



# 2-DAY SS7 OVER IP AND SIGTRAN HIGH-LEVEL OUTLINE

## 2-DAY SS7 OVER IP AND SIGTRAN HIGH-LEVEL OUTLINE

### COURSE DETAILS

- OVERVIEW
- TRAINING METHOD
- COURSE DETAILS
- WHO SHOULD ATTEND
- PREREQUISITES
- PRESENTER DETAILS

### DAYS 1 AND 2, SS7OIP AND SIGTRAN



## **Course Details**

### **Overview**

This course provides the student with knowledge of SS7oIP architectures as well as a background in next generation telephony architectures. The focus of the course is the SigTran protocols that enable C7/SS7 protocols to be run over IP networks; namely the SCTP, M2UA, M2PA, M3UA, IUA, and SUA protocols. In addition an overview of the ITU BICC protocol will be provided.

The course begins by covering architectural elements including Application Servers, Virtual Switching Elements, Virtual Database Elements, Media Gateways, Media Gateway Controllers, Signalling Gateways, and Routing Keys. How these elements interact to provide signalling in an IP domain is further detailed. After architectural coverage the functions and features the SCTP protocol is provided. The C7/SS7 related SigTran protocols are then individually presented including the functions provided by each protocol layer and seamless C7/SS7 message transmission to an IP domain.

Required background information, technical standards, including network architecture, and call models are detailed.

### **Training Method**

- Lectures
- Paper Based Exercises
- PC Based Exercises

The course is largely lecture based. At the end of each day, delegates will spend approximately 45 minutes completing a tutorial. Additionally 30 minutes a day will be spent decoding SigTran traffic.

### **Course Details**

- Duration: Two Day
- Language: English
- Documentation: English
- Participants: No limitation

### **Who Should Attend**

- Engineers, who are involved in design and testing of services that use SigTran
- Non-engineers requiring a technical appreciation of the SS7oIP
- Engineers who wish to cross-train
- Network architects, designers, planners, product managers, and operational support staff who require an understanding of SS7oIP
- Those interested in the future of telecoms systems

### **Prerequisites**

The course assumes that the delegates have basic familiarity with signalling system #7 (C7/SS7), basic telecommunication and datacommunication concepts.



## Presenter Details

The course will be taken by **Lee Dryburgh**.

### Highlights from his career include:

- Graduated in Computer Science then specialised in **signalling** for nearly a decade, with the main emphasis on the protocol used in 99% of networks - **signalling system #7 (SS7)**.
  - Was a **SS7/C7** software engineer covering virtually every **SS7/C7** layer/applications - **MAP, TCAP, SCCP, INAP, ISUP, MTP, IS-41, BSSAP** and standards **ETSI, ANSI, Bellcore** and **ITU**. For example he wrote the software decode for the **Chinese INAP**. He worked as a software engineer for both the **acceSS7** and **HP3900** platforms.
  - Was a protocol software engineer responsible for a proprietary **telecommunications protocol system** involving communications between transactions terminals out in the field and a central **UNIX** host.
  - Played a leading role in achieving **national SS7/C7 certifications** for a switch and a softswitch produced by a major Internet equipment manufacturer.
  - Performed switch installations as well as post installation **SS7 testing**.
  - Performed **SS7/C7** testing for many variants including **Swedish ISUP, UK ISUP, NUP/IUP** and **Russian ISUP** in addition to the more common **ITU** and **ANSI** protocols.
  - Performed testing against one of the world's most complex **Intelligent Network (IN)** platforms, certifying the **SCCP** and **TCAP** SS7/C7 protocols.
  - Has unique knowledge of **SS7/C7 Security** aspects and provides consulting on **signalling security** issues largely to parties involved in **VoIP** and **3G** implementations.
  - **He is lead-author of the most comprehensive book on SS7/C7 - "SS7/C7 Protocol, Architecture and Services"** and is regularly invited to be a speaker at international seminars.
- Since the **initial 3G rollouts** in 2001 has provided hands on **2/2.5** and **3G** support and later service additions as well as **3GPP** lead architecture changes. Such support has included **SS7, SIP, H.323, CODECs/transcoding** and **softswitch** management.
- Has been working in **Next-Generation Network (NGN)** environments since **first rollouts** in 2004.
  - Wrote and performed **SS7 to SIP interworking** tests.
  - Dealt with signalling issues such as **SIP/H.323/SS7 interworking** for PSTN calls.
  - Tested **3G services** such as video calling and location based services which require such **signalling interworking**.
  - Managed **softswitches** and **media gateways** since 2004.
  - Played a leading role in **BICC/ISUP/SIP interworking** verification for a **softswitch** produced by a major telecoms equipment vendor.
  - He is currently authoring another book on **next generation** signalling systems including **NGN protocol interworking with SS7/C7**.
- **Has spent 7+ years delivering signalling related training on an international basis**. He currently provides training in **SS7, C7, INAP, CAMEL, MAP (GSM and ANSI-41), SIGTRAN (M3UA, M2UA, SUA, M2PA), H.323, SIP, P2P SIP, NGNs** as well as issues related to the **future of telephony**.
- He is working on an Engineering Doctorate in conjunction with the University College of London (UCL) mapping out the **future of telephony** and trying to **foresee killer applications and required protocols**.
- He is a member of The Institution of British Telecommunications Engineers (IBTE), The Professional Contractors Group (PCG), The Federation of Telecommunications Engineers of the European Community (FITCE), The British Computer Society (BCS), The Institution of Electrical Engineers (IEE) and The Institute of Electronic and Electrical Engineers (IEEE).

