## Cisco Training – HD Telepresence

## CVOICE: Implementing Cisco Unified Communications Voice over IP and QOS 8.0

This 5-day course provides the learners with voice-related quality of service (QoS) mechanisms that are required in Cisco Unified Communications networks.

$3,495.00

- 5 Days
- Promotional and package discounts may apply

## Upcoming Dates

## Course Description

Implementing Cisco Voice Communications and QoS (CVOICE) teaches students about voice gateways, characteristics of VoIP call legs, dial plans and their implementation, basic implementation of IP phones in Cisco Unified Communications Manager Express environment, and essential information about gatekeepers and Cisco Unified Border Element.

The version of the authorized course materials is v8.0, but SLI is using 9.x in all our labs

## Course Outline

**Module 1: Introduction to Voice Gateway**

**Lesson 1: Understanding Cisco Unified Communications Networks and the Role of Gateways**

- Cisco Unified Communications
- Cisco Unified Communications Gateways
- Gateways in Cisco Unified Communications Deployment Models
- Gateway Hardware Platforms
- Gateway Operational Modes

**Lesson 2: Examining Gateway Call Routing and Call Legs**

- Gateway Call-Routing Components
- End-to-End Call Routing
- Configuring POTS Dial Peers
- Dial Peer Matching
- Matching Inbound Dial Peers
- Matching Outbound Dial Peers
- Default Dial Peer
- Direct Inward Dialing

**Lesson 3: Configuring Gateway Voice Ports**

- Gateway Voice Ports
- Analog Voice Ports

- Configuring Analog Voice Ports
- Digital Voice Ports
- Understanding ISDN
- Configuring Digital Voice Ports
- Configuring ISDN
- Fine-Tuning Analog and Digital Voice Ports
- Echo Cancellation
- Verifying Analog and Digital Voice Ports

**Lesson 4: Understanding DSP Functionality, Codecs, and Codec Complexity**

- Voice Codecs
- Evaluating Quality of Codecs
- Evaluating Overhead
- Digital Signal Processors
- Codec Complexity
- Configuring DSPs
- Verifying DSPs

**Module 2: VoIP Call Legs**

**Lesson 1: Examining VoIP Call Legs and VoIP Media Transmission**

- VoIP Overview
- Converting Voice to VoIP
- VoIP Packetization
- VoIP Media Transmission
- Voice Activity Detection

**Lesson 2: Explaining H.323 Signaling Protocol**

- 323 Architecture
- 323 Call Flows
- Codecs in H.323
- Configuring H.323 Gateways
- Customizing H.323 Gateways
- Verifying H.323 Gateways

**Lesson 3: Explaining SIP Signaling Protocol**

- SIP Architecture
- SIP Call Flows
- SIP Addressing
- Codecs in SIP
- Configuring Basic SIP
- Configuring SIP ISDN Support
- Configuring SIP SRTP Support
- Customizing SIP Gateways
- Verifying SIP Gateways

**Lesson 4: Explaining MGCP Signaling Protocol**

- MGCP Architecture
- MGCP Call Flows
- MGCP Special Considerations
- Configuring MGCP Gateways
- Customizing MGCP Gateways
- Verifying MGCP Gateways

**Lesson 5: Describing Requirements for VoIP Call Legs**

- Audio Clarity
- QoS Requirements
- Transporting Modulated Data over IP Networks
- Understanding Fax and Modem Pass-Through, Relay, and Store and Forward
- Gateway Signaling Protocols, and Fax and Modem Pass-Through and Relay
- DTMF Support

**Lesson 6: Configuring VoIP Call Legs**

- Configuration Components of VoIP Dial Peer
- Configuring DTMF Relay
- Configuring Fax and Modem Support
- Configuring Codecs
- Limiting Concurrent Call

**Module 3: Cisco Unified Communications Manager Express Endpoints Implementation**

**Lesson 1: Introducing Cisco Unified Communications Manager Express**

- Introducing Cisco Unified Communications Manager Express
- Cisco Unified Communications Manager Express Key Features and Benefits
- Cisco Unified Communications Manager Express Supported Platforms
- Cisco Unified Communications Manager Express Operation

**Lesson 2: Examining Cisco Unified Communications Manager Express Endpoint Requirements**

- Overview of Cisco Unified Communications Manager Express Endpoints
- Identifying Cisco Unified Communications Manager Express Endpoint Requirements
- Power over Ethernet
- VLAN Infrastructure
- IP Addressing and DHCP Network Time Protocol
- Endpoint Firmware and Configuration
- Setting Up Cisco Unified Communications Manager Express in SCCP Environment
- Setting Up Cisco Unified Communications Manager Express in a SIP Environment

**Lesson 3: Configuring Cisco Unified Communications Manager Express Endpoints**

- Directory Numbers and Phones in Cisco Unified Communications Manager Express
- Creating Directory Numbers for SCCP Phones
- Configuring SCCP Phone-Type Templates
- Creating SCCP Phones
- Creating Directory Numbers for SIP Phones
- Creating SIP Phones
- Configuring Cisco IP Communicator Support
- Managing Cisco Unified Communications Manager Express Endpoints
- Verifying Cisco Unified Communications Manager Express Endpoints

**Module 4: Dial Plan Implementation**

**Lesson 1: Introducing Call Routing**

- Introducing Numbering Plans
- Scalable Numbering Plans
- Overlapping Numbering Plans
- Private and Public Numbering Plan Integration
- Number Plan Implementation Overview
- Call Routing Overview

**Lesson 2: Understanding Dial Plans**

- Defining Dial Plans
- Endpoint Addressing
- Call Routing and Path Selection
- PSTN Dial Plan Requirements
- ISDN Dial Plan Requirements
- Digit Manipulation
- Calling Privileges
- Call Coverage

