



2-DAY NGN SIGNALLING: SIGTRAN, SIP, H.323 AND BICC

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DAY 1 – NGN INTRODUCTION, SIGTRAN AND SIP OVERVIEW

DAY 2 – H.323 AND BICC OVERVIEW, RELATED WORK, SUMMARY



Course Details

Overview

This course is aimed at providing the student with a detailed overview of the control (signalling) protocols emerging in Next Generation Network (NGN) architectures including interworking both within and outwith NGNs.

For over two decades telecommunication networks have been adopting Signalling System #7 (SS7/C7) for the exchange of control information (signalling) between network entities. The ubiquitous deployment of SS7/C7 will become something of the past as control protocols suited for NGN packet based telecommunications are rolled out eating into former SS7/C7 space.

NGNs introduce greater technical complexity including more protocols. Many of the protocols are complimentary in nature, whereas others are directory competitive. In terms of NGN signalling protocols, the protocols may be used in various complimentary configurations, but in other scenarios the protocols compete with each for dominance. The course aims at arming the student with the knowledge of what protocol may be used where, how and why, along with some protocol specifics.

It is critical that those involved with telecommunications understand the revolution taking place. For those involved in telecommunications on a deeper level it is critical to understand the emerging NGN protocols; their purpose, pros and cons, associated architectures, background, future deployment and interworking scenarios.

The course provides an overview of the packet based signalling protocols: SIGnaling TRANsport (SIGTRAN), H.323, Session Initiation Protocol (SIP), and Bearer Independent Call Control protocol (BICC). The overviews are provided in an integrated way so that students should understand how the protocols relate to each other, how they may work together, protocols specifics, service possibilities and interworking methods both between themselves, the current PSTN and their use within third generation (3G) cellular networks.

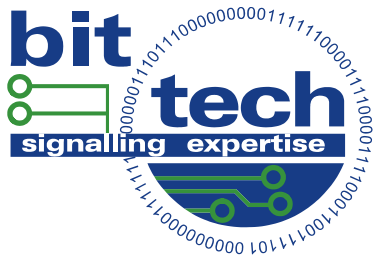
Training Method

- 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 NGN products and services
- Non-engineers requiring a technical appreciation of NGN protocols
- Engineers who wish to cross-train to meet the challenges of the revolution taking place in telecommunications
- Network architects, designers, planners, product managers, and operational support staff who require an understanding of next generation networks
- Those interested in the telecommunication and datacommunications convergence

Prerequisites

The course assumes that the delegates have familiarity with 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).

Day 1 – NGN Introduction, SIGTRAN and SIP Overview

- Introduction to Signalling and Signalling History
- Next-Generation Networks
 - Definition and Purpose
 - NGN Architecture
 - Media Gateway (MG)
 - Media Gateway Controller (MGC)
 - Signalling Gateway (SG)
- SigTran Overview
 - History and Purpose
 - Stream Transmission Control Protocol (SCTP)
 - 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)
 - M2PA and M2UA Comparison
 - M2PA Differences from Other UAs
 - Example Sequences
- SIP Overview
 - History and Purpose
 - Architecture
 - User Agent Server (UAS)
 - User Agent Client (UAC)
 - Redirect Sever
 - Proxy Server
 - Registrar Server
 - SIP Messages
 - General/Entity Headers
 - Requests
 - Request Headers
 - Responses
 - Response Headers
 - Addressing
 - Example Sequence – no proxy
 - Example Sequence – with proxy
 - RTP Basics
 - SDP Basics
 - SIP-ISUP/BICC Interworking
 - Testing
 - Examples



- Firewall and NAT Traversal
- Authentication and Authorization
- Logging
- Billing Issues
- Loading Balancing
- Forking
- Third Party Call Control
- SIP in UMTS
 - 3GPP Release 5 Architecture
- SIP-T

Day 2 – H.323 and BICC Overview, Related Work, Summary

- H.323 Overview
 - History and Purpose
 - Timeline
 - Revision 1
 - Revision 2
 - Revision 3
 - Revision 4
 - Revision 5
 - Architecture
 - Endpoint
 - Gatekeeper (GK)
 - Multipoint Conference Unit (MCU)
 - Example Scenarios
 - Protocol Stack
 - H.225.0 RAS
 - RAS Messages
 - Main RAS Message Fields
 - Example – GK Routed RAS Call
 - H.225.0 Call Signalling
 - Q.931 Messages
 - Q.932 Messages
 - Example – Call Setup
 - H.245
 - Message Types
 - Terminal Capabilities
 - H.235
 - H.450.x
 - Direct H.323 Call
 - Gatekeeper Administration
 - Inter Gatekeeper Communication
 - ISUP Tunnelling
- BICC Overview
 - History and Purpose
 - Documentation Structure
 - Architecture
 - Call Node Types
 - Functional Entities
 - Interfaces
 - Protocol Stack
 - UMTS-GSM Interworking
 - Capability Set (CS) 1
 - Capability Set (CS) 2
 - Capability Set (CS) 3
 - Capability Set (CS) 4
 - Example Message Flows
- Related Groups of Interest
 - SIMPLE
 - IPTEL
 - SIPING
 - SPIRITS
 - PINT
 - ENUM



- TIPHON
- TISPAN
- OSA and PARLAY
- Course Summary
 - Pros and Cons of Each Protocol
 - The Road Ahead