AC concepts review
 - 1.2 HLR/AC 4.0 differences overview
- 2 New and enhanced subscriber features
 - 2.1 Explain HLR/AC 3.1 features
 - 2.2 Explain HLR/AC 4.0 features
 - 2.3 Practical exercises
- 3 Significant Operation and maintenance improvements
 - 3.1 Explain license manager
 - 3.2 Explain JPA enhancements (overview)
 - 3.3 Explain new features in ENR 3.0 (overview)
 - 3.4 Explain SS7 Stack Integrity Verification
 - 3.5 Explain Counters
 - 3.6 Practical exercises
- 4 Delta Hardware TSP
 - 4.1 Overview of new TSP hardware
- 5 Jambala Provisioning Agent
 - 5.1 Describe JPA architecture
 - 5.2 Explain JPA user administration
 - 5.3 Explain JPA parameter configuration
 - 5.4 Explain JPA client access
 - 5.5 Practical exercises

Target audience

The target audience for this course is customers with previous knowledge of Jambala HLR/AC 3.0 courses, which requires specific knowledge update to HLR/AC 4.0. This audience includes personnel in charge of the application operation of this network element.

For customers' personnel:

HLR/AC Network Engineer

HLR/AC Network Specialist

Prerequisites

Jambala HLR/AC 3.0 Overview course

Jambala HLR/AC 3.0 Operation, Administration and Maintenance 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.

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	• Course introduction	½ h
	• HLR/AC 4.0 Overview	1 ½ h
	• New and enhanced features	2 h
	• Significant O&M Improvements	1 ½ h
	• Exercises	1 ½ h
2	• Delta Hardware TSP	1 ½ h
	• Jambala Provisioning Agent 4.0	2 ½ h
	• Exercises	1 ½ h
	• Course Conclusion	½ h

IP Networking

LZU 102 397 R2A

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.

Learning objectives

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

- 1 Describe IPv4 and IPv6 protocol, addressing and subnetting / aggregation
 - 1.1 Describe the functions of the different bodies involved in IP standards / RFCs
 - 1.2 Describe IPv4 packet structure, protocol header and features
 - 1.3 Describe and perform exercises on IPv4 addresses, CIDR, subnetting and aggregation
 - 1.4 Describe IPv6 packet structure, protocol header, features and the different types of IPv6 addresses
- 2 Describe the purpose and operation of different protocols such as TCP, UDP, ICMP, HTTP, FTP, TFTP, SMTP, POP3, IMAP, ARP, DNS and DHCP
 - 2.1 Describe the OSI reference model and how it relates to the TCP / IP stack
 - 2.2 Describe the TCP and UDP protocol structures, headers and functionality
 - 2.3 Describe and perform exercises and analysis on the operation of different protocols / applications (ARP, DHCP, DNS, HTTP, FTP, TFTP, SMTP, POP3, IMAP, etc.)
- 3 Describe the purpose and operation of different network devices and routing protocols used in IP networking
 - 3.1 Describe the operation of Hubs, Bridges and Switches
 - 3.2 Describe and perform exercises and analysis on the operation of Spanning Tree Protocol (STP)
 - 3.3 Describe and perform exercises and analysis on the operation of Static and Dynamic routing protocols
 - 3.4 Describe and perform exercises and analysis on RIP routing protocol
 - 3.5 Describe and perform exercises and analysis on OSPF routing protocol

Target audience

The target audience for this course is personnel 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 the following course or equivalent:

Datacom Networking - LZU 102 371 – 4 days ILT

And/or

Introduction to IP Networks, WBL – FAB 102 1313

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 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	• 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 exercises and analysis 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)	3.5

