IMS for VoLTE – 3 days

CONTENTS

The course provides general knowledge of the architecture, functions and protocols in the IP Multimedia Subsystem (IMS) as defined for VoLTE.

The IMS Architecture is discussed, with the functions of all the nodes analysed from the perspective of the VoLTE requirements. The IMS registration, session setup and SRVCC scenarios are described. QoS, basics of Policy and Charging Control architecture and charging functions of IMS are discussed, as well as the SIP-based service architecture for the voice service.

PREREQUISITES

General knowledge of the telecom networks' architecture, mode of operation and terminology is recommended. LTE/EPS network architecture knowledge is necessary. For background knowledge, we recommend Apis' LTE/EPC System Overview.

IMS Functionalities

- Introduction to IMS architecture
- Transport network functions for IMS subscribers
- IMS subscription: identities and service definitions
- Public and Private User Identities
- User profiles and Filter Criteria
- Roles of core IMS nodes: P-CSCF, I-CSCF, S-CSCF, SLF, HSS/UPSF and AS
- Protocols used in IMS: SIP, SDP, RTP, RTCP and Diameter
- Basics of SIP protocol and principles of SIP routing

IMS Registration

- Registration traffic case: SIP and Diameter
- Roles of different IMS network elements during registration
- Logical links established at IMS Registration
- Overview of IMS security: quintets, authentication and key agreement, IMS access security
- Roaming scenarios: local breakout versus home-routed traffic

IMS Invitation

- Invitation traffic case between two IMS users: SIP and Diameter
- SDP offer/answer model
- Break-out and break-in scenarios to/from Circuit Switched domain: roles of BGCF and MGCF
- Introduction to ENUM in IMS

User Plane Handling

- Separation of Control Plane and User Plane in 3GPP networks
- Roles of optional IMS nodes: IMS-ALG/IMS-AGW, IBCF/TrGW, MRFC/MRFP, ATCF/ATGW
- Protocol used for user plane handling: H.248

Policy and Charging Control

- QoS parameters in EPS and PCC
- IMS control of QoS and charging
- Role of PCRF (Home and Visited), P-CSCF, S-CSCF and SPR for QoS
- Contents of PCC rules
- Role of PCEF in IP-CAN gateways

- Signalling flow for EPS bearer authorization via PCRF
- Basics of Diameter protocol and principles of Diameter routing

Services in IMS

- Service provisioning in IMS
- Service invocation over ISC
- Service examples: Telephony, Presence, Conferencing, Messaging, SRVCC
- Overview of interworking with pre-IMS service platforms

VoLTE: IMS Profile for Voice in LTE/EPS

- History of IMS and VoLTE standardization
- Introduction to EPS bearer concepts
- UE idle mode activities depending on service availability
- VoLTE requirements for APN handling, EPS bearer parameters, LTE attach, IMS registration and IMS session setup
- Role of TAS and SCC AS in service provisioning

VoLTE Network Architecture

- Introduction to SRVCC and 'enhanced SRVCC'
- Roles of SCC AS, ATCF, and ATGW during IMS registration, session invitation, and SRVCC service execution
- Handling of PS bearers in legacy PS networks
- Usage of STN-SR, ATU-STI, and C-MSISDN identifiers