Course ID
SONET-SDH
Course Duration
2 days

Course Title
SONET/SDH Technology & Design

Related Courses

- SONET/SDH – Advanced (SONETADV, 4 days)
- DWDM – Introduction (DWDM101, 2 days)
- DWDM – Advanced (DWDM, 2-3 days)
- Optical Networking for Managers (OPTNET, 2-3 days)

Group Size

5-25

Prerequisites

Some prior exposure to telecommunications networks will be helpful.

Course in a Nutshell

Optical networks are a key component of the global telecommunications infrastructure. Synchronous Optical Network (SONET) and Synchronous Digital Hierarchy (SDH) have become the worldwide standard for the interface and multiplexing of user information to optical networks. SONET/SDH systems allow much greater network flexibility and management over existing optical systems.

In this course, you will learn both the technology and applications of SONET/SDH. We will review the SONET/SDH system components as well as the end-to-end SONET/SDH network design process. We will also discuss the essentials of SONET/SDH synchronization, control, network management, and practical deployment issues. In short, this course will give you the knowledge and skills needed to understand and deploy this important technology.

Customize It!

We can tailor the content and tech-level of this course to the intended audience, e.g., transmission or network engineers, optical system installers, managers, marketing or sales personnel. Also, if desired, the course can be extended by a day to include a review/overview of modern telecommunications as related to SONET/SDH and optical networking.

Learn How To

- Understand the conceptual and theoretical underpinnings of this field
- Define the important SONET/SDH terms
- Identify applications of SONET/SDH

- Describe the detailed workings of SONET/SDH
- Name the key components of SONET/SDH systems and describe how they fit together
- Design a SONET/SDH system
- Describe the limitations of the SONET/SDH technology
- List the objectives and characteristics of the next generation SONET/SDH systems
- Describe the vision and structure of the Next Generation Network (NGN) project as it affects SONET/SDH

Course Outline

- SONET Technology and Terminology
  - SONET digital hierarchy
  - Comparison with the Plesiochronous Digital Hierarchy (PDH)
  - SONET equipment types
  - STS-1 frame format
- SONET Headers
  - Section Overhead (SOH)
  - Line Overhead (LOH)
  - Path Overhead (POH)
  - Floating payload: SONET pointers
  - Synchronization and accommodating jitter
- Virtual Tributaries (Containers)
  - VT groups
  - Virtual tributaries pointers
  - SONET VT multiframe
  - SONET mapping of asynchronous DS-1, byte-synchronous DS-1, asynchronous DS-3, and asynchronous DS-4
- STS-N Frame Format
  - STS-N frame structure
  - Concatenated STS-Nc frame format
  - STS-Nc frame structure.
- SDH versus SONET
  - SONET vs SDH frame structure
  - STM-1 frame
  - Overhead bytes and their function
  - SDH layers
  - Mapping in SDH: C4 mapping and C-3 mapping examples
  - Hierarchical multiplexing structure

- SONET/SDH Networking
  - Network survivability architectures
  - Protection topologies: Linear
  - Protection topologies: Ring
  - protection topologies: Mesh
  - Topologies: Rings, # fibers, directionality
  - SONET: Automatic Protection Switching (APS)
  - SONET linear APS
  - Add-Drop Multiplexing (ADM)
  - Digital Cross-Connects (DCC)
- Current Architectures: Ring Protection
  - Unidirectional Path Switched Ring (UPSR)
  - Bidirectional Line Switched Ring (BLSR/2)
  - Bi-directional Line Switched Ring (BLSR/4)
  - Mesh restoration versus ring/linear protection
- IP over SONET
  - IP+SONET vs. IP+ATM+SONET
  - IP over Optical Networks (IPO)
  - Packets over SONET (POS)
  - Point-to-Point Protocol (PPP) - RFC1661
- SONET/SDH Limitations
- Next Generation SONET/SDH
  - Virtual Concatenation: VCAT
  - SONET channelization and concatenation
  - Virtual concatenation group
  - Link Capacity Adjustment Scheme: LCAS
  - LCAS architecture
- Generic Framing Procedure (GFP)
  - GFP client signal adaptation
  - GFP frame format
  - Adding GFP on SONET
  - Ethernet over SONET
  - Virtual concatenation for Ethernet
- Optical Transport Network
  - OTN hierarchical overview
  - Basic transport structure of an OTN
  - OTN transmitter and receiver

- OTN layer structure
- OTN interface classes
- OTN hierarchical overview

- Next Generation Network (NGN)
  - Merging the voice and data worlds
  - Vision of ITU-T NGN
  - Structure of ITU NGN Focus Group (FGNGN)

DCN NTDR-Kt-f