**Lesson 3: Describing Digit Manipulation**

- Digit Collection and Consumption
- Components of Digit Manipulation
- Digit Stripping
- Digit Forwarding
- Digit Prefixing
- Number Expansion
- Caller ID Digits Manipulation
- Digit Manipulation Using Voice Translation Rules and Profiles
- Digit Manipulation Using dialplan-pattern Command
- Verifying Digit Manipulation

**Lesson 4: Configuring Path Selection**

- Call Routing and Path Selection
- Dial-Peer Matching
- Path Selection Strategies
- Site-Code Dialing and Toll Bypass
- Configuring Site-Code Dialing and Toll Bypass
- Tail-End Hop-Off
- Configuring TEHO

**Lesson 5: Configuring Calling Privileges**

- Calling Privileges Characteristics
- Implementing Calling Privileges on Gateways
- Implementing Calling Privileges on SRST and Cisco Unified Communications Manager Express
- Configuring COR
- Verifying COR

**Module 5: Gatekeeper and Cisco Unified Border Element Implementation**

**Lesson 1: Understanding Gatekeepers**

- Gatekeeper Overview
- Gatekeeper Signaling
- Gatekeeper Call Routing
- Gatekeeper-Based Call Admission Control
- Configuring Gatekeeper

- Configuring Gatekeeper Zones
- Configuring Zone Prefixes
- Configuring Technology Prefixes
- Adapting H.323 Gateways to Gatekeepers
- Configuring Gatekeeper CAC
- Verifying Basic Gatekeeper Functionality

**Lesson 2: Examining Cisco Unified Border Element**

- Cisco Unified Border Element Overview
- Protocol Interworking on Cisco Unified Border Element
- Media Flows on Cisco Unified Border Element
- Configuring Media Flow and Transparent Codec
- RSVP-Based CAC on Cisco Unified Border Element
- Cisco Unified Border Element Call Flows
- Configuring H.323-to-H.323 Interworking
- Configuring H.323-to-SIP Interworking
- Verifying Cisco Unified Border Element

**Module 6: Quality of Service**

**Lesson 1: Introducing QoS**

- QoS Issues
- QoS and Voice Traffic
- QoS for Unified Communications Networks
- QoS Requirements
- Methods for Implementing QoS Policy
- QoS Models

**Lesson 2: Understanding QoS Mechanisms and Models**

- DiffServ Model
- DSCP Encoding
- DiffServ PHBs
- DiffServ Class Selector
- DiffServ QoS Mechanisms
- Cisco QoS Baseline Model

**Lesson 3: Explaining Classification, Marking, and Link Efficiency Mechanisms**

- Modular QoS CLI
- Configuring Classification
- Configuring Class-Based Marking
- Trust Boundaries
- Mapping CoS to Network Layer QoS
- Link Efficiency Mechanisms Overview
- Link Speeds and QoS Implications
- Serialization Issues
- Link Fragmentation and Interleaving
- Configuring MLP with Interleaving
- Configuring FRF.12 Frame Relay Fragmentation
- Class-Based RTP Header Compression

**Lesson 4: Managing Congestion and Rate Limiting**

- Congestion and Its Solutions
- Policing and Shaping
- Measuring Traffic Rates

- Class-Based Policing
- Configuring Class-Based Policing
- Class-Based Shaping
- Configuring Class-Based Shaping
- Low-Latency Queuing
- Configuring LLQ
- Calculating Bandwidth for LLQ

**Lesson 5: Understanding Cisco AutoQoS**

- Cisco AutoQoS VoIP
- Configuring Cisco AutoQoS VoIP
- Monitoring Cisco AutoQoS VoIP
- Automation with Cisco AutoQoS
- Cisco AutoQoS for the Enterprise
- Configuring Cisco AutoQoS for the Enterprise
- Monitoring Cisco AutoQoS for the Enterprise

Labs:

- Lab 1-1: Configuring Voice Ports
- Lab 1-2: Configuring DSPs
- Lab 2-1: Configuring VoIP Call Legs
- Lab 3-1: Configuring Cisco Unified Communications Manager Express to Support Endpoints
- Lab 4-1: Implementing Digit Manipulation
- Lab 4-2: Implementing Path Selection
- Lab 4-3: Implementing Calling Privileges
- Lab 5-1: Implementing gatekeepers
- Lab 5-2: Implementing Cisco Unified Border Element
- Lab 6-1: Implementing QoS Using Cisco AutoQoS and Manual Configuration

## Audience

This course is intended for:

- Network Administrators, Network Engineers, and Systems Engineers
- Anyone who has their CCNA Voice and/or is working towards CCNP Voice Certification

## Prerequisites

To fully benefit from this course, students should have the following prerequisite skills and knowledge:

- Working knowledge of fundamental terms and concepts of computer networking, including LANs, WANs, and IP switching and routing.
- Ability to configure and operate Cisco IOS routers in an IP environment at the Cisco CCNA® Routing and Switching level.
- Basic knowledge of traditional voice, converged voice, and data networks at the Cisco CCNA Voice level

Recommended authorized prerequisite Cisco training: ICND 1 & ICND 2 or CCNA Bootcamp, and ICOMM

## What You Will Learn

After completing this course, students will be able to:

- Explain what a voice gateway is, how it works, and describe its usage, components, and features.
- Describe the characteristics and configuration elements of VoIP call legs.
- Describe how to implement IP phones using Cisco Unified Communications Manager Express.
- Describe the components of a dial plan, and explain how to implement a dial plan on a Cisco Unified voice gateway.
- Explain what gatekeepers and Cisco Unified Border Elements are, how they work, and what features they support.

- Describe why QoS is needed, what functions it performs, and how it can be implemented in a Cisco Unified Communications network.