



# Implementing Cisco Voice Gateways and Gatekeepers

**Length**  
5 days

**Format**  
Lecture/lab

**Version**  
2.0

## Course Description

GWGK is an advanced course on implementing Cisco voice gateways and gatekeepers in enterprise or service provider environments. Passing the associated GWGK exam is a requirement for the Cisco Certified Voice Professional (CCVP) Certification.

The goal of the course is to prepare students to install, configure, monitor and troubleshoot Cisco voice gateways and gatekeepers in enterprise installations, in accord with the recommendations of Cisco's Solution Reference Network Design (SRND) for IP telephony guides.

## Who Should Attend

GWGK is designed for Cisco customers and Channel Partners who are working toward CCVP certification.

## Recommended Prerequisites

- CCNA certification
- Cisco Voice over IP (CVOICE)
- Cisco IP Telephony Part 1 (CIPT1)

## Related Courses

- Cisco Voice over IP (CVOICE)
- Quality of Service (QOS)
- Cisco IP Telephony Part 1 (CIPT1)
- IP Telephony Troubleshooting (IPTT)

# GWGK

## Learning Objectives

After completing this course, you will be able to:

- Integrate gateways and gatekeepers into an enterprise IP telephony network with Cisco CallManager and Cisco Unity
- Select an appropriate deployment model
- Configure the gateways and gatekeepers (distributed or centralized)
- Design and implement call plans
- Select and implement service provider or managed services applications, features, and requirements



Learning  
Solutions

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# Implementing Cisco Voice Gateways and Gatekeepers

Course Outline

## Module 1: Gateway Deployments

### Lesson 1: Introducing Gateways

- Gateway Functionality
- Gateway Hardware Platforms
- Gateway Signaling Protocols
- Comparing Signaling Protocols
- IP-to-IP Gateways

### Lesson 2: Implementing H.323 Gateways

- Overview of H.323 Gateways
- H.323 Call Flow
- H.323 Advantages
- H.323 Configuration Considerations for DTMF
- H.323 Configuration Considerations for Fax Integration
- H.323 Commands
- Integrating H.323 Gateways with Cisco Unified CallManager
- Verifying an H.323 Integration with Cisco Unified CallManager

### Lesson 3: Implementing MGCP Gateways

- Overview of MGCP Gateways
- MGCP Call Flow
- MGCP Advantages
- MGCP Configuration Considerations
- Basic MGCP Configuration
- MGCP Commands
- Integrating MGCP Gateways with Cisco Unified CallManager
- Verifying an MGCP Integration with Cisco Unified CallManager

### Lesson 4: Implementing SIP Gateways

- Overview of SIP Gateways
- SIP Call Flow
- SIP Advantages
- SIP Integration Options
- SIP Configuration Considerations for DMTF
- SIP Commands
- Integrating Cisco IOS Gateways with SIP VoIP Networks
- Verifying an SIP Integration

## Module 2: Cisco IP Communications PSTN and PBX Integrations

### Lesson 1: Introducing PSTN and PBX Trunks

- Introduction to Trunks
- Hardware Requirements
- DSP Types and Codec Complexity
- Calculating DSP Resources
- Analog Trunks
- Digital Trunks
- Clocking for Digital Interfaces
- PSTN Trunks
- PBX Trunks

### Lesson 2: Implementing Analog and Digital CAS Trunks

- Analog and Digital CAS Interfaces
- Configuring Analog PSTN Trunks
- FXO Power Failover
- Configuring E&M Trunks
- Verifying Analog Trunks
- T1 CAS Overview
- E1 R2 CAS
- Configuring E1 R2 Trunks
- Verifying CAS Trunks

### Lesson 3: Implementing BRI and PRI Trunks

- BRI and PRI Interfaces
- Signaling for BRI and PRI Interfaces
- BRI and PRI Configuration Commands
- Configuring BRI Trunks
- Configuring PRI Trunks
- Verifying BRI and PRI Trunks

