Planning and Designing Successful Cloud Calling Deployments with Webex Calling

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Cisco Webex App

Questions?
Use Cisco Webex App to chat
with the speaker after the session

How

1. Find this session in the Cisco Live Mobile App
2. Click "Join the Discussion"
3. Install the Webex App or go directly to the Webex space
4. Enter messages/questions in the Webex space

Webex spaces will be moderated
until February 24, 2023.
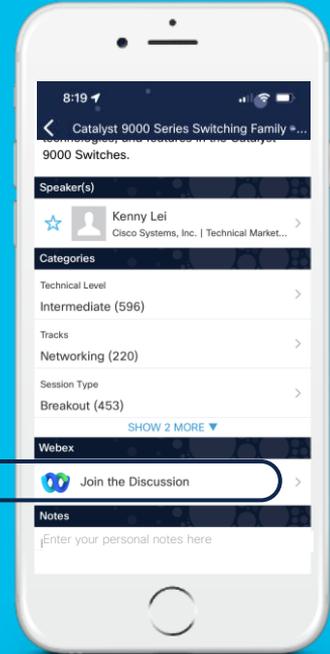
Agenda

- Introduction

- Solution Overview

- PSTN Options

- Regions

- Location Considerations

- Call Control Integration / Coexistence

- Advanced Call Handling, Group Functions

- Sharing Numbers

- Webex Calling Provisioning APIs

- Conclusion

Solution Overview

Webex Calling
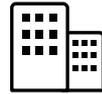
Enterprise-grade calling features

Easy-to-use and secure

Centralised management and administration

Hybrid deployment & Flexible migration

Mobile First & AI led innovation

Webex Calling - Architecture

Webex by CISCO

Webex Calling

Services

| Control Hub | Analytics \| Telemetry | Directory and Contacts | Recording | APIs |

Network Connectivity
Webex Edge Connect | Partner Peering | PNC | OTT

PSTN
Cisco PSTN | CCPP | Premises PSTN/SBC

Devices

- Global cloud calling platform
- Centralized administrative experience from the cloud
- Public Cloud Multi-tenant platforms
- Flexibility to provision users to best address cloud calling business needs
- Flexible PSTN options
- OTT and Private network connectivity options to fit enterprise of various sizes
- Webex App for a unified end-user experience

A complete enterprise feature set
A partial list of supported calling features

Alternate numbers	Call logs w/click to dial	Directed call pickup	Inbound caller ID	Pre-alert announcement	Simultaneous ring
ATA support	Call redial	Directed call pickup barge in	Inbound fax to email	Privacy	Speed Dial 100
Auto attendant	Call restrictions	Distinctive ring	Main number outbound call ID	Webex Go	T-38 Fax
Barge-in exempt	Call routing and queuing	Do not disturb	Mobility	Reports and metrics	Three-way calling (variable length)
Business continuity (CFNR)	Call transfer – attended	Enterprise phone directory	Music on hold (site)	Receptionist client	Video (point to point)
Busy lamp monitoring	Call transfer-blind	Exec / assistant	N-Way voice and video calling (6)	Schedules	Virtual extensions
Call forwarding	Call waiting – Up to 4 calls	Feature access codes	Single number reach (Office anywhere)	Selective call rejection	Visual voicemail
Call history	Conferencing (site based)	Hoteling (guest)	Outbound caller ID blocking	Sequential ring	Voicemail transcription
Call hold and resume	Convenience call recording	Hunt group	Personal phone directory	Shared line appearance	Video N Way

PSTN Options

PSTN Options for Webex Calling

Premises PSTN

Available in 110+ countries

Continue using your existing provider

Support remote branch offices

Manage phone numbers Control Hub

Cisco Calling Plans (Cisco PSTN)

Available in the U.S., Canada, Europe, Australia* and New Zealand*

Single offer through Cisco and our partners

Fully integrated and managed from Control Hub

Cloud Connect for Webex Calling

Available in over 65 countries

Select from multiple world-class Cisco-certified providers

Choose providers on a site-by-site basis

Manage numbers in Control Hub

https://blog.webex.com/cloud-calling/webex-calling-pstn-options/

Premises PSTN and PBX interconnect

Trunks

Represents a single SIP trunk to an on-premises device. Device can be registering (CUBE) or certificate based (CUBE + 3rd party) trunk

Must be assigned to a location. If used for PSTN the country dial plan is based on location address.