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">• IP Networking	2 hours
1	<ul style="list-style-type: none">• IP Internetworking	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">Using the network - IP Network Applications	2 hours
1	<ul style="list-style-type: none">The TCP/IP Data Communications Architecture	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.
- 1.1 Describe and configure the Transition Mechanisms between IPv4 and IPv6.
- 1.2 Understand how QoS (DiffServ, RSVP / IntServ) and IPsec are working.
- 1.3 Configure these mechanisms and features on a router.
- 1.4 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"> • Introduction <ul style="list-style-type: none"> • Welcome • Presentation • Training Schedule 	1 h
	<ul style="list-style-type: none"> • IPv6 and Mobile Internet <ul style="list-style-type: none"> • Increased Address Space • Built in Security • Quality of Service (QoS) for Real Time Services • Simple Routing for Scalability 	1 h
	<ul style="list-style-type: none"> • IPv6 <ul style="list-style-type: none"> • IPv6 Header • Address Architecture • Unicast, Multicast and Anycast • Auto-configuration • Neighbor Discovery • ICMPv6Dual Stack Model DNS • DHCP 	6 h
2	<ul style="list-style-type: none"> • QoS <ul style="list-style-type: none"> • DiffServ • IntServ (RSVP) • MPLS • Policy • Policing • Traffic Conditioning • Metering • Scheduler • Shaper • Queue Management (RED) 	4 h

- 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"> • Introduction <ul style="list-style-type: none"> • Welcome • Presentation • Training Schedule • Course outline 	1 h
	<ul style="list-style-type: none"> • IPv6 <ul style="list-style-type: none"> • IPv6 Header • Address Architecture • Unicast, Multicast and Anycast • Auto-configuration • Neighbor Discovery • ICMPv6 • Making an IPv6 NetworkConnecting IPv6 islandsDual Stack Model DNS • DHCP 	3 h
	<ul style="list-style-type: none"> • Transition Mechanisms <ul style="list-style-type: none"> • Configured tunnels • IPv6 to IPv4 (6to 4) • ISATAP • Teredo • SIIT NAT-PT • Other Transition Mechanisms 	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.
- 1.1 Describe and configure the Transition Mechanisms between IPv4 and IPv6.
- 1.2 Describe how The Transition Mechanisms work when setting up an IPv6 network.
- 1.3 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.

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"> • Introduction <ul style="list-style-type: none"> • Welcome • Presentation • Training Schedule 	1 h
	<ul style="list-style-type: none"> • IPv6 and Mobile Internet <ul style="list-style-type: none"> • Increased Address Space • Built in Security • Quality of Service (QoS) for Real Time Services • Simple Routing for Scalability 	1 h
	<ul style="list-style-type: none"> • IPv6 <ul style="list-style-type: none"> • IPv6 Header • Address Architecture • Unicast, Multicast and Anycast • Auto-configuration • Neighbor Discovery • ICMPv6Dual Stack Model DNS • DHCP 	5 h
2	<ul style="list-style-type: none"> • Tunneling <ul style="list-style-type: none"> • 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 	3 h
	<ul style="list-style-type: none"> • Translation <ul style="list-style-type: none"> • Introduction • DSTM • Header Translation • NAT-PT • FTP-ALG • DNS-ALG • SIIT • BIS • Socks64 • TCP/UDP Relay 	2 h

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
- 1.1 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"> • Introduction <ul style="list-style-type: none"> • Welcome • Presentation • Training Schedule 	1 h
	<ul style="list-style-type: none"> • RIPng <ul style="list-style-type: none"> • The RIPng Header • Distance Vector Algorithm • Hop Counts • Flooding • Counting to Infinity • Reverse Poisoning • Split Horizon 	3 h
	<ul style="list-style-type: none"> • OSPFv3 <ul style="list-style-type: none"> • The OSPFng Header • Link State Advertisements (LSAs) • The Link-State Database • Hello Packets • Database Synchronization • Flooding • Routing Calculations • SPF Algorithm • External Routing Information • OSPF Areas • OSPF Range • Stub Areas • 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 	5 h

- | | | |
|---|---|-----|
| 2 | <ul style="list-style-type: none">• ISIS<ul style="list-style-type: none">• 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+<ul style="list-style-type: none">• 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 | 1 h |
| | | 2 h |

Jambala HLR/AC Operation and Maintenance

LZU 108 3828

Description

This course is intended to teach the students the concepts and tasks related to operating, and maintaining the HLR/AC on Jambala Platform.

