Voice over IP Fundamentals

Part I PSTN

1. **Overview of the PSTN and Comparisons to Voice over IP**
- The Beginning of the PSTN
- Understanding PSTN Basics
- PSTN Services and Applications
- Drivers Behind the Convergence Between Voice and Data Networking
- Packet Telephony Network Drivers
- New PSTN Network Infrastructure Model

2. **Enterprise Telephony Today**
- Similarities Between PSTN and ET
- Differences Between PSTN and ET
- Common ET and PSTN Interworking

3. **Chapter 3 Basic Telephony Signalling**
- Signalling Overview
- E&M Signalling
- CAS
- ISDN
- QSIG
- DPNSS

4. **Chapter 4 Signalling System 7**
- SS7 Network Architecture
- SS7 Protocol Overview
- SS7 Examples
- List of SS7 Specifications

5. **Chapter 5 PSTN Services**
- Plain Old Telephone Service
- Business Services
- Service Provider Services

Part II Voice over IP Technology

6. **Chapter 6 IP Tutorial**
- OSI Reference Model
- Internet Protocol
- Data Link Layer Addresses

- IP Addressing
- Routing Protocols
- IP Transport Mechanisms

7. Chapter 7 VoIP: An In-Depth Analysis

- Delay/Latency
- Jitter
- Pulse Code Modulation
- Voice Compression
- Echo
- Packet Loss
- Voice Activity Detection
- Digital-to-Analog Conversion
- Tandem Encoding
- Transport Protocols
- Dial-Plan Design

8. Chapter 8 Quality of Service

- QoS Network Toolkit
- Edge Functions
- Traffic Policing
- Backbone Networks
- Rules of Thumb for QoS
- Cisco Labs' QoS Testing

9. Chapter 9 Billing and Mediation Services

- Billing Basics
- Case Study: Cisco SIP Proxy Server and Billing
- Challenges for VoIP Networks
- Mediation Services

10. Chapter 10 Voice Security

- Security Requirements
- Security Technologies
- Protecting Voice Devices
- Protecting IP Network Infrastructure
- Security Planning and Policies

Part III IP Signalling Protocols

11. Chapter 11 H.323

- H.323 Elements
- H.323 Protocol Suite

- H.323 Call-Flows

12. Chapter 12 SIP

- SIP Overview
- SIP Message Building Blocks
- Basic Operation of SIP
- SIP Procedures for Registration and Routing
- SIP Extensions

13. Chapter 13 Gateway Control Protocols

- MGCP Overview
- MGCP Model
- MGCP Commands and Messages
- MGCP Call Flows
- Advanced MGCP Features
- H.248/MEGACO

Part IV VoIP Applications and Services

14. Chapter 14 PSTN and VoIP Interworking

- Cisco Packet Telephony
- Packet Voice Network Overview
- PGW2200 Architecture and Operations
- PGW2200 Implementation
- PSTN Signalling Over IP
- Changing Landscape of PSTN-IP Interworking
- Session Border Controller (SBC)

15. Chapter 15 Service Provider VoIP Applications and Services

- The Service Provider Dilemma
- Service Provider Applications and Benefits
- Service Provider VoIP Deployment: Vonage
- Service Provider Case Study: Prepaid Calling Card
- Session Border Control: Value Addition
- VoIP Peering: Top Priority for the Service Providers
- Service Provider VoIP and Consumer Fixed Mobile Convergence

16. Chapter 16 Enterprise Voice over IP Applications and Services

- Migrating to VoIP Architecture
- Enterprise Voice Applications and Benefits
- Advanced Enterprise Applications
- Wi-Fi–Enabled Phones
- Better Voice Quality Using Wideband Codecs