



Very good training. Managed to explain the complexity in a very good and understandable manner.



Watch our course intro video.

SS7 and Sigtran

Course Description

Originally designed for TDM based transport, SS7 is the foundation of signalling within PSTN and PLMN networks. This course will catalogue the operation of SS7, both from an architectural and procedural perspective. Key focus will be placed on the operation of the MTP lower layers, as well as analysis of SCCP and ISUP. In addition, this course will also focus on the transport of SS7 across IP based transport networks. As part of this, the Sigtran User Adaptation layers will be examined, as well as the operation of SCTP.

This course has no prerequisites.

2

Days
(LiveOnsite, LiveOnline)

12

CPD Learning
Credits



Level: 2
(Intermediate)

This course will contain the following sections:

1. SS7 and Sigtran Introduction

Topic areas covered include:

- Requirements for SS7 and Sigtran in modern networks.
- SS7 Network Architecture - Signalling Points, SPC, STP, SLS, SRS.
- SS7 Protocol Stack - MTP 1, 2 and 3, SCCP, SS7 Applications.
- SS7 Standards.
- Sigtran Transport Architecture.
- Sigtran Protocol Stack - IP, SCTP, User Adaptation.
- Application Servers and ASPs.

2. Message Transfer Parts Levels 1 and 2

Topic areas covered include:

- MTP1 Characteristics and Physical Formatting.
- MTP2 Signalling Units - MSU, LSSU, FISU.
- Link Establishment Procedures.
- Link Reliability Mechanisms - Preventive Cyclic Retransmission.

Activity: Where appropriate, network traces and associated exercises will feature throughout the section to enhance understanding.

3. Message Transfer Part Level 3

Topic areas covered include:

- MTP3 SNM and SMH.
- Routing Label Composition.
- Signalling Message Handling - Discrimination, Distribution and Routing.
- MTP3 Primitives - Transfer, Pause, Resume, Status.
- Signalling Network Management - header format and functionality.
- Signalling Traffic Management - signalling link and route management, changeovers, changeback etc.

Activity: Where appropriate, network traces and associated exercises will feature throughout the section to enhance understanding.

4. NUP and ISUP

Topic areas covered include:

- ENUP Messages - key headers and fields.
- Call Establishment using NUP.
- NUP Supplementary Services.
- ISUP Messages - key headers and fields.
- Call Establishment using ISUP.
- ISUP End to End Signalling.

Activity: Where appropriate, network traces and associated exercises will feature throughout the section to enhance understanding.

12

**CPD Learning
Credits**

ITP

**ITP accredited
course**



**LiveOnsite,
LiveOnline**

5. SCCP and SCCP Applications

Topic areas covered include:

- SCCP Architecture.
- Connectionless Control - Class 0 and 1, UDT, XUDT, LUDT.
- Connection Orientated Control - Class 2 and 3, CR and CC, SLR, DLR.
- SCCP Routing and Global Titles.
- SCCP Message Formats and Types.
- SCCP Management.
- TCAP Operation - Transaction and Component Sublayers.

Activity: Where appropriate, network traces and associated exercises will feature throughout the section to enhance understanding.

6. Stream Control Transmission Protocol

Topic areas covered include:

- Drivers for SCTP Development - limitations of TCP.
- SCTP Architecture - Associations, Endpoints, Streams, Chunks.
- SCTP Association Establishment - INIT, INIT-ACK, COOKIE-ECHO, COOKIE-ACK.
- SCTP Data Transmission and Acknowledgement - TSN, SSN, SID, SACK.
- Congestion Control and Load Balancing - Slow Start, Congestion Avoidance, Fast Retransmit.

Activity: Where appropriate, network traces and associated exercises will feature throughout the section to enhance understanding.

7. MTP3 User Adaptation Layer

Topic areas covered include:

- M3UA Protocol Architecture.
- M3UA Deployment Options.
- Routing Keys and Routing Contexts.
- Layer Management Functions.
- M3UA Header Format.

MTP3 User Adaptation Layer (cont.)

- Procedures - ASP Establishment, Data Transfer, Signalling Network Management.

Activity: Where appropriate, network traces and associated exercises will feature throughout the section to enhance understanding.

8. M2UA and M2PA

Topic areas covered include:

- M2UA Protocol Architecture.
- M2UA Interface Identifiers.
- M2UA Operation - border primitives, messages and message formats.
- MTP2 User Data Transfer and Support for SNM.
- Services Offered by M2PA.
- M2PA Message Format and Procedures - link setup, data message transfer.

Activity: Where appropriate, network traces and associated exercises will feature throughout the section to enhance understanding.

9. SUA and IUA

Topic areas covered include:

- SUA Architecture and Deployment.
- Routing Keys and Routing Contexts.
- SUA Management and Data Transfer Messages.
- IUA and Q.931 Architecture.
- IUA Procedures - address mapping, message formats, Q.931 message mapping.

Activity: Where appropriate, network traces and associated exercises will feature throughout the section to enhance understanding.

10. IP Network Security

Topic areas covered include:

- Confidentiality, Integrity and Authentication of Signalling Messages.
- Techniques used to provide CIA - encryption, hashing, digital signatures and certificates.
- Protecting Sigtran with IPSec.
- IPSec- AH and ESP.
- Sigtran and TLS (Transport Layer Security).



ENTERPRISE

Need to train a large group?

mpirical.com/enterprise



TEAM

Training for a team?

mpirical.com/team-training



INDIVIDUAL

Looking for yourself?

mpirical.com/individual-training

NetX

The Mpirical Network Visualisation Solution: **NetX Bringing Telecoms to Life!**
Imagine the benefits of having an entire mobile network available from your desktop.

- Where you can view a complete network map.
- Watch call flows across the network.
- Investigate network procedures.

NetX does this... and even more with our NetX customization options!
NetX is not just a learning aid, it is a valuable resource in the day to day activities of any telecoms professional and has been spotlighted as such by the 3GPP.

Explore NetX further at www.mpirical.com/netx



+44(0)1524 844669



enquiries@mpirical.com

www.mpirical.com