



## Who Should Attend?

This course is intended for anyone who needs to broaden his/her knowledge about VoIP technology. This 4-day session gives the participants deep understanding and practical knowledge of SIP, and VoIP related protocols.

## Course Scope

1. VoIP Background.
  - VoIP—Benefits and Problems.
  - Circuit-switching vs. Packet-switching for Real-time Services.
  - Voice Service Quality and Measurement Standards (MOS, etc.).
  - Real-time Services in ATM, Frame Relay, and IP Networks (RTP/RTCP).
  - Voice Compression (Linear Prediction, G.72x codecs) and Packetisation.
  - VoIP Signalling Overview (Call Control, Media Negotiations, Mobility Management).
  - VoIP Standards Evolution.
  - H.32x Standards Overview.
  - H.248 Overview.
  - SIP Overview, History, Standard Evolution.
2. SIP Fundamentals.
  - SIP Main Architecture.
  - SIP Components (servers and clients) and Their Functions; SIP User Agents (AU client and server).
  - SIP Servers: Proxy (stateful and stateless), Redirect, and Registrar.
  - SIP Location Servers.
  - SIP Gateways
  - SIP Message Structure.
  - SIP Requests and Response Codes.
  - SIP Supporting IETF Protocols (SAP, SDP).
  - SIP Sessions: Setup, Proxying and Redirecting Requests, Address Resolution, and Media Negotiation via SDP.
  - SIP Security.
  - General SIP Message Flow (examples).
3. Transport Protocols in VoIP Networks.
  - IP4 vs. IP6.
  - RTP and RTCP Protocols.
  - Secured Media Transport—SRTP Protocol.
  - Media Streaming—RTSP Protocol.
4. Aspects of Voice Coding.
  - Basic Information about Speech; Narrowband Coding.
  - Speech Codecs, Basic Facts, and Speech Compression.
  - PCM, ADPCM, and CELP codecs; Key Differentiators for Codecs Used in VoIP.
5. Quality of Service in VoIP.
  - Quality of Voice and Service Expectations.
  - Media quality; Key Facts.



- Speech QoS—Sources of Network Impairments.
  - QoS Measure: MOS, PESQ Model, E Model.
  - QoS Testing Methods.
6. VoIP Usage in Mobile Networks—IMS System.
- Architecture.
  - Call Session Control Function (CSCF).
  - P-CSCF, I-CSCF, S-CSCF.
  - HSS & SLF.
  - SIP—Multimedia Session Set-up.
  - P-CSCF Discovery.
  - IMS Registration.
  - IMS Session Set-up (MO).
  - Authorisation of QoS Resources.
  - IDs of IP Multimedia Flows.
  - SIP Forking.
  - Policy and Charging Control.

## **Course Objectives**

This course teaches the participants the workings of new VoIP technology, the architectures used to offer services based on VoIP, and problems stemming from deploying real-time service in packet networks.

## **Prerequisites**

None. Basic IP knowledge recommended.

## **Training Structure**

Four-day training divided into logical sessions.

## **Methodology**

Instructor-led training.