

EPC Signalling – 3 days

CONTENTS

The course describes the Evolved Packet Core (EPC) as standardized by 3GPP in technical specifications. The course accounts for the network architecture, logical functions (nodes) and signalling protocols in EPC, primarily with E-UTRAN access. Message-level traffic cases (signalling flows) are used throughout the course to illustrate the use of EPC protocols.

The course also accounts for procedures for Mobility Management, Security and Policy and Charging Control, as well as interworking with legacy 3GPP (GERAN/UTRAN) and non-3GPP networks.

PREREQUISITES

General knowledge about the architecture, terminology and modes of operation of the GSM/UMTS Packet Switched Core Network is highly recommended. Basic knowledge of the Internet Protocol (IP) family is useful. For required background IP knowledge, the Apis course TCP/IP in Mobile Networks (or equivalent) is recommended.

EPC Introduction

- 3GPP Core Network evolution
- Nodes and interfaces introduced for the Evolved UTRAN and Evolved Packet Core (EPC)
- Basic Concepts: EPS Bearers, PDN Connections

NAS (Non Access Stratum) Protocols – EMM and ESM

- EPS Mobility Management (EMM) Procedures
- ESM Session Management (ESM) Procedures
- Network Attach and PDN Connection Setup
- Default and Dedicated EPS Bearers

S1AP – the S1 Application Protocol

- The S1-MME Interface
- S1-MME Connections and S1 Connections
- Main S1AP procedures and use cases

GTP – the GPRS Tunnelling Protocol

- GTP-C and GTP-U
- GTP Tunnels and TEIDs
- GTP at Session and Bearer setup
- GTP at UE Mobility scenarios

Mobility in EPS

- Pool concept for MME and SGW
- Idle mode mobility – TA Updates
- Connected mode mobility – PS Handovers
- Context storage in EPS nodes

DNS use in EPS

- General about DNS
- DNS procedures for node selection in EPS
- Selected Traffic Cases – SGW and PGW selection

DIAMETER

- General about Diameter
- Main Diameter procedures in EPS
- Selected Traffic Cases

PCC – Policy and Charging Control

- Purpose of Policy and Charging Control
- The PCRF and PCEF
- AF and SPR
- Service Data Flows (SDFs)
- PCC Rules

Security in EPS

- EPS Authentication and Key Agreement
- User to Network security mechanisms
- EPS usage of IPsec
- Network Domain Security mechanisms

Interworking with GERAN/UTRAN

- Mobility principles between E-UTRAN and GERAN/UTRAN
- Idle mode mobility – RA Updates
- Connected mode mobility – inter-RAT Handover
- CS Domain interworking – CS Fallback SRVCC

Interworking with Non-3GPP IP-access

- Trusted and non-trusted non-3GPP access networks
- Mobility Mechanisms using Mobile IP
- Selected Traffic Cases