### Lesson 4: Implementing QSIG Trunks

- QSIG Overview
- QSIG Support on Cisco IOS Gateways
- QSIG Support in Cisco Unified CallManager
- QSIG Configuration Commands
- Configuring QSIG in Cisco Unified CallManager Deployments
- Verifying QSIG Trunks



Learning Solutions



# Implementing Cisco Voice Gateways and Gatekeepers

## Module 3: Dial Plans on Cisco IOS Gateways

### Lesson 1: Introducing Dial Plans

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

### Lesson 2: Implementing PSTN Dial Plans

- PSTN Dial Plan Requirements
- ISDN Dial Plan Requirements
- Digit Manipulation
- Voice Translation Rules and Profiles
- Voice Translation Profiles vs. dialplan-pattern
- Digit Manipulation Commands
- Call Routing and Path Selection Commands
- Configuring PSTN Dial Plans
- Verifying PSTN Dial Plans

### Lesson 3: Implementing Multisite Dial Plans on Cisco IOS Gateways

- Multisite Dial Plan Requirements
- Site-Code Dialing and Toll Bypass
- Configuring Site-Code Dialing and Toll Bypass
- Tailend Hop-Off
- Configuring TEHO

### Lesson 4: Implementing RSVP-Based CAC

- Overview of RSVP-Based CAC
- Overview of RSVP
- RSVP CAC Flow
- RSVP Commands
- Configuring RSVP-Based CAC
- Verifying RSVP-Based CAC

### Lesson 5: Implementing Calling Privileges on Cisco IOS Gateways

- Calling-Privilege Requirements
- Understanding COR on Cisco IOS Gateways
- COR for SRST and Cisco Unified CallManager Express
- COR Configuration Commands
- Configuring COR for Cisco Unified CallManager Express

## Module 4: Advanced Gateway Features

### Lesson 1: Implementing SRST Gateways

- Overview of SRST Gateways
- SRST Features and Capabilities
- SRST Operation Process
- SRST and Voice Mail
- Basic SRST Commands
- Optional SRST Commands
- Configuring SRST for SCCP Support
- Configuring Additional SRST Features for SCCP Reference
- SIP SRST Commands
- Configuring SIP SRST
- Verifying SRST Operation

### Lesson 2: Implementing Media Resources Using Cisco IOS Gateway DSPs

- Media Resources on Cisco IOS Gateways
- DSP Requirements
- Cisco Unified CallManager and Media Resources
- SCCP Configuration Commands for Enhanced Media Resources
- DSP Farm Configuration Commands for Enhanced Media Resources
- Configuring Cisco Unified CallManager-Controlled Enhanced Media Resources
- Verifying Cisco Unified CallManager-Controlled Media Resources

### Lesson 3: Implementing Fax and Modem Support on Cisco IOS Gateways

- Transporting Modulated Data over IP Networks
- Understanding Fax and Modem Pass-Through
- Understanding FAX and Modem Relay
- Gateway Signaling Protocols with Fax and Modem Pass-Through and Relay
- Understanding Store-and-Forward Fax
- Configuring Fax Pass-Through and Relay with Dial Peers
- Configuring FAX Pass-Through and Relay with MGCP Gateways
- Cisco Unified CallManager Interaction and Restriction





# Implementing Cisco Voice Gateways and Gatekeepers

## Module 4: Advanced Gateway Features (Cont.)

### Lesson 4: Implementing Call Applications on Cisco IOS Gateways

- Call Applications Overview
- Introducing Tcl
- Call Application Syntax Changes
- Call Application Commands
- Configuring Call Applications
- Verifying Call Applications

## Module 5: Gatekeeper Deployments

### Lesson 1: Introducing Cisco Gatekeepers

- Cisco Gatekeeper Overview
- Gatekeeper Hardware and Software Requirements
- Gatekeeper Signaling
- Directory Gatekeepers
- Technology Prefix
- Gatekeeper Address Resolution Process
- Gatekeeper Call Routing
- Gatekeeper Transaction Message Protocol