Learning objectives

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

- 1 Review the role and functionality of the HLR/AC in the network
- 2 Summarize the architecture and main principles of the cellular network
- 3 Identify the entities in a cellular network
- 4 Outline the function of the HLR
- 5 Understand the O&M model in the HLR/AC
- 6 Describe the main tasks related to Operation and Maintenance of the HLR/AC
- 7 Understand geographical redundancy
- 8 Use and get familiarity with the GUI
- 9 Realize the main tasks in the features of HLR and execute O&M exercises of the traffic functions in the 3.0 version
- 10 Realize the main tasks in the features of AC and execute O&M exercises of the traffic functions in the 3.0 version

Target audience

The target audience for this course is Operation and Maintenance staff who comes into contact with the new HLR/AC 3.0.

Prerequisites

Successful completion of the following courses:

Jambala HLR/AC Overview (LZU 108 3827)

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
1	• Review of HLR/AC architecture and functionalities	3 h
	• HLR/O&M Model	3 h
2	• HLR/AC O,A&M main tasks	3 h
	• Geographical redundancy	0.5 h
	• GUI exercises	2.5
3	• HLR features presentation	2 h
	• HLR O&M Exercises	4 h
4	• HLR O&M Exercises	2 h
	• AC features presentation	1 h
	• AC O&M Exercises	2.5 h
	• Course conclusion	0.5 h

Jambala HLR/AC Overview

LZU 108 3827

Description

This course is intended to provide an overview of the Home Location Register and Authentication Center 3.0 functionality according to how it is implemented on the new Jambala platform.

It outlines the role of the HLR/AC in the mobile network and how it communicates with other entities. It describes the main functionality of the HLR/AC and explains the services that the HLR/AC provides. It analyses the architecture of the HLR/AC and examines the hardware and software components. The HLR/AC Overview course summarises how the Jambala platform supports the evolution of the world of telecommunications

Learning objectives

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

- 1 Understand the role of the HLR/AC in the network
- 2 Understand the functionality of the HLR/AC
- 3 Know the services provided by the HLR/AC
- 4 Recognize hardware and the software of the HLR/AC

Target audience

The target audience for this course is Operation and Maintenance staff who comes into contact with the new HLR/AC 3.0.

Prerequisites

Successful completion of the following courses:

CDMA2000 System Survey (LZU 108 5839)

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
1	<ul style="list-style-type: none">• Course introduction	0.5 h
	<ul style="list-style-type: none">• HLR/AC overview	1 h
	<ul style="list-style-type: none">• HLR/AC functionality	2 h
	<ul style="list-style-type: none">• HLR/AC services	2 h
	<ul style="list-style-type: none">• Jambala hardware and software description	0.5 h

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">• Local Area Networks and the Ethernet Standard	1 hour 15 mins
1	<ul style="list-style-type: none">• Wireless Local Area Networks, WLAN	1 hour 15 mins

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">• Networking Basics	1 hour
1	<ul style="list-style-type: none">• Your PC and the Datacom Network	1 hour

PPCS 8.5 Delta

LZU 108 6251 R1A – Instructor-Led Training (ILT) version

LZU 108 6251/9 R1A – Virtual Classroom Training (VCT) version

Description

This course provides information about changes in the different functions of the PPCS 8.5 from PPCS 8.0 and before. These changes affect functions such as charge rate, link capacity and Data charging capability. Prior knowledge of the functionality of the PPCS 7.0/8.0 release is essential.

Learning objectives

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

- 1 List the main functionality of PrePaid Calling Service Solution
- 2 Describe new core Features of PPCS 8.5
- 3 Understand Call scenarios
- 4 Describe the System Impact
- 5 Describe the upgrade path
- 6 Understand Rate Capabilities
- 7 Overview of System platform requirements

Target audience

The target audience for this course is operators/engineers working with PPCS Systems who have attended the PPCS 8.0 courses or before.