Can be included in one or more route groups or can be directly associated to a dial plan.

PSTN (SIP, ISDN, …) decoupled
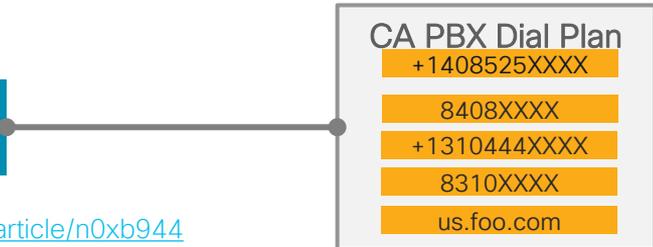
Route groups

Logical grouping of trunks (max. 10) for scale and redundancy of connections to the premises

Does not "live" in a location

Dial Plans

Dial plans allow you to route calls to on-premises destinations by use of trunks or route groups.

Specifies the routing choice (trunk or route group) for calls that match any of its dial patterns.

Dial pattern represents **on-premises extensions**; ESN/on-net numbers, +E.164 patterns, SIP URI domains.

Local Gateway — Trunk — **US East (Route Group)** — CA PBX Dial Plan

- +1408525XXXX
- 8408XXXX
- +1310444XXXX
- 8310XXXX
- us.foo.com

https://help.webex.com/en-us/article/n0xb944

Registering vs. Cert Based Trunk

| Concurrent Calls	# of users serviced	Preferred Trunk Type	Connectivity
~2000 – 6500	65000	Certificate based	Interconnect
250 – 2000	20000	Certificate based	OTT
<= 250	2500	Registering trunk	OTT

Connectivity specs
- OTT: max latency 100 ms, max jitter 10 ms, max packet loss 0.2 %
- Interconnect: max latency 30 ms, max jitter 5 ms, 0 packet loss

Certificate based trunk requirements
- Public IPv4, domain, SRV
- Trusted certificate
- Inbound connections through firewall

https://help.webex.com/en-us/article/n0xb944

Webex Calling PSTN:
Cloud Connect for Webex Calling

- PSTN access through peering with a selection of Cloud Connected partners integrated into the Webex® Calling cloud

- Partner helps enterprise procure and provision PSTN

- Fully integrated option (number ordering from within Control Hub) available in the US

- Available to service providers who serve customers with locations outside of their PSTN footprint

https://community.cisco.com/t5/collaboration-knowledge-base/cloud-connect-for-webex-calling-global-availability/ta-p/3916211

PSTN Options - Comparison

| Cloud PSTN (Cisco PSTN / Cloud Connect for Webex Calling)	Premises PSTN (Trunk, Local Gateway)
No invest in on-premises GW	re-use of existing PSTN
no maintenance for on-premises GW	interconnect with PBX
No PSTN media hair-pinning*	PSTN interconnect in markets not supported by Cloud PSTN options
Number orders potentially in-band (Cisco PSTN, fully integrated CCPP)	Number orders out of band

*calls from Webex Calling endpoint to PSTN via Local Gateway anchored on Webex Calling access; ICE media path optimization possible if ICE negotiation w/ Local Gateway host candidate succeeds

Regions

Webex Calling global footprint

Global platform offers services to multinational customers from a single region
Global backbone purposely designed for audio and video transport
Low loss 100+ Gigabit interconnectivity with multiple redundant paths

Vancouver
Chicago
San Jose
Toronto
New York
Columbus
Dallas
Dallas
Dallas

Amsterdam
Amsterdam
Frankfurt
London
London
Tokyo
South Korea
Osaka
Singapore
Sydney
Melbourne

Unified Webex DC's
Calling DC's
Calling Media PoP
Control Hub (AWS)
Common Identity DC's
MPP Device EDOS

Notes

Common Identity for AJP Region served out of Europe.

Cities with multiple services may have these services across multiple DC's

.

CISCO Live!

