CCIE Collaboration v3.1 Practical Exam Topics

Exam Description: The Cisco CCIE Collaboration (v3.1) Practical Exam is an eight-hour, hands-on exam that requires a candidate to plan, design, implement, operate, and optimize complex enterprise Collaboration solutions.

The following topics are general guidelines for the content likely to be included on the exam. However, other related topics may also appear on any specific delivery of the exam. To better reflect the contents of the exam and for clarity purposes, the guidelines below may change at any time without notice.

The exam is closed book and no outside reference materials are allowed.

10% 1.0 Protocols and APIs

1.1 SIP signaling protocol
- 1.1.a SIP Theory (Request and Respond)
- 1.1.b Identity headers (Name, number, URI, Privacy)
- 1.1.c Route headers
- 1.1.d Diversion headers
- 1.1.e CallID, SessionID, and CiscoGUID

1.2 Media negotiation
- 1.2.a SDP Offer/Answer model
- 1.2.b SDP Early offer, delayed offer, early media
- 1.2.c SDP Payload type interworking

1.3 Media path optimization
- 1.3.a Interactive Connectivity Establishment (ICE)
- 1.3.b TURN and STUN

1.4 Media protocols
- 1.4.a RTP/RTCP, SRTP/SRTCP
- 1.4.b Binary Floor Control Protocol (BFCP)
- 1.4.c ActiveControl (iX)

1.5 DTMF relay
- 1.5.a In-band vs out-of-band
- 1.5.b RFC 2833
- 1.5.c Key Pad Markup Language (KPML)
- 1.5.d Unsolicited NOTIFY
- 1.5.e Interworking

1.6 Collaboration APIs
- 1.6.a Unified CM Administrative XML (AXL) API
- 1.6.b Webex REST API
- 1.6.c Unified CM User Data Service API

1.7 Security protocols
- 1.7.a TLS negotiation
- 1.7.b TLS certificate verification

10% 2.0 Infrastructure and Quality of Services

2.1 Network services
- 2.1.a DHCP
- 2.1.b NTP
- 2.1.c DNS
- 2.1.d LLDP

2.2 Troubleshoot layer 2 and layer 3 network connectivity issues

2.3 Quality of service for Collaboration applications and endpoints on LAN/WAN/WLAN (Cisco IOS-XE)
- 2.3.a Identification
- 2.3.b Classification and marking
- 2.3.c Queuing and scheduling
- 2.3.d Congestion management

2.4 Troubleshoot voice and video quality issues
- 2.4.a Media stream packet loss, jitter, and latency
- 2.4.b Endpoint media quality metrics
- 2.4.c One-way or no-way media
- 2.4.d Media quality troubleshooting tools in Webex Control Hub

2.5 Call Admission Control
- 2.5.a Cisco Unified Border Element (CUBE)
- 2.5.b Cisco Unified Communications Manager (UCM)

2.6 Certificate management
- 2.6.a Premise based PSTN gateway
- 2.6.b UCM, Instant Messaging & Presence (IM&P), Cloud Connected UC
- 2.6.c Cisco Expressway Series

20% 3.0 Call Control and Dial plan

3.1 Global dial plans
- 3.1.a Localization and globalization
- 3.1.b Numbering schemes
- 3.1.c Dialing habits
- 3.1.d Interdigit timeouts
- 3.1.e Calling privileges
- 3.1.f Number presentation

3.2 Dial plan features on UCM
- 3.2.a Partitions and calling search spaces
- 3.2.b Translation and transformation patterns
- 3.2.c Urgent priority
- 3.2.d Path selection
- 3.2.e Global dial plan replication
- 3.2.f Local route groups
- 3.2.g Emergency Location Groups

3.3 Dial plan features on Webex Calling
- 3.3.a Location and numbers, Routing prefix
- 3.3.b Interworking dial plan, route list, route groups, trunks, call typing, unknown extension dialing
- 3.3.c Outgoing and incoming permissions
- 3.3.d Transfer and forwarding restrictions

3.4 URI and domain-based routing

3.5 Telephony features on UCM
- 3.5.a Call Park and Pickup
- 3.5.b Barge/privacy
- 3.5.c Call queuing
- 3.5.d Busy Lamp Field (BLF)

3.6 Telephony features on Webex Calling
- 3.6.a Call Park
- 3.6.b Auto attendant
- 3.6.c Call queuing and hunting
- 3.6.d Receptionist and paging
- 3.6.e Single Number Reach
- 3.6.f Voicemail

3.7 Audio and video codec selection

3.8 SIP trunking
- 3.8.a SIP profiles
- 3.8.b SIP trunk security profiles
- 3.8.c Resiliency
- 3.8.d Mid-call signaling
- 3.8.e Session refresh
- 3.8.f Securing SIP Trunks on UCM

3.9 UDS in a multi-cluster environment
- 3.9.a Service discovery
- 3.9.b ILS
- 3.9.c User search

3.10 Dial plans on Cisco Unified Border Element (CUBE)
- 3.10.a Inbound and outbound dial-peers
- 3.10.b Voice translation rules and profiles
- 3.10.c Dial-peer provisioning policy
- 3.10.d Destination server groups
- 3.10.e Destination dial-peer groups
- 3.10.f E.164 pattern maps
- 3.10.g URI-based dialing
- 3.10.h VRF-aware call routing

