Lab – CCIE Collaboration

Online Course

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Course Modules

1. Protocols and APIs

- SIP signalling protocol
  - SIP Theory (Request and Respond)
  - Identity headers (Name, number, URI, Privacy)
  - Route headers
  - Diversion headers
  - CallID, SessionID, and CiscoGUID
- Media negotiation
  - SDP Offer/Answer model
  - SDP Early offer, delayed offer, early media
  - SDP Payload type interworking
- Media path optimization
  - Interactive Connectivity Establishment (ICE)
  - TURN and STUN
- Media protocols
  - RTP/RTCP, SRTP/SRTCP
  - Binary Floor Control Protocol (BFCP)
- DTMF relay
  - In-band vs out-of-band
  - RFC 2833
  - Key Pad Markup Language (KPML)
  - Unsolicited NOTIFY
  - Interworking

- Collaboration APIs
  - o Unified CM Administrative XML (AXL) API
  - o Webex REST API
  - o Unified CM User Data Service API
- Security protocols
  - o TLS negotiation
  - o TLS certificate verification

2. **Infrastructure and Quality of Services**
   - SIP Signaling protocol
     - o SIP Theory (Request and Respond)
     - o Identity headers (Name, number, URI, Privacy)
     - o Route headers
     - o Diversion headers
     - o CallID, SessionID, and CiscoGUID
   - Media negotiation
     - o SDP Offer/Answer model
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     - o TURN and STUN

- Media protocols
  - RTP/RTCP, SRTP/SRTCP
  - Binary Floor Control Protocol (BFCP)
  - ActiveControl (iX)
- DTMF relay
  - In-band vs out-of-band
  - RFC 2833
  - Key Pad Markup Language (KPML)
  - Unsolicited NOTIFY
  - Interworking
- Collaboration APIs
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3. Call Control and Dial Plan

- Global dial plans
- Localization and globalization
- Numbering schemes
- Dialling habits
- Interdigit timeouts
- Calling privileges
- Number presentation
- Dial plan features on UCM
- Partitions and calling search spaces
- Translation and transformation patterns
- Urgent priority
- Path selection
- Global dial plan replication
- Local route groups
- Emergency Location Groups
- Dial plan features on Webex Calling
- Location and numbers, Routing prefix
- Interworking dial plan, route list, route groups, trunks,etc.,
- Outgoing and incoming permissions
- Transfer and forwarding restrictions
- URI and domain-based routing
- Telephony features on UCM
- Call Park and Pickup

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- Barge/privacy
- Call queuing
- Busy Lamp Field (BLF)
- Telephony features on Webex Calling
- Call Park
- Auto attendant
- Call queuing and hunting
- Receptionist and paging
- Single Number Reach
- Voicemail
- Audio and video codec selection
- SIP trunking
- SIP profiles
- SIP trunk security profiles
- Resiliency
- Mid-call signaling
- Session refresh
- Securing SIP Trunks on UCM
- UDS in a multi-cluster environment
- Service discovery
- ILS
- User search
- Dial plans on Cisco Unified Border Element (CUBE)
- Inbound and outbound dial-peers

- Voice translation rules and profiles
- Dial-peer provisioning policy
- Destination server groups
- Destination dial-peer groups
- E.164 pattern maps
- URI-based dialling
- VRF-aware call routing
- Survivability Features
- SIP-SRST
- Webex Calling Survivability Gateway
- Dial plans on Cisco Expressway Series
- Transforms
- Search rules
- Zones

4. **Endpoint and User Management**
   - Hardware and software endpoint registration
   o On-premises (local or proxy TFTP)
   o Mobile and Remote Access (Service Discovery)
   o Cloud
   o Hybrid
   - Mixed mode and Security By Default (SBD) on UCM
   o Certificate Trust List (CTL) and Identity Trust List (ITL)

- o Trust Verification Service (TVS)
- Securing endpoints
  - o SIP OAuth
  - o CAPF and LSC
- Collaboration endpoints and infrastructure using IPv6
- User authentication and authorization
  - o Directory synchronization On-premises
  - o Directory synchronization Cloud
  - o Single-Sign-On (SSO)
  - o OAuth
- Cloud clients
  - o Privacy features
  - o Analytics and troubleshooting
  - o Proximity
  - o Security and compliance

5. **Edge Services**
   - SIP trunks using Cisco Unified Border Element (CUBE)
   - Multi-tenancy on Cisco Unified Border Element (CUBE)
   - SIP normalization and SDP normalization
     - o Normalization and transparency scripts (Lua)
     - o Cisco IOS-XE SIP profiles
   - Securing SIP trunks on Cisco Unified Border Element (CUBE)
     - o SRTP to RTP interworking
     - o SRTP pass-through