### Lesson 2: Implementing Basic Gatekeeper Functionality

- Single Gatekeeper—Multizone Configuration Scenario
- Gatekeeper Configuration Steps
- Configuring Zone Prefixes
- Configuring Technology Prefixes
- Registering Gateways
- Dial Peer Configuration
- Preventing Ephone and Dial-Peer Registration
- Registering a Cisco Unified CallManager Cluster
- Verifying Basic Gatekeeper Functionality

### Lesson 3: Implementing Gatekeeper-Based CAC

- Gatekeeper Zone Bandwidth Operation
- Gatekeeper in Cisco Unified CallManager Networks
- Zone Bandwidth Calculation
- Zone Bandwidth Configuration
- Verifying Zone Bandwidth Operation
- RAI in Gatekeeper Networks
- RAI Configuration
- RAI Command
- Verifying RAI Operation

### Lesson 4: Implementing Advanced Gatekeeper Functionality

- Multiple Gatekeepers
- Interconnecting Gatekeepers
- Configuring Directory Gatekeepers
- Restricting Gatekeeper Registration
- Verifying Advanced Gatekeeper Functionality

### Lesson 5: Implementing Gatekeeper Redundancy

- Gatekeeper Redundancy Options
- Comparing HSRP with Gatekeeper Clusters
- Configuring Gatekeeper HSRP
- GUP Configuration Commands
- Configuring a GUP Gatekeeper Cluster
- Verifying Gatekeeper Clustering Operation





# Implementing Cisco Voice Gateways and Gatekeepers

## Course Outline

### Module 6: IP-to-IP Gateway Enterprise Deployments

#### Lesson 1: Introducing IP-to-IP Gateways

- IP-to-IP Gateway Functionality
- Cisco IOS Image Support for IP-to-IP Gateways
- IP-to-IP Gateways in Enterprise Environments
- Protocol Interworking on IP-to-IP Gateways
- Media Flows on IP-to-IP Gateways
- Codec Filtering on IP-to-IP Gateways
- RSVP-Based CAC on IP-to-IP Gateways
- IP-to-IP Gateways and Gatekeeper Interworking
- IP-to-IP Gateway Call Flows

#### Lesson 2: Implementing IP-to-IP Gateways

- Protocol Interworking Command
- Configuring H.323-to-H.323 Interworking
- Configuring H.323-to-SIP Interworking
- Media Flow and Transparent Codec Commands
- Configuring Transparent Codec Pass-Through and Media Flow-Around
- Configuring IP-to-IP Gateways and Via-Zone Gatekeepers
- Verifying IP-to-IP Gateways and Via-Zone Gatekeepers

- Lab 1-1: Implementing H.323 Gateways
- Lab 1-2: Implementing MGCP Gateways
- Lab 1-3: Implementing SIP Gateways
- Lab 2-1: Implementing Analog Trunks
- Lab 2-2: Implementing CAS Trunks
- Lab 2-3: Implementing PRI Trunks
- Lab 2-4: Implementing QSIG Trunks
- Lab 3-1: Implementing PSTN Dial Plans on Cisco IOS Gateways
- Lab 3-2: Implementing Multisite Dial Plans on Cisco IOS Gateways
- Lab 3-3: Implementing RSVP-Based CAC
- Lab 3-4: Implementing Calling Privileges on Cisco IOS Gateways
- Lab 4-1: Implementing SRST Gateways
- Lab 4-2: Implementing Media Resources Using Cisco IOS Gateway DSPs
- Lab 4-3: Implementing Call Applications on Cisco IOS Gateways
- Lab 5-1: Implementing Basic Gatekeeper Functionality
- Lab 5-2: Implementing Gatekeeper-Based CAC
- Lab 5-3: Configuring Remote Zones
- Lab 5-4: Implementing Gatekeeper Redundancy
- Lab 6-1: Implementing IP-to-IP Gateways



Learning Solutions