

Cisco Unified Communications Architecture and Design (UCAD) v8.0

Course Objectives

- Identify the components that comprise a complete Cisco Unified Communications solution and size and position products within the solution
- Identify the products and features required in the LAN environment to support Cisco Unified Communications call control
- Based on existing telephony and data statistics, perform these tasks:
 - Calculate the WAN bandwidth requirements to support VoIP calls
 - Size the voice gateway
 - Size and locate the media resources
 - Identify the issues and components that make up a Cisco Unified Communications call control solution
 - Size and locate Cisco Unified Communications call agents and Cisco Unified Communications Manager 8.x
 - Design a correct dial plan
 - Explain issues that impact E911 requirements
 - Secure the voice network components

Prerequisites

You should have a working knowledge equivalent to the following Cisco courses:

- Interconnecting Cisco Network Devices Part 1, Version 2.0 (ICND1)
- Interconnecting Cisco Network Devices Part 2, Version 2.0 (ICND2)
- Designing for Cisco Internetwork Solutions, Version 2.1 (DESGN)
- Implementing Cisco Voice Communications and QoS (CVOICE) v8.0 (CVOICE 8)
- Implementing Cisco Unified Communications Manager, Part 1 v8.0 (CIPT1 8)
- Implementing Cisco Unified Communications Manager, Part 2 v8.0 (CIPT2 8)

Course Outline

Module 1: Cisco Unified Communications Architecture Overview

Lesson 1: Examining Cisco Unified Communications Features

- List the components available to build a Cisco Unified Communications solution
- Describe the key features of Cisco Unified Communications Manager Version 8.x
- Describe the new Cisco IP phones that support rich media collaboration services
- Explain the migration of Cisco Unified Communications applications to Cisco Unified Computing Systems
- Describe the Cisco Unified Communications Manager 8.x Business Edition

Lesson 2: Describing Cisco Unified Communications Messaging Components

- Present an overview of Cisco Unified Communications messaging components
- Explain the placement of Cisco Unified Messaging components
- Describe the features of Cisco Unity
- Describe the features of Cisco Unity Connection
- Describe the features of Cisco Unity Express

Lesson 3: Describing Cisco Unified Mobility and Cisco Unified Presence

- Describe the components of Cisco Unified Mobility
- Describe the features that are offered by Cisco Unified Mobile Communicator
- Describe the features of the Cisco Unified Wireless IP Phone 7921G
- Describe Cisco Unified Presence

Lesson 4: Examining Conferencing Products

- Describe the conferencing capabilities of Cisco Unified Communications Manager
- Describe the features and benefits of Cisco Unified MeetingPlace Express VT 2.0
- Describe the features and benefits of Cisco Unified MeetingPlace
- Describe the features and benefits of Cisco WebEx

Lesson 5: Examining Cisco Unified Contact Center

- Identify the key components of Cisco Unified Contact Center products
- Identify the features of Cisco Unified Contact Center Express
- Identify the features of Cisco Unified Contact Center Enterprise
- Identify the four Cisco Unified Contact Center Enterprise deployment models

Lesson 6: Describing Management Tools

- Describe the Cisco Unified Communications Management Suite
- Describe Cisco Unified Operations Manager 2.3
- Describe Cisco Unified Service Monitor 2.2
- Describe Cisco Unified Provisioning Manager 2.0
- Describe Cisco Unified Service Statistics Manager 1.3

Lesson 7: Understanding Cisco Unified Communications Security

- Describe general security principles of Cisco Unified Communications
- Describe Cisco IP phone security
- Describe access layer security
- Explain access control lists
- Explain gateways, media resources, and firewall security challenges
- Describe Cisco Security Agent

Module 2: LAN Design for Cisco Unified Communications Call Control

Lesson 1: Explaining Campus Evolution and Cisco Unified Communications

- Review an existing network and understand the business and technical needs and restrictions that will affect the design and implementation of a Cisco Unified Communications solution
- Explain how the three-tier network design model provides a modular, systematic approach to the consideration of LAN components and how it might contribute to improved quality in LAN design for Cisco Unified Communications
- Describe how campus network size affects the three-tier network design model and the implications for LAN designs of different sizes
- Explain the impact that the addition of Cisco Unified Communications will have on a LAN, based on the assessment of an existing LAN topology
- Discuss how the new redundant technologies that are available with the Cisco Catalyst 6500 VSS and the new Cisco Nexus switches affect the simplification of the LAN design.

