



CCIE Collaboration Written Exam Version 1.0 (400-051)

Exam Description: The Cisco CCIE® Collaboration Written Exam (400-051) version 1.0 has 90-110 questions and is 2 hours in duration. This exam validates that candidates have the skills to plan, design, implement, operate, and troubleshoot enterprise collaboration and communication networks. The exam is closed book, and no outside reference materials are allowed.

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. In order to better reflect the contents of the exam and for clarity purposes, the guidelines below may change at any time without notice.

- 10%** **1.0** **Cisco Collaboration Infrastructure**
- 1.1 Cisco UC Deployment Models
- 1.2 User management
- 1.3 IP routing in Cisco Collaboration Solutions
- 1.4 Virtualization in Cisco Collaboration Solutions
 - 1.4.a UCS
 - 1.4.b VMware
 - 1.4.c Answer files
- 1.5 Wireless in Cisco Collaboration Solutions
- 1.6 Network services
 - 1.6.a DNS
 - 1.6.b DHCP
 - 1.6.c TFTP
 - 1.6.d NTP
 - 1.6.e CDP/LLDP
- 1.7 PoE
- 1.8 Voice and data VLAN
- 1.9 IP multicast
- 1.10 IPv6

- 15% 2.0 **Telephony Standards and Protocols**
 - 2.1 SCCP
 - 2.1.a Call flows
 - 2.1.b Call states
 - 2.1.c Endpoint types
 - 2.2 MGCP
 - 2.2.a Call flows
 - 2.2.b Call states
 - 2.2.c Endpoint types
 - 2.3 SIP
 - 2.3.a Call flows
 - 2.3.b Call states
 - 2.3.c DP
 - 2.3.d BFCP
 - 2.4 H.323 and RAS
 - 2.4.a Call flows
 - 2.4.b Call states
 - 2.4.c Gatekeeper
 - 2.4.d H.239
 - 2.5 Voice and video CODECs
 - 2.5.a H.264
 - 2.5.b ILBC
 - 2.5.c ISAC
 - 2.5.d LATM
 - 2.5.e G.722
 - 2.5.f Wide band
 - 2.6 RTP, RTCP, and SRTP
- 25% 3.0 **Cisco Unified Communications Manager (CUCM)**
 - 3.1 Device registration and redundancy
 - 3.2 Device settings
 - 3.3 Codec selection
 - 3.4 Call features
 - 3.4.a Call park
 - 3.4.b Call pickup
 - 3.4.c BLF speed dials
 - 3.4.d Native call queuing
 - 3.4.e Call hunting
 - 3.4.f Meet-Me

- 3.5 Dial plan
 - 3.5.a Globalized call routing
 - 3.5.b Local route group
 - 3.5.c Time-of-day routing
 - 3.5.d Application dial rules
 - 3.5.e Digit manipulations

- 3.6 Media resources
 - 3.6.a TRP
 - 3.6.b MOH
 - 3.6.c CFB
 - 3.6.d Transcoder and MTP
 - 3.6.e Annunciator
 - 3.6.f MRG and MRGL

- 3.7 CUCM mobility
 - 3.7.a EM/EMCC
 - 3.7.b Device Mobility
 - 3.7.c Mobile Connect
 - 3.7.d MVA

- 3.8 CUCM serviceability and OS administration
 - 3.8.a Database replication
 - 3.8.b CDR
 - 3.8.c Service activation
 - 3.8.d CMR

- 3.9 CUCM disaster recovery

- 3.10 ILS/URI dialing
 - 3.10.a Directory URI
 - 3.10.b ISL topology
 - 3.10.c Blended addressing

- 3.11 Call Admission Control
 - 3.11.a CAC/ELCAC
 - 3.11.b RSVP
 - 3.11.c SIP preconditions

- 3.12 SIP and H.323 trunks
 - 3.12.a SIP trunks
 - 3.12.b H.323 trunks
 - 3.12.c Number presentation and manipulation