3.11 Survivability Features
- 3.11.a SIP-SRST
- 3.11.b Webex Calling Survivability Gateway

3.12 Dial plans on Cisco Expressway Series
- 3.12.a Transforms
- 3.12.b Search rules
- 3.12.c Zones

10% 4.0 Endpoints and User Management

4.1 Hardware and software endpoint registration
- 4.1.a On-premises (local or proxy TFTP)
- 4.1.b Mobile and Remote Access (Service Discovery)
- 4.1.c Cloud
- 4.1.d Hybrid

4.2 Mixed mode and Security By Default (SBD) on UCM
- 4.2.a Certificate Trust List (CTL) and Identity Trust List (ITL)
- 4.2.c Trust Verification Service (TVS)

4.3 Securing endpoints
- 4.3.a SIP OAuth
- 4.3.b CAPF and LSC

4.4 Collaboration endpoints and infrastructure using IPv6

4.5 User authentication and authorization
- 4.5.a Directory synchronization On-premises
- 4.5.b Directory synchronization Cloud
- 4.5.c Single-Sign-On (SSO)
- 4.5.d OAuth

4.6 Cloud clients
- 4.6.a Privacy features
- 4.6.b Analytics and troubleshooting
- 4.6.c Proximity
- 4.6.d Security and compliance

20% 5.0 Edge Services

5.1 SIP trunks using Cisco Unified Border Element (CUBE)

5.2 Multi-tenancy on Cisco Unified Border Element (CUBE)

5.3 SIP normalization and SDP normalization
- 5.3.a Normalization and transparency scripts (Lua)
- 5.3.b Cisco IOS-XE SIP profiles

5.4 Securing SIP trunks on Cisco Unified Border Element (CUBE)
- 5.4.a SRTP to RTP interworking
- 5.4.b SRTP pass-through
- 5.4.c SRTP to SRTP interworking

5.5 Stateful box-to-box redundancy on Cisco Unified Border Element (CUBE) (Cisco IOS-XE)

5.6 Network and application level security on Cisco IOS-XE
- 5.6.a IP Trust List
- 5.6.b Call spike protection
- 5.6.c Media policing
- 5.6.d Call thresholds
- 5.6.e RTP port ranges
- 5.6.f Telephony denial of service attacks
- 5.6.g Multi-VRF

5.7 Firewall traversal in a collaboration solution
- 5.7.a Port numbers and transport
- 5.7.b NAT
- 5.7.c Web proxy servers
- 5.7.d Deep Packet Inspection considerations

5.8 Cisco Expressway Series traversal communications
- 5.8.a Traversal zones
- 5.8.b SSH tunnels
- 5.8.c Encryption interworking

5.9 Mobile and Remote Access (MRA)

5.10 Network and application level security on Cisco Expressway Series
- 5.10.a Toll fraud prevention (CPL)
- 5.10.b Zone authentication
- 5.10.c Automated intrusion protection
- 5.10.d Mutual TLS

5.11 Cloud-based PSTN for Webex Calling
- 5.11.a Cloud Connected PSTN Provider
- 5.11.b Cisco Calling Plan

5.12 Premises-based PSTN for Webex Calling
- 5.12.a Registration-based Local Gateway
- 5.12.b Certificate-based Local Gateway

5.13 Edge Audio for Webex

5.14 Third-party interoperability and federation
- 5.14.a Voice and video calling
- 5.14.b IM&P
- 5.14.c Meeting Interoperability

15% 6.0 Media Resources and Meetings

6.1 Media resources
- 6.1.a Transcoding
- 6.1.b MTP
- 6.1.c Music on hold

6.2 Ad-hoc conferencing
- 6.2.a Cisco IOS-XE conferencing
- 6.2.b Cisco Meeting Server

6.3 Webex meetings
- 6.3.a Meeting scheduling
- 6.3.b Webex meeting Features

6.4 Media quality troubleshooting

6.5 Meeting Security
- 6.5.a Planning a secured meeting
- 6.5.b End-to-end encryption plus identity
- 6.5.c Personal meeting room security
- 6.5.d Participant roles

6.6 Video Mesh

15% 7.0 Collaboration Applications and Services (15%)

7.1 On-premises IM&P servers and clients

7.2 Cisco Unity Connection voicemail
- 7.2.a Voicemail integration
- 7.2.b Call and directory handlers
- 7.2.c Voicemail access from soft clients
- 7.2.d Video greetings and messaging
- 7.2.e Partitions and search spaces
- 7.2.f Routing rules

7.3 Mobility features
- 7.3.a Mobile Connect (Single Number Reach)
- 7.3.b Device Mobility
- 7.3.c Mobile Identity
- 7.3.d Extend and Connect
- 7.3.e Extension Mobility

7.4 Audio and video call recording architectures
- 7.4.a SIP-based media Recording (SIPREC)
- 7.4.b Network-based recording
- 7.4.c Built-in bridge
- 7.4.d Cisco Unified Border Element (CUBE) Media Proxy
- 7.4.e Secure call recording
- 7.4.f Cloud based recording

7.5 Webex Contact Center

7.6 Webex Bot (Implement from a provided Python code skeleton)