Lesson 2: Connecting IP Phones

- Plan for IP phone cabling
- Plan subnets and VLANs for a Cisco Unified Communications solution
- Explain power requirements for Cisco IP phone systems
- Determine the best method for ensuring uninterrupted power to Cisco IP phones

Lesson 3: Designing High Availability at the Data Link and Network Layers

- Explain what is meant by link redundancy
- Explain how link redundancy helps LANs achieve Layer 2 convergence
- Explain how 802.1D STP convergence times can be improved
- Explain 802.1s MSTP and when it should be used
- Explain 802.1w RSTP and why it is recommended
- Explain the importance of Layer 3 redundancy and the use of HSRP or VRRP
- Explain the consequences of extending Layer 3 to the access and core layers
- Explain how Cisco NSF contributes to high availability through device failover
- Explain design considerations for redundancy at the network layer

Lesson 4: Reviewing LAN QoS for Cisco Unified Communications

- Distinguish between data and voice traffic characteristics
- Explain the factors that affect voice-transmission quality
- List the QoS implementation steps
- Explain traffic classification
- Explain traffic scheduling
- Explain bandwidth provisioning
- Explain the design considerations for access layer QoS

Lesson 5: Designing the LAN Access Layer for Cisco Unified Communications

- Perform an IDF survey
- Evaluate cabling requirements for the IDF
- Evaluate IDF switch upgrade requirements
- Calculate switch power consumption, heat dissipation, and HVAC
- Complete the access layer and design checklist
- Specify the VLAN design

Lesson 6: Designing the LAN Distribution Layer for Cisco Unified Communications

- Describe the characteristics of the distribution layer
- Describe the tasks of the distribution layer in aggregating access layer traffic for IP telephony
- Describe the role of the distribution layer in maintaining QoS for voice
- Determine gateway redundancy requirements for HSRP
- Explain the transition from Layer 2 at the access layer to Layer 3 at the distribution layer
- Describe distribution layer security policies as they apply to IP telephony design
- Evaluate distribution layer switch upgrade requirements

Lesson 7: Designing the Core Layer for Cisco Unified Communications

- Determine the hardware redundancy requirements for the core layer, to address a customer problem
- Analyze Layers 2 and 3 of the network for potential weaknesses in convergence, to support the load and quality requirements that are imposed by IP telephony
- Recommend switch options for the core layer

Module 3: WAN Design for Cisco Unified Communications Call Control

Lesson 1: Calculating WAN Bandwidth Requirements

- Review SPAN West Coast WAN requirements
- Explain the procedure for sizing the WAN link
- Perform traffic engineering analysis
- Determine the bandwidth that is required for the WAN link

Lesson 2: Designing WAN QoS for Cisco Unified Communications

- Explain classification with respect to the IP WAN link
- Explain the queuing mechanisms that are used to ensure voice quality
- Create a QoS policy for VoIP for bandwidth provisioning
- Explain CAC and its importance for IP telephony WAN circuits
- Explain how to ensure link efficiency on an IP WAN link
- Describe LFI and traffic conditioning as QoS tools for T1/E1 and slower WAN links
- Describe the requirements to get the proper QoS by using MPLS

Lesson 3: Sizing and Selecting Voice Gateways

- Examine gateway capabilities to meet customer requirements
- Identify call survivability features that match customer requirements
- Select the correct endpoint equipment to support modems and fax machines
- Identify the benefits of PBX integration using QSIG
- Size trunks to meet offnet calling patterns

Lesson 4: Designing Media Resources

- Identify appropriate media and DSP resources

- Calculate the DSP resources that are required for voice termination, transcoding, MTPs, and conferencing
- Analyze the impact of encryption requirements on DSP resources
- Analyze the impact of IP SLA traffic generation and analysis on DSP resources
- Structure media resource access in the Cisco Unified Communications Manager using MRGs and MRGLs
- Specify media resource platforms
- Map the DSP resources to physical locations to reduce WAN bandwidth utilization and support business requirements
- Determine the MOH transport mechanism and service locations to support a Cisco Unified Communications solution

Module 4: Component Design for Cisco Unified Communications Call Control

Lesson 1: Designing Cisco Unified Communications Call Control

- Identify the hardware and software available to achieve repeatable call control deployment success
- Choose the correct number and configuration of Cisco Unified Communications Manager servers for a Cisco Unified Communications solution
- Describe the characteristics of possible deployment models
- Define how different Cisco Unified Communications call control services can be used together to create a working solution
- Select the best Cisco Unified Communications Manager deployment model for the solution

Lesson 2: Designing the Dial Plan

- Explain what a dial plan does for an IP telephony solution
- Explain the arrangement and sequencing of digits in a dial plan
- Explain how a dial plan influences call path selection
- Explain how a dial plan can be used to provide different privileges to different groups of callers
- Explain how the dial plan coordinates digit manipulation if the originally dialed numbers need to be modified
- Design a dial plan that supports call routing schemes, any special dial string considerations, dial plan groups, and emergency services requirements

Lesson 3: Designing Emergency Services

- Review the requirements for legislated functionality requirements for lifeline calls from single-site or multisite deployment of the MLTS
- Develop a list of all PSAPs for all customer locations, including the 911 network service providers for those points and determine the type of interface and configuration
- Explain the E911 interfaces that are required for the IP telephony system
- Develop a plan to enable Cisco Emergency Responder to meet or exceed legislated minimums
- Evaluate the effect of E911 on the dial plan and on gateways
- Design the dial plan to easily recognize emergency calls with or without egress access codes
- Design unrestricted access to the egress point for E911 calls to the LEC network so that emergency calls are quickly and reliably routed to the appropriate local PSAP

Lesson 4: Designing a Secure Cisco Unified Communications Solution

- Identify security basics that apply to Cisco Unified Communications
- Discuss methods and options for securing voice gateways
- Discuss firewall placement and features
- Explain Security By Default and the Trust Verification Service