



1-DAY SS7/C7 GENERAL OVERVIEW

Course Details

1-DAY SS7/C7 GENERAL OVERVIEW V2.3

COURSE DETAILS

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Course Details

Overview

Signalling System #7 (SS7) (AKA C7 outside N.America) is the predominant signalling system for the public switched telephone network (PSTN) and also Public Land Mobile Networks (PLMNs). New packet networks for voice telephony also typically rely on SS7 for signalling. SS7 defines the procedures for setting-up, managing and clearing down calls between users, as well as non-circuit related signaling. For example it is used to provide Local Number Portability (LNP) as mandated by the FCC, Call Management Database Services (CMSDB) such as 800,900, and 500 services (0500,0800,0898 Etc within the UK), and Line Information Database Services (LIDB) such as calling card services. The SS7 protocol is also a key component in providing Advanced Intelligent Networks (AINs) as defined by Bellcore and Intelligent Networks as defined by ITU-T.

This is an introductory course.

Training Method

- Lectures
- Exercises
- Demonstrations

Course Details

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

Course Location

- The course is normally held at your premises or choice of location, although a schedule will be drawn up in the next two months detailing a public venue.

Who Should Attend

- Technical development and support professionals involved in the support and implementation of networks and services who wish to have a general appreciation of SS7 concepts and terminology.
- Planners and developers of packet based carrier grade networks and services that wish to have a basic grasp of the purpose of SS7 and associated terminology.

Prerequisites

The course has no prerequisites, although a good technical understanding of voice networks and associated technology would be beneficial.

Learning Outcomes

- Knowledge of C7/SS7 Architecture Including Signalling Points and Links
- Ability to Define Signal Unit Structure
- Knowledge of what Function MTP Performs
- Knowledge of what Function the Fixed Line User Parts 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
- Knowledge of what the Wireless User Parts are and their functions



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).



Course Contents

What is Signalling?

- What is Signalling?
- What is the Purpose of Signalling?
- Where does C7/SS7 Signalling Take Place?

C7/SS7 Network Elements

- The Three Types of Signalling Point (SP) Explained
- Links and Linksets Explained
- The N.American SS7 Network Architecture Shown
- The UK C7 Network Architecture Shown

C7/SS7 Overview

- The C7/SS7 Protocol Stack compared with the OSI Model Shown
- C7/SS7 Functionality Overviewed
- Requirements of C7/SS7 Signalling
- Advantages of C7/SS7 Signalling
- Associated Mode
- Quasi-Associated Mode
- Who are the C7 and SS7 Protocol Standards Bodies?

Message Transfer Part 3 (MTP 1)

- MTP1 Overviewed

Message Transfer Part 3 (MTP 2)

- MTP 2 Overviewed
- Signal Units and the Three Types Explained
- SU Layers of Operation Shown
- MTP 2 Overhead Shown
- SU Delimitation Described
- SU Error Detection/Correction Explained
- Basic Error Correction Method Shown
- Link Error Monitoring Described
- Link Initial Alignment Shown

Message Transfer Part 3 (MTP 3)

- Functions of MTP 3 Described?
- MTP 3 Overhead Shown
- Signalling Information Field (SIF) for MTP 3 MSUs Shown
- Contents of Service Information Octet (SIO) Explained
- Service Information Octet (SIO)- SubService Field (SSF) Shown
- Service Information Octet (SIO)- Service Indicator (SI) Shown
- The ITU Routing Label Described and Shown
- The ANSI Routing Label Described and Shown
- The UK Routing Label Described and Shown
- International/National SS7/C7 Networks Hierarchy Explained
- Relationship between L1,L2 and L3 Shown
- Signalling Network Management (SNM) Overviewed
- Signalling Message Handling (SMH) Overviewed
- MTP Summarised



Fixed Line User Parts

- User Parts Described
- TUP Overviewed
- NUP/IUP Explained
- Two NUP Call Sequences Shown
- N-ISDN User Part (N-ISUP) Overviewed
- Signalling Information Field (SIF) for N-ISUP MSU Shown
- N-ISUP Evolution Explained
- N-ISUP Variants Discussed
- N-ISUP Message Groups Shown
- Five N-ISUP Messages Explained/Shown
- Two Call Sequences Shown
- Supplementary Services Described

Signalling Connection Control Part (SCCP)

- Signalling Connection Control Part Overviewed
- Two Categories of Service and Four Protocol Classes Described
- Connection Orientated Procedures – Example
- Connectionless Procedure – Example

Intelligent Networks (INs)

- Intelligent Networks (INs) Described
- IN Standards Described

Transaction Capabilities Application Part (TCAP)

- Transaction Capabilities Application Part (TCAP) Overviewed
- TCAP Definitions Detailed
- Components/Transactions Described
- The Transaction Capabilities (TC) Described

Wireless Application Parts

- MAP Described
- BSSAP Described
- BSSMAP Described
- DTAP Described

C7/SS7 Protocol Standards and Recommendations

- C7 Protocol Standards - Europe/Britain Detailed
- SS7 Protocol Standards - Europe/N.America Detailed

Appendices

- Appendix A – SS7/C7 Further
- Appendix B – Further Reading