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Legend:
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Singapore

Media pops provide regional media services and regional peering with cloud connected PSTN providers

Sydney
Melbourne

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Cities with multiple services may have these services across multiple DC's

Webex Calling regional scaling

Core call control scales horizontally

- Leveraging micro services to quickly deploy/expand

SBC Resources are separated from Access and Peering

- Access for Endpoints and Local Gateways
- Peering for CCPP integration to PSTN
- Access and Peer SBCs scale horizontally
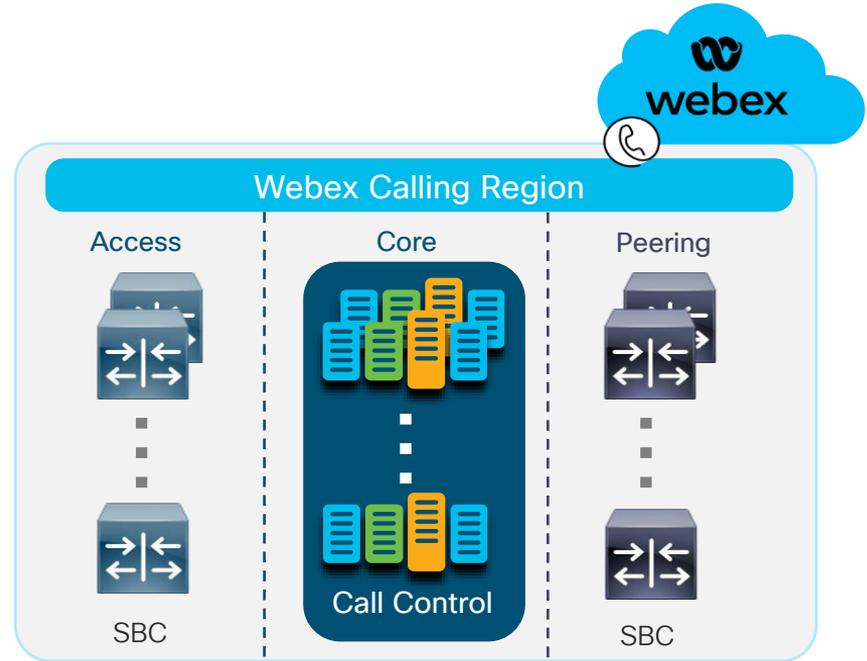
Headquarters' Location – First Time Setup Wizard (FTSW)

- **Required** – When a new Webex Calling Org is created, a first location is required to set up Webex Calling for customer use.

- Based off the country of the Location, this will define the regional platform used, "Home region".

- All call signaling traffic is routed to this Home Region as well as the calling data is stored here. Media is supported globally with regional SBCs.

- It is highly recommended that the country or region with the majority of your users should be defined as your headquarters' location.

- You can edit or delete your headquarters' address any time in Control Hub. This changes will always be reflected by all Location dependent objects (e.g. Users).

The country of the headquarters' location or the regional platform cannot be changed after creation.

