

# IMS Signalling for VoLTE – 4 days

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## CONTENTS

This course presents the VoLTE/SRVCC signalling for the voice service. It is designed for participants that will work with traces from the IMS/VoLTE networks.

The EPS and IMS network architecture and procedures for the voice service in VoLTE solution will be presented, on a level allowing understanding and analyzing SIP and Diameter traces from a VoLTE environment. The course includes the enhanced SRVCC solution with the ATCF/ATGW deployment. A significant part of the time will be devoted to hands-on exercises with Wireshark-based traces, with focus on the messages and parameters for the VoLTE-specific traffic cases.

## PREREQUISITES

Knowledge of the IMS network architecture is assumed, as well as a general understanding of signalling principles in telecom networks. Attending APIS "IMS for VoLTE" course prior to this event, or having the equivalent knowledge, is necessary.

## EXERCISES

This is a theoretical training with practical exercises. The exercises are hands-on and require the participants to have a laptop with the Wireshark analyzer software installed.

### Brief overview of IMS network architecture

- IMS subscription: Service Profile and Filter Criteria
- IMS identities: IMPI, IMPU, GRUU, ICSI
- Roles of basic core IMS nodes: P-CSCF, I-CSCF, S-CSCF, SLF, HSS/UPSF and AS
- IMS breakout: BGCF, MGCF, MGW, ENUM roles
- Roles of IMS nodes for additional user plane handling functions: IMS-ALG/IMS-AGW, IBCF/TrGW, MRFC/MRFP, ATCF/ATGW
- Policy and Charging Control: PCRF, SPR

### SIP and Diameter basics

- SIP addressing and routing functions, SIP and tel URI identifiers, SIP nodes, DNS usage
- SIP as an application layer protocol
- Diameter addressing and routing functions, Diameter Identity, DEA/DRA nodes, DNS usage
- Diameter as an application layer protocol

### Birds-eye view of Voice over LTE profile for IMS (VoLTE)

- Life cycle of a UE in a VoLTE environment: power-up sequence, LTE Attach, PDN Connection Establishment, IMS Registration, Invitation, SRVCC
- Requirements on UE, the LTE and the IMS nodes

### Impact of VoLTE on the network nodes

- VoLTE-specific parameters in HSS
- Identities used for call anchoring and for SRVCC: STN-SR, ATU-STI, C-MSISDN
- Functionalities and usage of TAS and SCC AS

### Access Attach for VoLTE

- VoLTE-specific parameters and settings at LTE Attach and PDN Connection Setup
- APN and QoS recommendations for Default Bearers

## IMS Registration for VoLTE

- IMS Registration: SIP extensions in VoLTE
- ATCF/ATGW inclusion at IMS Registration
- IMS Access Network Security: SIP extensions for AKA and IPsec
- The Registration traffic case with analysis of a trace

## IMS Invitation for VoLTE

- IMS session setup: SIP extensions in VoLTE
- Service handling in IMS: TAS and Supplementary Services handling
- Access Domain Selection for voice call delivery decision: PS vs CS
- IMS QoS handling: SIP extensions for preconditions, Diameter on Gx and Rx for PCRF inclusion
- Session anchoring in ATCF/ATGW
- User Plane manipulation: transcoding, functions at the network border
- The IMS session setup traffic case with analysis of a trace

## Single Radio Voice Call Continuity (SRVCC)

- Functions of network elements involved in SRVCC: ATCF/ATGW, SCC AS, enhanced MSC Server
- SRVCC Access Transfer: SIP extensions at IMS registration and session setup in enhanced SRVCC
- The SRVCC traffic case

## A peek into VoLTE interworking

- Integrating CS domain with IMS: MSC Server enhanced for ICS
- A birds-eye view of the ICS procedures from the GERAN/UTRAN access
- Life cycle of a UE in an ICS environment: power-up sequence, CS Attach, PS Attach and PDP Context Activation, IMS Registration from the MSC, CS call anchored in IMS, rSRVCC
- A short discussion of the VoHSPA and VoWiFi options