

SS7oIP and SigTran Training

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

COURSE INFO

- # Duration: **Two Days**
- # Language: English
- # Documentation: English
- # Participants: Generally class of five on a public course

WHO SHOULD ATTEND

- # Engineers who are involved in design and testing of services that use SigTran
- # Non-engineers requiring a technical appreciation of 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.**

CONTACT

Lee S Dryburgh

Lead author of **Signalling System No. 7 (SS7/C7): Protocol, Architecture, and Services.**

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LEARNING OUTCOMES

- # Knowledge of C7/SS7 Architecture Including Signaling Points and Links
- # Ability to Define Signal Unit Structure
- # Knowledge of what Function MTP Performs
- # Knowledge of what Function the User Parts for Fixed Line Perform
- # Ability to Explain ISUP Message Format and Describe Basic Messages
- # Knowledge of what Function SCCP Performs Including SCCP Classes
- # Knowledge of what Function TCAP Performs
- # Knowledge of what an IN is and what the Associated Standards are

PRESENTER DETAILS

The course is delivered by **Lee S Dryburgh**, lead author of **Signalling System No. 7 (SS7/C7): Protocol, Architecture, and Services**.

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.
- # 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).

COURSE CONTENTS

DAY 1 ARCHITECTURES AND PROTOCOL OVERVIEWS DAY 2 PROTOCOL DETAILS

DAY 1 ARCHITECTURES AND PROTOCOL OVERVIEWS

- # 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

- RKM Messages
- Message Flow Example

DAY 2 PROTOCOL DETAILS

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

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