EPC, VoLTE Architecture & Signalling Protocols

Who Should Attend?

This course is intended for everyone who requires in-depth understanding of architecture and signalling procedures in the core part of EPS – especially network engineers responsible for network maintenance, troubleshooting, planning and commissioning.
Whether you already have an LTE network, you are getting ready to deploy it, or you are planning to implement VoLTE technology – this training is right for you!

Course Scope

1. EPS Introduction.
   - 3GPP Core Network Evolution.
   - EPC Architecture.
   - Protocols in EPC – overview.
   - Roaming in LTE (conceptual view).
     - Home-routed traffic.
     - Local traffic breakout.
2. Introduction to Voice over LTE Architecture.
   - Circuit Switched Fallback (CSFB).
   - IMS – based.
   - VoIP Over-the-top (OTT).
   - Road towards VoLTE – various deployment strategies.
3. Signalling Protocols in EPC.
   - Overview of key EPC procedures.
     - Network Attachment and Detachment.
     - Tracking Area Update.
     - Service Request.
     - Dedicated Bearer Activation, Modification and Deactivation.
   - NAS protocol & procedures.
   - S1AP protocol & procedures.
   - GTP protocol & procedures.
   - S6a protocol & procedures.
   - [Optional] introduction to Diameter.
4. CSFB. Technical Realisation.
   - SGsAP protocol and procedures.
5. IMS, technical aspects.
   - IMS standardisation.
   - IMS architecture and functional elements.
   - IMS identities.
   - Charging aspects in IMS.
   - IMS interfaces and signalling protocols.
6. [Optional] SIP Fundamentals.
   - SIP components (servers and clients) and their functions.
   - SIP servers: proxy (stateful and stateless), redirect, registrar.

- SIP message structure.
- SIP sessions: session setup, proxying and redirecting requests, address resolution..
- SDP (Session Description Protocol).
- General SIP message flow examples.

7. [Optional] Policy and Charging Architecture.
   - Introduction to content-based charging and policy enforcement.
   - Online and offline charging.
   - PCC architecture.
   - Roaming aspects in PCC enforcement.
   - Gx, Gxx, Rx, Gy Diameter Applications and Procedures.

Course Objectives

The 4-5-day “EPC, VoLTE Architecture and Signalling Protocols” advanced course is focused on explaining how EPS network works and how it is integrated with previous-generation (2G/3G) networks and services. The training starts with an architecture introduction, including possible voice over LTE deployment strategies, followed by a general overview of all key signalling procedures and a detailed explanation of all key protocols in EPC network. Policy and Charging Architecture will also be discussed because of its great importance to IMS operation, especially in the context of mobile-based IMS deployments. Most protocols are illustrated with example traces captured in commercial networks. Practical issues related to testing and troubleshooting will be also discussed.

Prerequisites

Participants should know architecture of mobile networks and have some knowledge about signalling protocols in telecommunication networks.

Training Structure

Four- or five-day (five including optional IMS part) training divided into logical sections. We recommend at least one additional day of workshop with our Expert to gain even more experience in network testing and troubleshooting.

Methodology

Instructor-led training, illustration of real signalling traces.