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Implementing VoIP Course (Exam 642-436)

5 Sessions -
13 Hours of Interactive Training

Implementing VoIP course validates associate-level knowledge and skills required to administer a voice network. Learn to demonstrate the skills required to perform baseline installations, operation and maintenance on Cisco VoIP solutions. Master such technologies as IP PBX, telephony, handset, call control and voicemail solutions. This is a foundation course to understand the design, planning and development of converged voice and data networks that provides theoretical and practical

Session 1

Section A: Introduction

- Telephony
- Early Telephony Training
- Why VoIP Matters
- What Is CCNA Voice?
- Convergence+
- Course Overview

Section B: Traditional Telephony

- The Human Voice
- Early Speech Synthesis
- Speech
- Converting Voice to Signal
- How We Listen
- Converting Signal to Speech
- Traditional Telephones
- Telephone Companies

Section C: PSTN Components

- PSTN Lines
- Local Exchange
- Interoffice Switching
- Central Office Hierarchy
- Anatomy of a Call
- Business PSTN Connections
- PBX Hardware

Section D: PSTN Features

- Features of PSTN
- PBX Automation Features
- PBX Call Management
- Advanced PBX Features

Section E: Numbering/Dialing Plans

experience. This course is structured for preparation to take and pass the 642-436 CCNA Voice exam.

Benefits

- Understand the differences among the common VoIP protocols
- Ensure that your voice network is installed correctly and securely
- Learn the benefits and components of Cisco Unified Communications System

- Dialing Plans
- Numbering Plans
- NANP Rules
- NANP Review
- Internal Number Plans

Section F: Call Routing

- Digit Manipulation
- Cisco 2801 Router
- Manipulation Commands
- Connecting to the C2801
- Creating the Voice Translation-Rule
- Assign Rule to a Profile
- Associate Profile with Voice-Port
- Verify Profile Association
- Dial Plan Preparation
- Path Selection
- Call Coverage
- Grade of Service
- Dial Plan Considerations

Section G: VoIP Packetization

- Analog to Digital
- Sampling
- H.261 and H.264
- G.7xx Codecs
- Companding Compression Defined
- Voice Conversion Process

Section H: VoIP Protocols

- TCP vs. UDP
- RTP
- RTCP and cRTP
- sRTP
- SCCP
- MGCP
- H.323
- SIP
- Network Topologies
- Transmission Media
- NAT and PAT

About The Author

Tom Carpenter has delivered training programs to more than 27,000 professionals since 1997. He has written, developed and delivered courses on: Windows NT, 2000, XP and Server 2003. With experience as a Fortune 1000 system administrator and security officer, Carpenter brings a wealth of real world experience and knowledge to his courses. Tom is Microsoft certified and is one of the founding managers of the Certified Technology Services Professional certification.

Session 2

Section A: Codecs

- Codec Defined
- Cisco Supported Codecs
- Selecting Codecs
- Codec Complexity
- Configuring/Verifying Codec Complexity

Section B: Unified Communications Overview

- Unified Communications
- Unified Communications Applications
- UC and the OSI Model
- OSI Model Analogy
- Physical Topologies
- Three-Tier Design
- Traffic Engineering
- Traffic Shaping Model

Section C: UC Devices

- Endpoint Devices
- VoIP Phones
- Infrastructure Devices
- Switches
- Routers
- 2800 Series
- 1700 Series
- 2620 Series
- Add-on Modules
- Other Infrastructure Devices
- Networking Technologies

Section D: Digital Signal Processors

- DSPs
- DSP Functions
- Transcoding
- Media Termination Points
- DSP Farms
- Installing a PVDM Module
- Configure DSP Parameters
- Enable DSP Farm Function

- Set Up DSP Farm Profile
- Verify DSP Configuration

Section E: Analog Voice Ports

- IP Telephone Call Types
- Analog Ports
- Installing a VIC Module
- Analog Signaling
- FXS and FXO Signaling
- E&M Signaling
- Configuring an FXS Port
- Configure Dial Tone
- Configure Ring Tone

Section F: Digital Voice Ports

- Digital Port Types
- Digital Trunks
- Configure T1 and Clock Source
- Configure T1 Framing and Linecode
- Review T1 Configuration

Section G: Contact Centers

- Contact and Call Centers
- Components of a Call Center
- Contact Center Management
- Call Routing
- Call Queuing
- Call Recording
- Interactive Voice Response

Section H: Voice Gateways

- Understanding Voice Gateways
- H.323 Gateway
- H.323 Benefits
- MGCP Gateways
- MGCP Benefits
- SIP Gateways
- SIP Benefits
- Configuring MGCP
- Configuring H.323 Gateways
- Set Up H.323 Gatekeeper ID
- Configuring Dial-Peers

