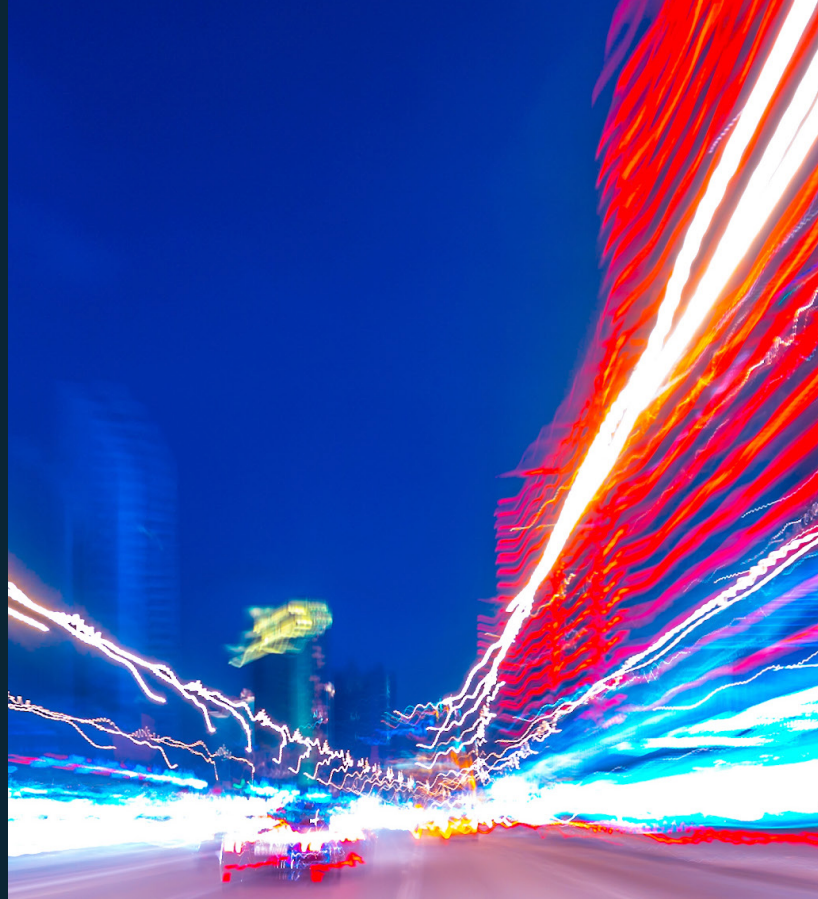




Excellent content of the course and brilliant way to transfer knowledge.



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# VoLTE System Engineering

## Course Description

As IMS based VoLTE becomes the prevalent voice service enabler for 4G, this course will cover the key elements of the end to end operation of a VoLTE network. Topics covered include the VoLTE architecture, with focus on the main technologies required, namely LTE, PCC and IMS. Procedural aspects are also covered, from initial registration, through to call establishment and PSTN interworking. Finally, complimentary technologies such as ICS, SR-VCC and VoWi-Fi will be examined.

**Prerequisites:** LTE System Engineering, IMS and PCC System Engineering, or equivalent knowledge.

**2** days  
(LiveOnsite,  
LiveOnline)

**12** hours  
learning  
(OnlineAnytime)

**12**

CPD Learning  
Credits



Level: 2  
(Intermediate)

**This course will contain the following sections:**

## 1. VoLTE End to End Architecture

**Topic areas covered include:**

- Deploying VoLTE:
  - VoLTE High Level Network Architecture.
  - VoLTE Standardization.
    - GSMA IR.92.
- LTE Access Network.
- IMS Call Control Network:
  - IMS Requirements.
  - IMS Architecture.
    - Control Plane Protocols.
  - Call Session Control Functions.
    - P-CSCF, S-CSCF, I-CSCF, E-CSCF.
  - Additional IMS Network Elements.
    - ATCF, ATGW, HSS and Application Servers (SCC, TAS).
    - Session Border Controllers.
  - IMS Deployment Options.
    - Geographic and Physical Consolidation.
- PCC Architecture:
  - PCRF, PCEF, AF, SPR, Charging Servers.
- End to End VoLTE Architecture.

## 2. VoLTE Foundation Technologies

**Topic areas covered include:**

- VoLTE Protocols:
  - Session Initiation Protocol.
  - SIP User Agents.
  - SIP Protocol Stack.
  - SIP Message Exchange.
  - Routing SIP Messages.