Multi-region customer: Regional media

- Access SBCs in other regions can be used

- In-region registration

- In-region media

- Signaling still inter-region

- Cut-through delay might still occur

- Media RTT not a factor

US

AU

Global Webex Backbone

Internet

Webex Calling Endpoints

Location 1

Webex Calling Endpoints

Location 2

—— SIP Registration

—— SIP Signaling

—— SRTP Media
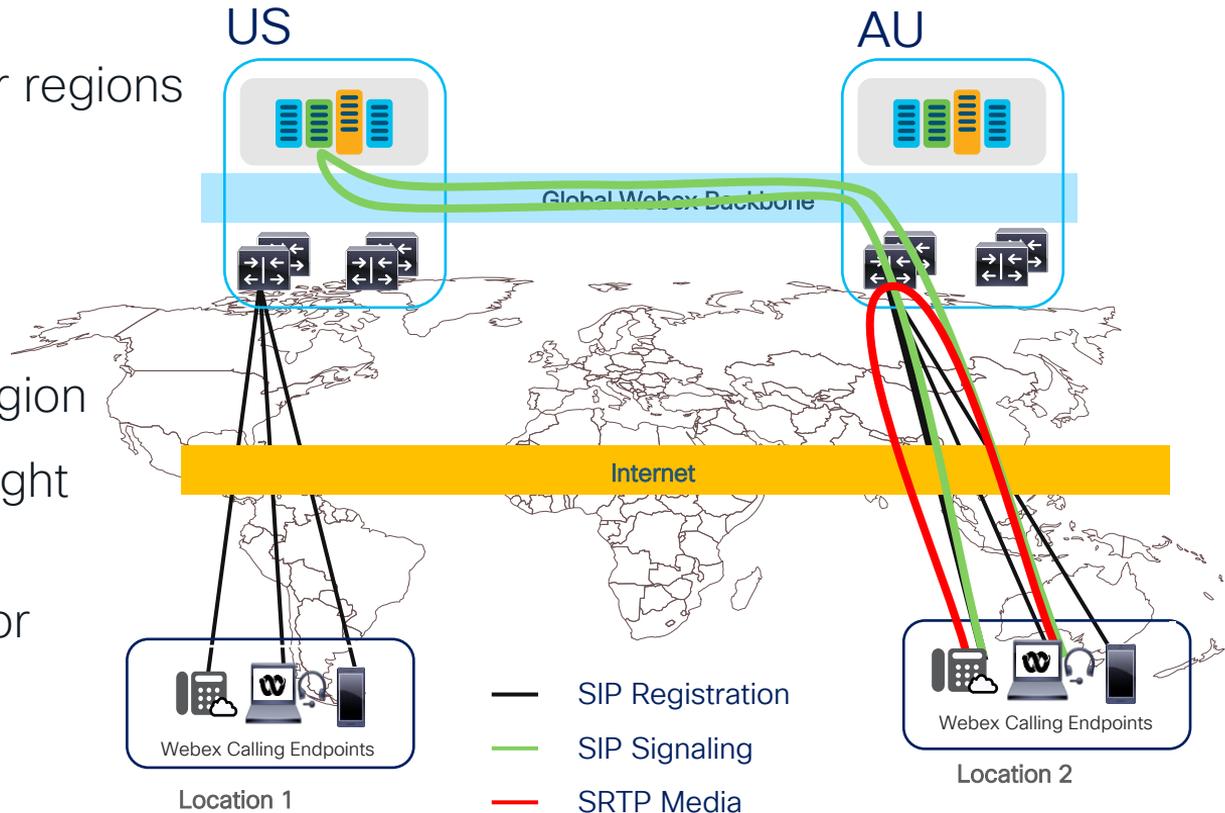
Multi–region customer: Regional media for Cloud Connected PSTN

- Locations in home region can use all CCPP providers available in home region

- New: locations in remote region can use CCPPs available in remote region

- PSTN media traffic stays within region if CCPP provider in remote region is used