- Configuring SIP Gateways

Session 3

Section A: Understanding Dial-Peers

- Dial-Peers
- Call Legs
- Call Legs Example
- Dial-Peer Commands
- Dial-Peer Wildcards
- PLAR Connections
- Call Processing
- Dial-Peer Directions

Section B: Configuring Voice Dial-Peers

- Enabling Voice Ports
- Configuring Dial-Peers
- Verify Voice Port Summary
- Call Tracking and Information
- Call History

Section C: VLANs in VoIP Networks

- VLANs
- VLAN Example
- VLAN Tagging
- VLAN Trunking Example
- VLAN Trunking Protocol
- VTP Modes
- Voice VLANs
- Configuring VTP
- Change VTP Operational Mode
- Define VTP Database Domain
- Verify VTP Status
- Configuring VTP Trunk Port
- Verify Switch Port
- Configuring VLANs
- Verify VLAN Configuration
- Config Interface to a Specific VLAN

Section D: Understanding and Configuring PoE

- Power over Ethernet

- Inline PoE/Midspan PoE
- Endpoint PoE
- PoE Standards
- PoE Fault Protection
- PoE Classes
- Cisco PoE Modes
- Configuring PoE
- Verify PoE Configuration

Section E: VoIP and Quality

- Mobility
- Potential VoIP Problems
- Jitter Buffers Explained
- Network Analysis
- Impact of Voice Data
- Quality Considerations
- Dealing with Convergences
- Increasing Bandwidth
- Decreasing Utilization
- Implement QoS

Section F: Quality of Service Protocols

- Voice Packet Requirements
- Mean Opinion Scores
- IP Precedence
- DiffServ
- 802.1p/Q
- Alternative QoS Solutions
- QoS Solution Considerations

Session 4

Section A: Configuring QoS

- VoIP Quality Requirements
- Three-Tier Application
- Automatic QoS
- AutoQoS Deployment
- Configuring AutoQoS
- Applying AutoQoS
- Verify AutoQoS
- QoS Setup for Switchports
- Manual QoS Configuration

- Class-Map Configuration
- Verify Class Map Config
- Prohibitive Class-Maps
- Creating Class-Map Policies
- Enable Class-Map Policies

Section B: Understanding Gatekeepers

- Gatekeepers
- Zones
- Types of Gatekeepers
- Gatekeeper Signaling
- Gatekeeper Interaction
- Dynamic Zone Prefix
- Gatekeeper Fault Tolerance
- IOS Supported Gatekeepers

Section C: Configuring Gatekeepers

- Zone Configuration
- Configuring Zone Prefixes
- Configuring Gateways
- Verifying Gatekeepers
- Setting Gatekeeper Zones
- Setting Zone Prefixes
- Gateway to Gatekeeper Connection
- Loopback IP Addresses
- Configuring the Interface for H.323
- Establishing Gatekeeper Communication
- Verify Gatekeeper Operations

Section D: CallManager Express

- Choosing A Version
- TFTP Server Setup
- Starting the TFTP Server
- Extracting CME
- Configuring CME
- Set Max Values for GUI

Section E: Legacy Integration

- Private Branch Exchange
- PBX Integration Methods
- Fax and Modem Integration
- Configuring Fax Pass-Through

- Configure Fax Relay
- Configuration Options

Section F: Managing VoIP Phones

- IP Phone Installation
- Phone Boot Process
- DHCP Configuration
- TFTP Configuration
- NTP Configuration
- Infrastructure Configuration
- DHCP Server Setup
- Configuring TFTP
- TFTP Server Commands

Session 5

Section A: IP-to-IP Gateways

- Why Use IP-to-IP?
- Unified Border Element
- UBE Benefits
- UBE Implementation
- UBE Functions
- Platform Support
- Gatekeeper Integration
- Configuring UBE
- UBE Dial-Peers

Section B: Configuring IP-to-IP Gateways

- Video over IP
- Delivery
- Formats
- IP Protocols
- Signal Resolution
- Bandwidth

Section C: Video over IP

- Five-Step Solution
- REACT
- Common Problems
- More Common Problems

Section D: Troubleshooting VoIP Networks

- Troubleshooting
- LEDs
- Fast Ethernet Ports
- Troubleshooting via Commands
- Port Commands
- Diag Commands
- Ping Command
- Traceroute Command
- Pathping Command

Section E: Troubleshooting Cisco Voice Hardware

- Security Problems
- Attack Points
- Hacking Examples
- Hacking Tools Demo
- VoIP Lockdown
- Perimeter Security
- Connection Security
- Security Monitoring

Section F: VoIP Performance Monitoring

- Performance Analysis
 - Monitoring Tools
 - Protocol Analyzer
 - Device Conversations
 - VoIP Calls
 - Spectrum Analyzer
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