



Who Should Attend?

The course is designed for employees of mobile network operators, who need to understand the principles of roaming signalling in mobile networks.

Course Scope

1. Overview of Network
 - Network Organisation.
 - 2G/3G End User Main Identities.
 - GERAN Nodes.
 - UTRAN Nodes.
 - Common Databases.
 - 2G Circuit-switched Service – Roaming Architecture.
 - 3G Circuit-switched Service – Roaming Architecture.
 - Packet Switched service – Roaming Architecture.
 - Evolved Packet Core – Roaming Architecture.
 - IMS Architecture.
 - IMS – Interworking.
2. Overview of Procedures.
 - GSM CS Registration.
 - GPRS Attach.
 - Call Setup (Monolithic MSC).
 - Call Setup (Split Architecture).
 - PDP Context Activation.
 - Voice over LTE (VoLTE) Call Setup.
 - Short Message Service (SMS).
 - International Roaming.
 - Call Forwarding.
3. IP-based Signalling Protocols.
 - Access Point Name (APN).
 - GPRS domain - .gprs
 - GPRS Roaming eXchange (GRX).
 - Session Management.
 - Secondary Packet Data Protocol (PDP) Context.
 - QoS in PS Service.
 - User IP Address Assignment.
 - IMS Session With Policy Control.
4. DIAMETER Base Protocol.
 - 3GPP DIAMETER Applications.
 - PCRF Application.
 - PCRF Application - Roaming.
5. Session Initiation Protocol (SIP).
 - Session Description Protocol Basics.



- SIP Multimedia Session Set-up.
- P-CSCF Discovery.
- 6. Signalling System 7 (SS7) Principles and Signalling Connection Control Part (SCCP).
 - SS7 Protocol Stack.
 - SS7 Key Concepts.
 - SCCP Basics and Routing.
 - SCCP Functional Structure.
 - SCCP Connection-oriented Service.
 - SCCP Message Parameters.
 - SCCP Address Component.
 - Global Title Translation (GTT) - Routing.
 - SCCP Connectionless Service.
 - SCCP Examples.
- 7. SS7 Mobile Services.
 - Transaction Capabilities Application Part (TCAP).
 - TCAP Structure.
 - TCAP Messages and Information Elements (IE's).
 - TCAP Information Element and Tag.
 - TCAP Messages.
 - Mobile Application Part (MAP).
 - MAP – Context and Coding.
 - General Mobile Application Part (MAP) Structure.
 - MAP Examples: Location Updating.
- 8. SS7 Call and Media Gateway Control.
- 9. Call and Bearer Control Protocols.
 - Integrated Services Digital Network (ISDN) User Part.
 - ISUP Messages.
 - Session Initiation Protocol (SIP).
 - ISUP-SIP Interworking: SIP-I.
 - SIP-I Example.
 - ISUP over SIP: Session Initiation Protocol for Telephony (SIP-T).
 - Bearer Independent Call Control (BICC).
 - BICC Serving Node.
 - BICC Features and IE's.
 - BICC Call Setup (part).
 - H.248/MEGACO Introduction.
 - Media Gateway Connection Model.
- 10. SS7 Transport.
 - Classical and Broadband Transport.
 - Layered structure of Message Transfer Part (MTP).
 - MTP Layer 3 Functions.
 - MTP L3 – Routing Labels.
 - MTPL3 – Routing Tables.
 - MTPL3 – International Signalling Aspects.
 - Signalling Transport over IP (SIGTRAN).
 - Basic Terms.



- SIGTRAN – Support for International Signalling.
- 11. Charging in Roaming.
 - Charging Principles.
 - Standard CRD Formats.
 - CS CDR – Selected Features.
 - PS CDR – Selected Features.
 - Transferred Account Procedure: TAP-in and TAP-out.

Course Objectives

The course is designed for employees of mobile network operators, who need to understand the principles of roaming signalling in mobile networks.

Prerequisites

Participants should have a basic understanding of mobile network architecture and its services.

Training Structure

Three-day training divided into logical sessions.

Methodology

Instructor-led training. Exercises and trace analysis.