US

AU

CCPP

CCPP

Global Webex Backbone

Internet

Webex Calling Endpoints

Location 1

Webex Calling Endpoints

Location 2

—— SIP Registration

—— SIP Signaling

—— SRTP Media
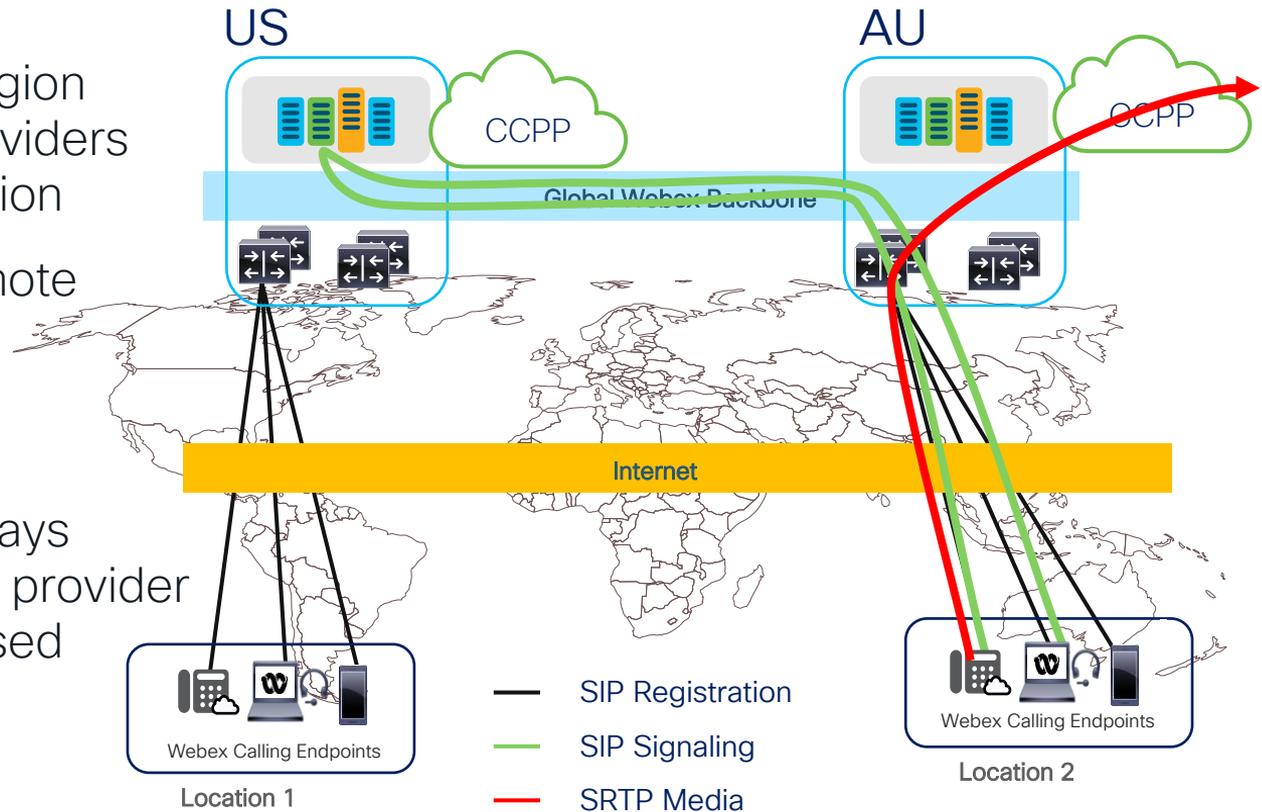
Singapore Media POP

- Two full Webex Calling deployments in APJC
  - JP: Osaka, Tokyo
  - AU: Sydney Melbourne
- Challenge: APAC region too large to keep RTT within acceptable bounds

- Mmdia POP in Singapore
  - Access: endpoint and Local Gateway registration, failover to JP (Osaka, Tokyo)
  - Peering: trunks to Cloud Connected PSTN providers
  - Media services (VM, conferencing)
  - Call Recording: local media server, call recording leg to JP (Osaka, Tokyo)

Webex Calling MT Regional Configuration

Countries				Webex Calling MT DC	
Country/Region selected during Customer creation in Control Hub (FTSW)				Home region for Webex Calling customer	
• Australia	• New Zealand	• Indonesia		• AU	Sydney/Melbourne
• Canada				• CA	Toronto/Vancouver
• Austria • Bahrain • Belgium • Bulgaria • Czech Rep. • Croatia • Cyprus • Denmark • Egypt • Estonia • Finland	• France • Germany • Ghana • Greece • Hungary • Iceland • Ireland • Israel • Italy • Kuwait • Latvia	• Lithuania • Luxembourg • Malta • Netherlands • Nigeria • Norway • Poland • Portugal • Qatar • Romania • Saudi Arabia	• Slovakia • Slovenia • South Africa • Spain • Sweden • Switzerland • Turkey • UAE • Ukraine • United Kingdom	• EMEA	London/Frankfurt Amsterdam/Frankfurt ** ** EU post Brexit
• Hong Kong • India • Japan	• Malaysia • Philippines • Singapore	• South Korea • Taiwan • Thailand	• Vietnam	• JP	Tokyo/Osaka