## ***DAYS 1 AND 2, SS7oIP and SigTran***

- Next-Generation Architectures
  - Media Gateway (MG)
  - Media Gateway Controller (MGC)
  - Signaling Gateway (SG)
- History of SigTran
- Benefits of SigTran
- Stream Transmission Control Protocol (SCTP)
  - Need for new IP protocol
  - Applications
  - Head-of-line Blocking
  - Failure Detection
  - Multi-homing and Failure Recovery
- Architecture
  - Components
    - Signalling Gateway (SG)
    - Signalling Gateway Process (SGP)
    - Application Service Process (ASP)
    - IP Signalling Point (IPSP)
    - Application Server (AS)
  - Routing
    - Interface Identifiers
    - Routing Contexts
    - Network Appearances
- User Adaptation (UA) Layers
  - UA Terminology
  - MTP Level 2 User Adaptation (M2UA)
  - MTP Level 3 User Adaptation (M3UA)
  - SCCP User Adaptation (SUA)
  - MTP Level 2 Peer Adaptation (M2PA)
  - ISDN User Adaptation (IUA)
  - DPNSS/DASS2 User Adaptation (DUA)
  - V5.2 User Adaptation (VUA)
  - Routing Keys and Interface Identifiers
- MTP Level 2 User Adaptation (M2UA)
  - Messages and Formats
    - Management Messages
    - ASPSM and ASPTM Messages
    - IIM Messages
    - SS7 Variant Specifics
    - Message Flow Examples
- MTP Level 3 User Adaptation (M3UA)
  - Messages and Formats
    - Message Header
    - Tag, Length and Value Format
    - Transfer Messages
    - Signalling Network Management Messages
  - Routing Contexts and Network Appearances
  - Example Registration/Deregistration
  - Example Activation/Deactivation
  - ASPSM and ASPTM messages
  - Management (MGMT) Messages
  - RKM messages



- Variant Specifics
- Message Flow Example
- Application Examples
- SCCP User Adaptation (SUA)
  - Messages and Formats
    - Connectionless Messages
    - Connection-Oriented Messages
    - Management Messages
    - ASPSM and ASPTM Messages
    - RKM Messages
    - Message Flow Example
- MTP Level 2 Peer Adaptation (M2PA)
  - Messages and Formats
    - User Data
    - Link Status
  - Example Signalling Link Setup
  - Message Sequence Example
  - Application Examples
- M2PA and M2UA Comparison
- M2PA Differences from Other UAs
- ISDN User Adaptation (IUA)
- Transport Adaptation Layer Interface (TALI)
- SS7 and SIP / H.323 Interworking
- Bearer Independent Call Control Protocol (BICC)
  - CS-1
  - CS-2
  - CS-3