Course ID	Course Title
SS7C7	**SS7/C7 Protocols and System Operation**
Course Duration	
3 days	

Related Courses

- SS7/C7: A Technology Overview (SS7C7-O, 2 days)

Aimed At

This course is aimed at the telecommunications engineers and engineering managers involved in the design, testing and operation of switched voice and data networks.

Group Size

5-25

Prerequisites

Those intending to take this course should have an understanding of the telecommunications systems in general and packet switched networks in particular.

Course In a Nutshell

SS7/C7 is a system used to implement signaling and protocols for telecommunications networks. Signaling System No. 7 is commonly known in North America as SS7 and elsewhere throughout the world as C7. SS7 supports both fixed-line and cellular networks. In recent years, expanded telecommunications services have resulted in the introduction of additional SS7 protocols and functionality.

The course presents the basic SS7/C7 concepts on the first day. The more complex features of SS7 level 4 protocols are covered on day two. Day three covers the newer and more advanced services including Advanced Intelligent Network (AIN) and Transaction Capabilities Applications Part (TCAP) message structures and architecture.

In this course, you will learn the history of signaling and the progression of the technology through both in-band signaling and out-of-band signaling protocols. The course explains the fundamental differences between the SS7 ITU-T and ANSI standards as well as the connection and connectionless signaling services. You will discover how SS7 supports cellular services such as subscriber roaming and packet-switched data services.

The course begins with several topics which explain the purpose of lower level signaling protocols MTP1, 2, and 3 including error control and network performance monitoring. Day three introduces the more advanced signaling and database query functions performed in compliance with AIN and non-circuit related transactions.

Customize It!

Customize this course to your specific needs at little-to-no additional cost. We offer distinct versions tailored for:
- Network design and optimization engineers
- Equipment or application designers
- Less technical audiences such as managers, executives, business planners,

sales and marketing specialists, and operations and support personnel

We can also tailor the course to cover particular applications or aspects of the SS7/C7 technology.

Learn How To

- Troubleshoot SS7 network problems.
- Monitor and evaluate SS7 network performance.
- Compare the SS7 North American ASCII standards and ITU international standards.
- Plan the integration and testing of new SS7 applications.
- Design new mobile network applications and services.

Course Outline

- Session 1: Signaling Overview

  o History of Telecommunications Signaling
  o Network Signaling Evolution
  o What is Signaling?
  o What is Out-of-Band Signaling?
  o A Summary of the Signaling Network Architecture
  o Network Signaling Evolution
  o The North American Signaling Architecture
  o Signaling System No 7
  o Overview of SS7, IN, AIN, Wireless, and VoIP
  o Standards Organizations

- Session 2: SS7 Network Architecture

  o Service Switching Points (SSPs)
  o Signal Transfer Points (STPs
  o Service Control Points (SCPs)
  o Intelligent Peripherals (IPs)
  o Service Nodes (SNs)
  o Service Management and Creation

- Session 3: SS7 Signal Data Links

  o Access Link (A)
  o Bridge Link (B)
  o Cross Link (C)
  o Diagonal Link (D)
  o Extended Link (E)
  o Fully Associated Link (F)

- Session 4: SS7 Applications

  o Advanced Intelligent Networks (AIN)
  o Basic Call Setup Example
  o Database Query Example
  o Layers of the SS7 Protocol
  o What Goes over the Signaling Link?