Webex Calling MT Regional Configuration
Continued

Countries				Webex Calling MT DC
Country/Region selected during Customer creation in Control Hub (FTSW)				Home region for Webex Calling customer
• American Samoa • Anguilla • Antigua & Barbuda • Argentina • Bahamas • Barbados • Bermuda • Bolivia • Brazil • British Virgin Islands • Canada* • Cayman Islands	• Chile • Columbia • Costa Rica • Dominica • Dominican Republic • Ecuador • El Salvador • Grenada • Guam • Guatemala • Honduras • Jamaica	• Mexico • Montserrat • Nicaragua • Northern Mariana Islands • Panama • Paraguay • Peru • Puerto Rico • Saint Kits & Nevis • Saint Lucia • Saint Vincent & the Grenadines	• Sint Maarten • Trinidad & Tobago • Turks & Caicos Islands • United States • Uruguay • US Virgin Islands	• US Dallas/Chicago/New York *Toggled Behavior

Location Considerations

PSTN Integration
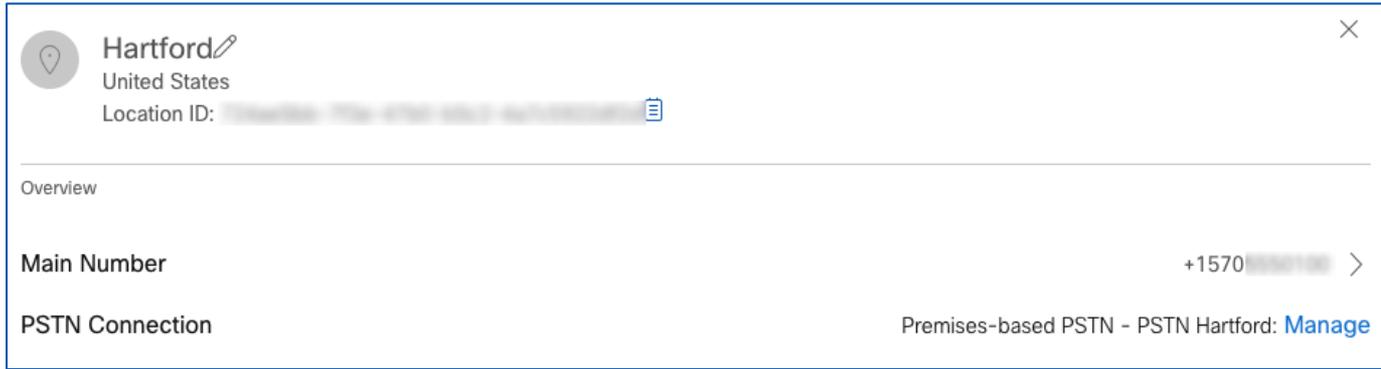
- PSTN defined at the location level

- One PSTN choice per location (Cisco PSTN, CCPP, Premises PSTN)

- All PSTN calls originating from location use same PSTN

- Location main number is required for any calls to/from location.

Emergency Calling

Two options to handle emergency calls:

Only applies to US/CAN

- Enhanced emergency (E911) service
  - Dynamic; support roaming device
  - Only available in US/CAN
  - https://help.webex.com/en-us/article/av6oo3/Enhanced-Emergency-Calling-for-Webex-Calling

- Emergency Callback Number (ECBN) based
  - Static configuration of ECBN per location (per user override)
  - https://help.webex.com/en-us/article/nzqvtyq/Emergency-Callback-Number-in-Control-Hub

Emergency Callback Number

- Set at location level
  - Can be main number
  - ... or any other assigned (and active) number in that location

- User level override

- Recommendations:
  - for users with phone number use that as ECBN
  - For users w/o phone numbers multiple ECBNs can exist within (large) locations
  - ECBNs must be live answering points (be careful with IVRs, queues, AAs, ...)

Emergency Callback Number (ECBN)
Choose which phone number will be the default ECBN for a user without a phone number.

○ Use location main number: +1570555 ■■■ (Hartford)

● Use assigned number from this location

+1575555 ■■■ (Anita Hunt) ▾

👤 **Lester Ray**
● Active · ■■■■■■■■■■■■ · Location: Hartford

Profile General Meetings **Calling** Messaging Hybrid Services

‹ Calling

Emergency callback number

○ User's phone number: +1570■■■111
○ Location default ECBN: +1570■■■100
● Assigned number from user's location

+1570555 ■■■ (Tomothy St... ▾

Feature / Location Dependencies

Calling features are configured at the location level ... and many features still work across locations

- **Numbers/extensions** – All numbers are accessible between locations. If an extension overlap exists, site codes can be used to allow extension dialing between locations.

