UMTS Core Network Signalling

Who Should Attend?

The course is intended for anyone who wants in-depth knowledge of UMTS signalling.

Course Content

1. Overview of Network and Procedures.
   - GSM Circuit-switched Services.
   - GSM Packet-switched Services.
   - Network Organisation.
   - Mobile Network Functions.
   - Common Databases.
   - Circuit-switched Subsystem Nodes.
   - Packet-switched Subsystem Nodes.
   - GERAN Nodes.
   - GSM CS Interfaces.
   - PS Service Interfaces.
   - MSC Server and Media Gateway.
   - 3G Architecture from R5.
   - IMS Architecture.
   - IMS Interworking.
   - Pre-paid Solutions.
   - GSM CS Registration.
   - GPRS Attach.
   - Call.
   - PDP Context Activation.
   - SMS.
   - International Roaming.
   - Handover.
   - Call Forwarding.
   - Push-to-talk over Cellular.
   - Protocols.
2. IP-based Signalling Protocols.
   - Short IP Overview.
   - Access Point Name.
   - GPRS Domain (.gprs).
   - GPRS Roaming Exchange.
   - Session Management.
   - Secondary PDP Context.
   - GPRS Tunnelling Protocol.
   - GTP-C Functions.
   - GTPS Tunnelling Capabilities.
   - GTP Header.
   - QoS in PS Service.

- GTP Tunnel Setup Case.
- GTP'.
- User IP Address Assignment.
- IMS Session with Policy Control.
- Diameter Protocol.
- Gx, Gy, and Gz Interfaces.
- Session Initiation Protocol (SIP).
- Session Description Protocol (SDP).
- SIP Multimedia Session Set-up.
- P-CSCF Discovery.
- IMS Registration.
- IMS Session Setup - MO.
3. SS7 Principles and SCCP.
    - SS7 Protocol Stack.
    - SS7 Key Concepts.
    - SS7 Signalling Modes.
    - Classical and Broadband Transport.
    - MTPL3 Signalling Network.
    - SCCP Basics and Routing.
    - SCCP Functional Structure.
    - SCCP Connection-oriented.
    - SCCP Message Parameters.
    - SCCP Address Component.
    - Global Title Translation - Routing.
    - Connection-less Service.
    - SCCP Examples.
4. SS7 Mobile Services.
    - TCAP.
    - TCAP Structure.
    - TCAP Messages and IEs.
    - TCAP Information Element and Tag.
    - TCAP Message Exchange.
    - Mobile Application Part.
    - MAP—Context and Coding.
    - General MAP Structure.
    - MAP examples—Location Updating.
    - MAP examples—HLR and EIR.
    - MAP examples—Call.
    - MAP examples—Handover.
    - MAP examples—SMS.
    - MAP Messages per Interface.
    - Mobile IN Architecture.
    - IN Services.
    - CAMEL.
    - CAMEL CS examples.
    - PDP Context with CAMEL.

5. SS7 Call and Bearer Control.
   - Call and Bearer Control Protocols.
   - ISDN User Part.
   - ISUP Messages.
   - Bearer Independent Call Control.
   - BICC Serving Node.
   - BICC Features and IEs.
   - H.248/MEGACO Introduction.
   - Media Gateway Connection Model.
   - Command and Parameters.
   - Packages and Profiles.
   - Bearer Control Protocols.
   - Position of ALCAP in UTRAN.
   - Transport for UTRAN Signalling.
   - Short ATM Overview.
   - Q.2630 Architecture.
   - Signalling Transport Converter.
   - Q.2630 Messages.
   - Signalling Association Identifiers.
   - Q.2630 Addressing Parameters.
   - Generic Bearer Setup.
   - Q.2630 example.
6. SS7 Classical Transport.
   - Classical and Broadband Transport.
   - Layered Structure of MTP.
   - MPT 1—Signalling Data Link.
   - High-speed Signalling Link.
   - MTP L2—Signal Unit Types.
   - MTPL2—FLag.
   - Service Information Fields.
   - MTP L2—Status Field.
   - MPTL2—Signalling Link Functions.
   - Error Correction.
   - MTP L3 Functions.
   - MTP3—Routing Labels.
   - MTP L3—Routing Tables.
   - MTP3—Load Sharing.
7. SIGTRAN.
   - Stream Transmission Control Protocol.
   - SCTP Packet.
   - SCTP Chunk.
   - SCTP DATA Chunk.
   - SCTP Association Setup.
   - Selective Acknowledgement.
   - SIGTRAN.
   - M2UA.

- ○ M2PA.
- ○ M3 User Adaptation—M3UA.
- ○ SUA.
8. RAN Signalling.
    - ○ RANAP.
    - ○ RANAP in Mobile Networks.
    - ○ Elementary Procedures.
    - ○ RANAP Messages.
    - ○ RANAP Scenarios.

Course Objectives

This course focuses on the architecture and functions of the protocols used in the different interfaces of a UMTS network. Each protocol is illustrated with example traces.

Prerequisites

None. Basic knowledge of UMTS recommended.

Training Structure

Five-day training divided into logical sessions.

Methodology

Instructor-led training. Theory and signalling trace analysis with WireShark.