## VoLTE Foundation Technologies (cont.)

- Diameter Base Protocol.
  - Diameter Client and Server.
  - Diameter Agents.
  - Diameter Base Header.
- LTE Key Concepts Associated with VoLTE:
  - EPS Bearers.
  - QoS in LTE.
  - Resources for VoLTE to VoLTE Calls.
- PCC Key Concepts Associated with VoLTE:
  - SDFs and Flow Filters.

## 3. VoLTE Initial Procedures

**Topic areas covered include:**

- IMS Identities:
  - Private User Identities.
  - Public User Identities.
  - USIM Derived Temporary Identities.
  - Public Service Identity.
- IMS Registration Analysis:
  - LTE Network Specifics.
  - IMS Network Specifics.
- IMS Registration Analysis – Initial Registration:
  - Initial Registration Request (UE to P-CSCF).
  - Forwarding the REGISTER (P-CSCF to I-CSCF).
  - S-CSCF Selection.
- IMS Authentication and Key Agreement:
  - Authentication Vector Acquisition.

**12**

**CPD Learning  
Credits**

**ITP**

**ITP accredited  
course**



**LiveOnsite, LiveOnline,  
OnlineAnytime**

- Authentication Challenge.
- Reregistration and Subscriber Profile Acquisition:
  - Second Register.
  - Authentication and Subscriber Profile Acquisition.
- Registration Acceptance:
  - Third Party Registration.
- Registration Event Subscription.
- Service Configuration (Ut Interface).

## 4. VoLTE Call Procedures

### Topic areas covered include:

- High Level SIP Signalling Flow:
  - Understanding the IMS Signalling Flow.
- VoLTE to VoLTE Call Establishment.
- Delivering the SDP Offer:
  - SIP INVITE Composition.
  - Media Anchoring (Calling Party).
  - Application Servers (Calling Party).
  - Routing the SIP Signalling to the Called Party.
  - Application Servers (Called Party).
  - Media Anchoring (Called Party).
- Delivering the SDP Answer:
  - 183 Session Progress.
  - Dedicated Bearer Establishment.
  - Bidirectional Media.
- PRACK, Preconditions and Acceptance:
  - Provisional Response Acknowledgement.
  - Meeting Preconditions.
  - Alerting and Call Acceptance.
  - Session Timers.
- VoLTE Call Termination:
  - Media Path Removal.
  - Dedicated EPS Bearer Deletion.

## 5. VoLTE to Legacy Voice Interworking

### Topic areas covered include:

- Supporting Legacy Voice Through the Migration to VoLTE.

## VoLTE to Legacy Voice Interworking (cont.)

- Focus on the MGCF and IM-MGW:
  - Media Gateway Control Function.
  - IMS Media Gateway.
  - H.248 Protocol.
- E.164 to SIP Mapping (ENUM).
- IMS to PSTN CS Procedures.
- PSTN to IMS CS Procedures.

## 6. ICS and SRVCC

### Topic areas covered include:

- IMS Service Centralization and Continuity.
- IMS Centralized Services:
  - Architectural Requirements.
  - Example Call Establishment (Mobile Originated).
  - Example Call Establishment (Mobile Terminated).
- Single Radio Voice Call Continuity:
  - Basic Concepts.
  - Support for SRVCC.
    - SRVCC Evolution.
- SRVCC with ATCF Enhancements:
  - Registration Procedure Utilizing an ATCF.
  - Access Transfer Procedure Using the ATCF (PS to CS).

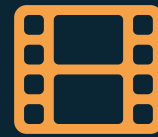
## 7. VoWi-Fi

### Topic areas covered include:

- VoWi-Fi Fundamentals:
  - Driving Factors.
- VoWi-Fi Network Architecture:
  - Untrusted Non-3GPP Access.
- VoWi-Fi Initial Procedures.

## VoWi-Fi (cont.)

- Attaching to the Network:
  - Network Discovery and Selection.
  - Accessing and Joining Wi-Fi.
  - ePDG Selection.
  - Network Attach.
- VoWi-Fi Call Procedures:
  - VoWi-Fi to VoWi-Fi / VoLTE.
  - VoWi-Fi to PSTN.
- Interworking Considerations:
  - Wi-Fi to LTE Handover.
  - LTE to Wi-Fi Handover.



Watch a Sample  
Video Online



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