- **Auto Attendants** – Assigned to a location, search scopes can be defined per Location or globally

- **Hunt Groups / Call Queues** – Assigned to a location, agents can be assigned from any location

- **Single Number Reach** – Assigned to a location, user access can be defined per Location or globally.

- **Paging Group** – Assigned to a location, paging targets and originators can be assigned from any location.

- **Receptionist Client** – Assign via user, searched filter available based on location.

- **Virtual Extension** – Can be defined per Location or globally.

- **Voicemail Group** – Assigned to a location and uses location voicemail settings. Any number within the customer can forward to the voicemail if required.

Features with Cross Location Limitations
Call Park

- **Call Park Extensions** – Call Park is used for a network hold and allows a user to park a call against an available user's extension or to a Call Park Extension

  - Call Park Extensions are configured within a specific location

  - Any user from any location can unpark the parked call (provided the extension is accessible)

  - Location level parameters for recall (parking user, hunt group, user/hunt), timers and ring pattern

- **Call Park Group** – The Call Park Group service allows a defined group of users to automatically park calls against other available members of a call park group

  - The members of this group can only be from the same Location and can be in a single group

  - Any user within the ORG can answer the parked call

  - Location level parameters for timers and ring pattern for parked calls

  - Call Park Group defines the recall options (parking user, hunt group, user/hunt)

Features with Cross Location Limitations
Call Pickup, Shared Lines

- **Call Pickup** – Users that are added to a call pickup can answer calls when another member of the call pickup is busy.

  - A user can only be assigned to one call pickup. A location may have multiple call pickups

  - A call pickup can only have users from the same location

  - Call Pickup requires FAC for use in Webex Calling; default Pickup softkey uses Directed Call Pickup

  - Directed call Pickup works across all locations

- **Shared Lines** – A user line that is assigned to multiple devices or other user's devices is a shared line. Scope of adding a shared line is limited to the numbers in a location*.

  - Alternatives to shared lines are using features that are supported across location:

    - <u>Virtual Lines</u>*

    - Hunt Group

    - Call Queue

    - Executive Assistant

  *cross-location limitation will be removed together with the release of virtual lines in Feb 2023

Per Location Scale

- Users & workspaces – 30k combined

- Numbers – No hard limits, recommended: less or equal 3 times the number of users

- Trunks – 100

- Auto Attendants – 1000

- Virtual Extension – 1000

- Hunt Group – 1000

- Call Queue – 1000

- Authorization Codes – 1000

- Call Park Extensions – 100

- Call Pickup Groups – 1000

- Receptionist Client – 500

Interworking Unified CM / Webex Calling

Webex Calling Dialing Habits

- Extension dialing: 2-6 digits (default 4)

  - Inter- and intra-site; inter-site requires unique extensions

- ESN (Location routing prefix + user extension) using an optional location code: up to 7 digits

- +E.164

  - Telephone numbers defined in the Webex Calling system. Always resolvable by +E164 dialing

- Country Dial Plans

  - US, Canada, Puerto Rico:

    - National: 10 digit dialing or 1+10 digit dialing

    - 7 digit dialing:

      - Webex Calling will normalize to E.164 for external calls assuming NPA of originator

      - Dial plans in phones not optimized for 7D dialing timeout experienced when using off-hook dialing

      - Avoid conflict between abbreviated inter-site dialing (enterprise numbers) and 7D when integrating with PBX via Local Gateway; no 7D enterprise numbers

  - Other countries

    - Various digit lengths based on published national numbering plan: https://help.webex.com/en-us/article/757iyo/Dial-plans-by-country

Understanding location codes

- What if extension ranges of sites overlap?
  - No extension dialing between sites
  - Alice can call Bob and Charlie using extension dialing
  - Alice cannot call Dave using extension dialing
  - What if Charlie dials 4002?

Widgets, Inc.