- o Addressing in the SS7 Network
- o Signal Unit Structure
- o What Are the Functions of the Different Signaling Units?
- o Message Signal Unit Structure
- o Local Number Portability (LNP)
- o SS7 and Database Connection
- o Wireless Applications
- o OSS Interconnection: E911/911, LIDB, OS/DA

- Session 5: SS7 Layers
  - o Physical Layer
  - o Message Transfer Part (MTP) - Level 2
  - o Message Transfer Part (MTP) - Level 3
  - o Signaling Connection Control Part (SCCP)
  - o ISDN User Part (ISUP)
  - o Transaction Capabilities Application Part (TCAP)
  - o Operations, Maintenance, and Administration Part (OMAP)

- Session 6: Network Service Part (NSP) of SS7
  - o Message Transfer Part (MTP)
  - o Data Link Level Signaling
  - o SS7 Signaling Units
  - o Signaling Network Function Level
  - o Signaling Information
  - o SS7 Signaling Message Types
  - o SS7 Network Node Identification
  - o SS7 Network Management Message Types
  - o Link and Route Management
  - o Traffic Management
  - o Signaling Connection Control Part (SCCP)
  - o Routing and Discrimination
  - o Global Title Routing
  - o Subsystem Management

- Session 7: User Part of SS7
  - o Transaction Capabilities Application Part (TCAP)
  - o Operation, Maintenance, and Administration Part (OMAP)
  - o ISDN User Part (ISUP)

- Session 8: Message Transfer Part (MTP)
  - o MTP Levels 1, 2, and 3
  - o Message Routing
  - o MTP Level One
  - o Structure of MTP Level Two
  - o Basic Error Control Method
  - o CRC
  - o Link Status Signal Unit (LSSU)
  - o Signal Unit Alignment Procedure
  - o Structure of MTP Level Three

- o Message Handling
- o Normal Routing Procedure
- o Signaling Network Management
- o Network Maintenance
- o Network and Link Management

- Session 9: ISDN User Part (ISUP) Advanced Concepts

  - o ISUP Services
  - o Call Setup and Teardown
  - o Connection Control
  - o Messages and Formats
  - o Interworking with ISDN Q.931

- Session 10: Signaling Connection Control Part (SCCP)

  - o Enhancements to MTP Routing
  - o Flow Control
  - o Connection-Oriented and Connectionless Services
  - o Global Title Translation
  - o SCCP Management
  - o SCCP Management Structure
  - o Message Types
  - o Task of SCCP Messages
  - o Parameters of SCCP Messages
  - o The Principle of a SCCP Connection

- Session 11: Transaction Capabilities Application Part (TCAP)

  - o Component and Transaction Portions
  - o ASP Services
  - o TCAP Message Structure
  - o Connectionless TCAP
  - o TCAP Parameters

- Session 12: Wireless Network Overview

  - o Elements in a Mobile Network
  - o Mobile Switching Center (MSC)
  - o Base Station Controller (BSC)
  - o Base Transceiver Station (BTS)
  - o Home Location Register (HLR)
  - o Visitor Location Register (VLR)
  - o Short Message Service Center (SMSC) ANSI-41 and Mobile Application Part (MAP)
  - o GSM, CDMA and SS7

- Session 13: SS7 Enabling Products

  - o SS7 Enabling Product Overview
  - o SS7 STACKS
  - o Source Code
  - o Binary Stacks
  - o SS7 Boards

- o SS7 Platforms

- Session 14: SS7 Equipments
    - o Service Switching Points (SSP) and Mobile Switching Center (MSC)
    - o SS7 Connectivity Software
    - o Signaling Transfer Points (STP)
    - o Service Control Points (SCP)/Adjunct Processors (AP)
    - o Intelligent Peripherals (IP)/Service Nodes (SN)
    - o Home Location Registers (HLR)/Visitor Location Registers (VLR)
    - o Short Message Service Centers (SMSC)
    - o Voice over IP (VoIP) Gateways

How You Will Learn

- An experienced instructor will present this course in an interactive lecture format with frequent pauses to summarize key points and invite questions.
- If you already know something about the technology, we will build on that. We'll compare and contrast what's familiar with what's new, making new ideas easier to learn as well as more relevant.
- If your background is less technical, we will use meaningful and ingenious examples and analogies to simplify the complex subject matter.
- The participant handbooks will provide you with a structure to which you can add the information and insight provided in real-time, turning it into a valuable reference resource you can take back to your job.

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