Prerequisites

Successful completion of the following courses:

PPCS 7.0 System Overview	LZU 108 5609
PPCS Open Interface Delta 8.0	LZU 108 5981

Duration and class size

The length of the course is 1 day and the maximum number of participants is 16 for the Instructor-Led Training version of the course and 10 for the Virtual Classroom Training version.

Learning situation

The course can be delivered in traditional classroom format (Instructor-Led Training-ILT) or via virtual classroom format (Virtual Classroom Training-VCT). The VCT version is split over two sessions totaling 5 hours that can be delivered on the same day or on separate days.

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	PrePaid Calling Service Solution	40 mins
1	New Core Features in 8.5	1 hour
1	Call Scenarios	1 hour
1	System Impact	40 mins
1	Upgrading to PPCS 8.5	30 mins
1	Rating Capabilities	40 mins
1	System Platform Requirements	30 mins

The Server Platform (TSP) Node Management

LZU 102 665 R1A

Description

This course teaches the concepts and tasks related to the operation and maintenance of a TSP4 system. It is also suitable as an introduction to TSP systems in general. The practical exercises are based on a system running on simulated Vega processors.

There is some overlap in content between this course and JAMBALA Application Platform (J-AP) 3.x Operation and Maintenance (LZU 108 6081).

Learning objectives

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

- 1 Describe the hardware components of a TSP4 system
- 2 Be familiar with Operation and Maintenance documentation
- 3 Perform common O&M tasks

Target audience

Operations staff working with TSP.

Prerequisites

Successful completion of the following courses:

- The Server Platform (TSP) System Overview (LZU 102 660)
- UNIX Basics (LZU 108 206)
- UNIX Fundamentals (LZUBB 108 170)
- SS7 Protocol Training or equivalent experience

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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none">• Introduction to TSP4 platform	2 hours
	<ul style="list-style-type: none">• TSP Concepts and Architecture	2.5 hours
	<ul style="list-style-type: none">• Operation Administration and Maintenance	2 hours
2	<ul style="list-style-type: none">• Operation Administration and Maintenance – continued	2 hours
	<ul style="list-style-type: none">• Software Backup and Restoration	2 hours
	<ul style="list-style-type: none">• System Upgrade	2 hours
3	<ul style="list-style-type: none">• SS7 Signaling	2 hours
	<ul style="list-style-type: none">• Geographical Redundancy (Network Redundancy)	4 hours
4	<ul style="list-style-type: none">• Alarm Handling	2.5 hours
	<ul style="list-style-type: none">• Expansion Repair and Replacement of Hardware	1 hour
	<ul style="list-style-type: none">• Virtual IP	2.5 hours
	<ul style="list-style-type: none">• Disk Log	1 hour

The Server Platform (TSP) System Overview

LZU 102 660 R1A

Description

This course serves as a general introduction to The Server Platform (TSP) for all job categories.

Learning objectives

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

- 1 Understand when TSP is a good platform choice and why.
- 2 Understand the main characteristics of TSP and how they are achieved.
- 3 Be familiar with the software and hardware architecture of TSP
- 4 Be familiar with the main concepts in TSP

Target audience

Anyone working with TSP.

Prerequisites

The participants should be familiar with basic knowledge about telecommunications and data communications.

Duration and class size

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

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	Short description of the topics in the course	Estimated time
1	<ul style="list-style-type: none">• Introduction	1.5 hours
	<ul style="list-style-type: none">• Hardware Overview	0.5 hour
	<ul style="list-style-type: none">• Software Architecture	1.0 hour
	<ul style="list-style-type: none">• Processes	0.5 hour
	<ul style="list-style-type: none">• The Database	1.0 hour
	<ul style="list-style-type: none">• Clusterware	0.5 hour
	<ul style="list-style-type: none">• Node Management (Operation and Maintenance)	0.5 hour
	<ul style="list-style-type: none">• Design Environment: TSP Application Design Environment (TADE)	0.5 hour

VPN & IP Security

LZU 102 323 R2A

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 is personnel 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.

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

