

LTE EPC Signaling

Course Outline

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Course Description:

The course offers a solid understanding of the main signaling protocols and procedures defined for the Evolved Packet Core network (EPC) introduced in 3GPP Release 8 and Release 9. The course focuses on the various 'S-interfaces' but includes also relevant information pertaining to the Non-Access Stratum protocols (NAS) used between the Mobility Management Entity (MME) and the User Equipment (UE).

The course begins with a high level description of the overall network architecture (nodes, areas, bearer concepts, alternative architectures etc). The signaling protocols are then discussed in detail one by one in a logical scenario-based sequence. Plenty of time is also devoted to central features/functionality such as security, interworking and other procedures.

Target Audience:

The course is targeted at those who need detailed knowledge of the EPC architecture, protocols and signaling scenarios. The course suits both vendors and operator staff. It is specially designed for Packet Core Engineers who work on configuration, O&M, design and development, Core network planning

Delivery Method:

The delivery will be instructor-led classroom training with extensive practical case studies, interactive discussions and Q&A / quiz sessions

Course Material:

The course material will be in the form of Presentation Slides (Hardcopy OR Protected Softcopy)

Pre-requisites:

The course requires general knowledge of legacy 3GPP systems (GPRS/UMTS). Familiarity with basic signaling/call flows is beneficial. IP-Solutions course 'LTE/EPC Technical Overview' (or equivalent) is recommended

Duration:

2 days

Revision:

1.0



Course Outline

Introduction

- Overview of 3GPP releases
- Current status of the LTE/EPC standardization work

EPS Network Architecture

- Legacy architecture and bearer concepts
- EPS nodes and interfaces
- Architecture with Gn-SGSNs (e.g. pre-R8 SGSN)
- Node selection functions
- CP and UP bearers and protocol stacks

NAS Protocols (EMM and ESM)

- Mobility management procedures
- Session management procedures
- NAS states and state transitions
- MME/SGW pool areas
- Authentication and Key Agreement
- Security keys and key derivation functions
- NAS message security
- Network Domain Security (NDS)
- NAS message formats

GPRS Tunneling Protocol (GTP)

- GTP interfaces and versions
- The 'tunnel' concept
- GTP messages (per interface)

DIAMETER Protocol



- DIAMETER interfaces
- Procedures, commands and AVPs
- Baseline protocol and extension applications
- S6a/S6d procedures and HSS data
- Rx/Gx procedures

Interworking & Roaming

- Idle mode signaling reduction (ISR)
- Inter-RAT PS handover scenarios
- Non-3GPP interworking
- CS Fallback and the SGs-interface
- SR-VCC and the Sv-interface
- Roaming interfaces (S8, S9 etc)

Signaling Flows

- Initial Attach and establishment of default bearer
- Dedicated bearer establishment
- Tracking Area Update with MME relocation
- S1-based handover with SGW relocation
- Inter-RAT handover to S4-SGSN



