

# Circuit Core Protocols & Procedures

"Key services, protocols & message flows to support the cellular circuit core"

## Overview

Voice and its related services still form the bedrock of revenue generation for mobile operators; however improvements are being made in how efficiently our networks can transport it. The circuit switched core network has evolved to handle voice and other real-time services better using packet-based technology through a staged migration process.

This course will provide you with the knowledge and skills to effectively understand and administer the circuit core network architecture with extensive analysis of message flows and use of signalling traces. Our hands-on approach of 'learning through doing' will improve your practical skills in areas of high demand in the workplace.

## You Will Learn

- Circuit core operation
- UMTS Release 4 architecture
- SS7 System Architecture
- The benefits of the IP softswitch solution
- The RTP, RTCP and SDP protocols
- Media gateway control
- Transporting telecoms signalling using IP
- Typical signalling scenarios for calls

## Who Can Benefit

Technical managers, consultants, communications professionals, BSS, RAN and NSS system engineers, network planners for 3G

### Introduction

- Overview of GSM & UMTS architecture
- Network evolution from GSM to UMTS & LTE
- Changes from Release 99 to Release 7
- MSC Server & Media Gateway (MGW)
- Gateway MSC Server (GMSC server)
- Circuit core interface architecture
- CS Domain External Interfaces
- IP-based (Release 4) Interfaces
- User identities: IMSI, IMEI, TMSI

### Packet Voice Transmission

- Sampling, Coding, CODECs & PCM
- Compression, comfort noise & activity detection
- The Adaptive Multirate CODEC (AMR)
- Provision of QoS in UMTS & GSM
- Video telephony CODEC
- Packetisation Delay
- Voice over IP (VoIP) & the IP Multimedia Subsystem (IMS)

### SS7 Signalling Framework

- SS7 signalling protocol architecture
- Links and routes
- The Message Transfer layers: MTP1, 2 & 3
- SS7 and mobile networks (GSM & UMTS)

### SS7 Call Control

- ISDN Q.931 protocol
- The ISDN User Part (ISUP)
- Basic call life cycle
- Example user signalling call flows for GSM/UMTS network
- Digit Analysis

### SS7 Support Signalling

- Signalling Connection Control Part (SCCP)
- SCCP services for RANAP & BSSAP
- Transaction Capabilities Application Part (TCAP)
- TCAP Messages
- Mobile Application Part (MAP)
- Mobility management procedures
- Operation of the Home Location Register (HLR)
- Intelligent Network Application Part (INAP)
- CAMEL Application Part (CAP)
- Example signalling scenarios

### Real-Time Transport Protocol (RTP)

- RTP at the Nb interface
- Encryption & redundancy with RTP
- Real Time Control Protocol (RTCP)
- SDES Source Description
- Session Description Protocol (SDP)

### Sigtran Protocol (SS7 over IP)

- Architecture for Signalling Transport
- Applications of SigTran to UMTS
- MTP3 User Adaptation Layer (M3UA)
- Other Adaptation Layers - SUA, IUA, M2UA, M2PA

- Stream Control Transport Protocol (SCTP)

#### *Media Gateway Control & MEGACO/H.248*

- Evolution of Media Control Protocols
- MEGACO/H.248 connection model
- Terminations and Contexts
- Events and Signals
- MEGACO/H.248 commands & transactions
- MEGACO/H.248 packages

#### *Bearer Independent Call Control (BICC)*

- Forward and Backward Bearer Establishment
- BICC Messages and Parameters
- Comparison with ISUP
- Bearer Control Functions & protocols
- BICC IP Bearer Control Protocol (Q.1970)
- Tandem Free and Transcoder Free Operation

#### *Services Architecture*

- Parlay & ParlayX

- Number portability
- IMS support for legacy services
- Charging & billing

#### *Signalling Procedures*

- Key Performance Indicators (KPIs)
- Registration & security process
- Making & receiving a call
- Paging a subscriber
- Video calls
- SMS procedures
- The UMTS USIM card
- Handover procedures & support for Roaming

DURATION	5 days
CLASS SIZE	Max 12 pax