

Delivering Voice in LTE-IMS Networks

Instructor Led | Duration: 2 Days

LTE

The LTE Evolved Packet Core (EPC) is an evolution of the 3GPP system architecture with the vision of an all-IP network finally realized. LTE in conjunction with IP Multimedia Subsystem (IMS) delivers various services such as VoIP, SMS, Video call, Picture share, IM and Presence. LTE and IMS support mobility with the existing 2G/3G wireless networks as well as PSTN to facilitate smooth migration, interworking and service continuity across these networks. This course provides a detailed look at the architecture of the LTE EPC, IMS and QoS framework to deliver end-to-end voice and data services in an LTE network. It provides a landscape of various methods for delivering voice in these networks such as VoIP, Single-radio Voice Call Continuity, CS Fallback, etc.

Intended Audience

This course is designed for those involved in deployment and engineering of next generation wireless networks and services based on LTE-EPC and IMS.

Learning Objectives

After completing this course, the student will be able to:

- Describe the role of LTE, EPC and IMS in 4G evolution
- Sketch the EPC architecture and describe the role of various nodes in establishing a data session in LTE for IMS signaling
- Sketch the IMS network architecture and identify the role of key network nodes, interfaces, and related protocols
- Step through the key IMS scenarios of IMS registration and VoIP call
- Explain the role of the PCC network to deliver QoS
- Step through the interactions between LTE-EPC and IMS nodes to establish a VoIP call
- Step through the interworking of IMS with non-IMS networks such as PSTN

Suggested Prerequisites

- Overview of IMS (eLearning)
- LTE SAE Evolved Packet Core (EPC) Overview (eLearning)

Course Outline

1. Emerging Wireless Networks

- 1.1. Role of LTE, EPC and IMS
- 1.2. LTE-EPC network architecture
- 1.3. Network nodes and roles of HSS, MME, S-GW, P-GW, and PCRF
- 1.4. Network interfaces and associated protocols
- 1.5. Supporting Voice in LTE

2. IMS Architecture

- 2.1. IMS network architecture
- 2.2. Role of CSCF, MGCF, MGW, HSS, AS
- 2.3. User addressing in IMS
- 2.4. End-to-end signaling and traffic flow

3. QoS Framework in LTE-EPC

- 3.1. QoS in LTE-EPC
- 3.2. PCC architecture
- 3.3. PCRF, PCEF, and AS
- 3.4. Interfaces: Gx, Rx, Sp

4. Pre-Call IMS Functions for VoIP

- 4.1. PDN connection for IMS APN
- 4.2. Default EPS bearer setup
- 4.3. P-CSCF discovery
- 4.4. IMS registration

5. Voice over LTE (VoLTE)

- 5.1. VoIP call setup in IMS
- 5.2. PCC interactions
- 5.3. Media format considerations
- 5.4. Single Radio Voice Call Continuity (SR-VCC)
- 5.5. Emergency calls

6. Voice in Non-IMS Domain

- 6.1. Circuit Switched Fall Back (CSFB)
- 6.2. Attach in LTE and 2G/3G network
- 6.3. Mobile-originated and mobile-terminated call flows

7. Interworking in IMS

- 7.1. IMS - PSTN interworking
- 7.2. Roaming in IMS
- 7.3. Role of IPX

Appendix:

End-to-end call scenario in LTE/IMS