- 3.13 SAF and CCD

- 3.14 Call recording and silent monitoring

- 20%** **4.0 Cisco IOS UC Applications and Features**
- 4.1 CUCME
 - 4.1.a SCCP phones registration
 - 4.1.b SIP phones Registration
 - 4.1.c SNR
- 4.2 SRST
 - 4.2.a CME-as-SRST
 - 4.2.b MGCP fallback
 - 4.2.c MMOH in SRST
- 4.3 CUE
 - 4.3.a AA
 - 4.3.b Scripting
 - 4.3.c Voiceview
 - 4.3.d Web inbox
 - 4.3.e MWI
 - 4.3.f VPIM
- 4.4 Cisco IOS-based call queuing
 - 4.4.a B-ACD
 - 4.4.b Voice hunt groups
 - 4.4.c Call blast
- 4.5 Cisco IOS media resources
 - 4.5.a Conferencing
 - 4.5.b Transcoding
 - 4.5.c DSP management
- 4.6 CUBE
 - 4.6.a Mid-call signaling
 - 4.6.b SIP profiles
 - 4.6.c Early and delayed offer
 - 4.6.d DTMF interworking
 - 4.6.e Box-to-box failover and redundancy
- 4.7 Fax and modem protocols
- 4.8 Analog telephony signalling
 - 4.8.a Analog telephony signalling theories (FXS/FXO)
 - 4.8.b Caller ID
 - 4.8.c Line voltage detection
 - 4.8.d THL sweep
 - 4.8.e FXO disconnect
 - 4.8.f Echo
- 4.9 Digital telephony signalling
 - 4.9.a Digital telephony signalling theories (T1/E1, BRI/PRI/CAS)

- 4.9.b Q.921 and Q.931
- 4.9.c QSIG
- 4.9.d Caller ID
- 4.9.e R2
- 4.9.f NFAS

- 4.10 Cisco IOS dial plan
 - 4.10.a Translation profile
 - 4.10.b Dial-peer matching logics
 - 4.10.c Test commands

- 4.11 SAF/CCD

- 4.12 IOS CAC

- 4.13 IOS accounting

- 12% 5.0 Quality of Service and Security in Cisco Collaboration Solutions**
 - 5.1 QoS: link efficiency
 - 5.1.a LFI
 - 5.1.b MMLPPP
 - 5.1.c FRF.12
 - 5.1.d cRTP
 - 5.1.e VAD

 - 5.2 QoS: classification and marking
 - 5.2.a Voice versus video classification
 - 5.2.b Soft clients versus hard clients
 - 5.2.c Trust boundaries

 - 5.3 QoS: congestion management
 - 5.3.a Layer 2 priorities
 - 5.3.b Low latency queue
 - 5.3.c Traffic policing and shaping

 - 5.4 QoS: medianet

 - 5.5 QoS: wireless QoS

 - 5.6 Security: mixed mode cluster

 - 5.7 Security: secured phone connectivity
 - 5.7.a VPN phones
 - 5.7.b Phone proxy
 - 5.7.c TLS proxy
 - 5.7.d IEEE 802.1x

 - 5.8 Security: default security features

- 5.9 Security: firewall traversal
- 5.10 Security: toll fraud
- 8%** **6.0 Cisco Unity Connection**
 - 6.1 CUCM and CUCME integration
 - 6.2 Single inbox
 - 6.3 MWI
 - 6.4 Call handlers
 - 6.5 CUC dial plan
 - 6.6 Directory handlers
 - 6.7 CUC features
 - 6.7.a High availability
 - 6.7.b Visual voicemail
 - 6.7.c Voicemail for Jabber
 - 6.8 Voicemail networking
- 4%** **7.0 Cisco Unified Contact Center Express**
 - 7.1 UCCX CTI Integration
 - 7.2 ICD functions
 - 7.3 UCCX scripting components
- 6%** **8.0 Cisco Unified IM and Presence**
 - 8.1 Cisco Unified IM Presence Components
 - 8.2 CUCM integration
 - 8.3 Cisco Jabber
 - 8.4 Federation
 - 8.5 Presence Cloud Solutions
 - 8.6 Group chat and compliance