- o SRTP to SRTP interworking
- Stateful box-to-box redundancy on Cisco Unified Border Element
- Network and application-level security on Cisco IOS-XE
  - o IP Trust List
  - o Call spike protection
  - o Media policing
  - o Call thresholds
  - o RTP port ranges
  - o Telephony denial of service attacks
  - o Multi-VRF
- Firewall traversal in a collaboration solution
  - o Port numbers and transport
  - o NAT
  - o Web proxy servers
  - o Deep Packet Inspection considerations
- Cisco Expressway Series traversal communications
  - o Traversal zones
  - o SSH tunnels
  - o Encryption interworking
- Mobile and Remote Access (MRA)
- Network and application level security on Cisco Expressway Series
 - o Toll fraud prevention (CPL)
  - o Zone authentication

- o Automated intrusion protection
- o Mutual TLS
- Cloud-based PSTN for Webex Calling
  - o Cloud Connected PSTN Provider
  - o Cisco Calling Plan
- Premises-based PSTN for Webex Calling
  - o Registration-based Local Gateway
  - o Certificate-based Local Gateway
- Edge Audio for Webex
- Third-party interoperability and federation
  - o Voice and video calling
  - o IM&P
  - o Meeting Interoperability

6. Media Resources and Meetings

- Media resources
  - o Transcoding
  - o MTP
  - o Music on hold
- Ad-hoc conferencing
  - o Cisco IOS-XE conferencing
  - o Cisco Meeting Server
- Webex meetings
  - o Meeting scheduling
  - o Webex meeting Features
- Media quality troubleshooting
- Meeting Security
  - o Planning a secured meeting
  - o End-to-end encryption plus identity
  - o Personal meeting room security
  - o Participant roles
- Video Mesh
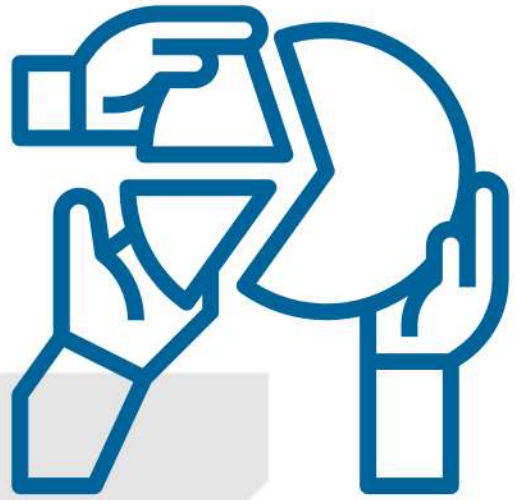
7. Collaboration Application and Services

- On-premises IM&P servers and clients
- Cisco Unity Connection voicemail

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- o Voicemail integration
- o Call and directory handlers
- o Voicemail access from soft clients
- o Video greetings and messaging
- o Partitions and search spaces
- o Routing rules
- Mobility features
  - o Mobile Connect (Single Number Reach)
  - o Device Mobility
  - o Mobile Identity
  - o Extend and Connect
  - o Extension Mobility
- Audio and video call recording architectures
  - o SIP-based media Recording (SIPREC)
  - o Network-based recording
  - o Built-in bridge
  - o Cisco Unified Border Element (CUBE) Media Proxy
  - o Secure call recording
  - o Cloud based recording
- Webex Contact Centre
- Webex Bot (Implement from a provided Python code skeleton)
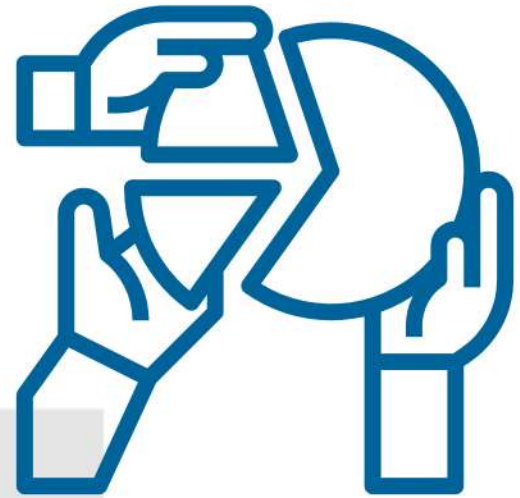
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For contact:+91 8680961847
+91 9600579474