LA

Alice
4001
+13105554001

Bob
4002
+13105554002

NY

Charlie
6001
+12125556001

Montreal

Dave
4002
+15145554002
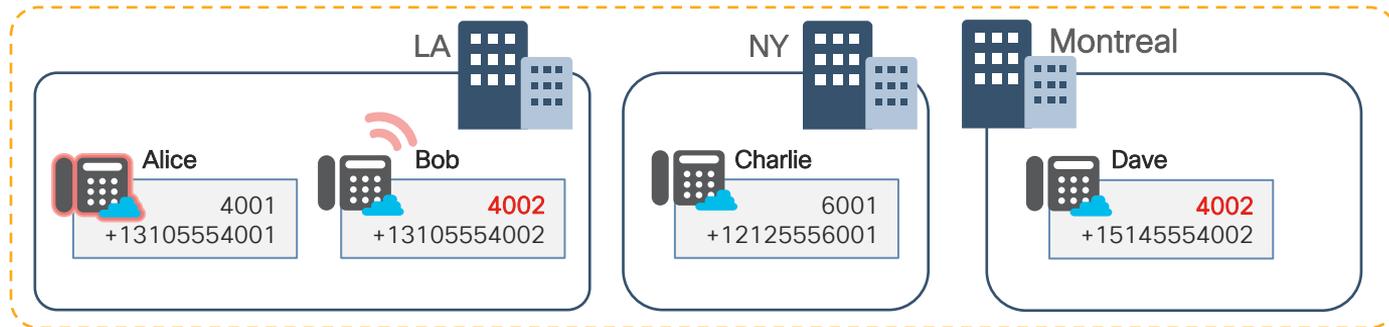
Understanding location codes

- Solution: add location codes
  - Need to be unique!
  - Inter-site dialing using location code + extension
  - Location code + extension is unique

- Alice can call Dave (and the other users) using inter-site dialing

Location	Location Code
LA	8201
NY	8202
Montreal	8251

Widgets, Inc.

LA — Alice
4001
82014001
+13105554001

Bob
4002
82014002
+13105554002

NY — Charlie
6001
82026001
+12125556001

Montreal — Dave
4002
82514002
+15145554002
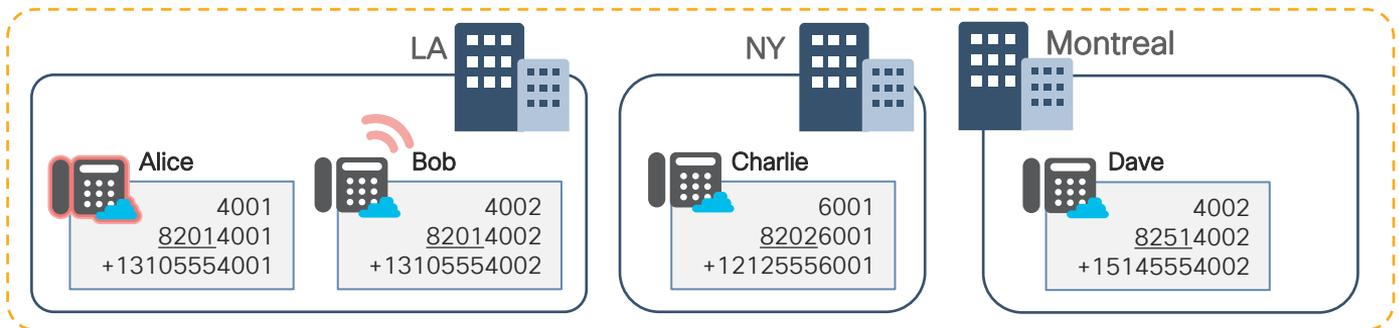
Enterprise Best Practices

- Goal: optimize dial plan handling in phones to minimize timeouts
    1. Outbound dialing digit (for example 9)
        - Per location
    2. Internal steering digit for inter-site (for example 8)
        - Different from PSTN
    3. Uniform location code length (for example 4)
        - Location code includes leading internal steering digit!
    4. Uniform extension length (for example 4)

- Uniform inter-site dialing: steering digit – location id – extension
    - Example: 8-496-9764

Enterprise Best Practices

- Goal: optimize dial plan ha
  1. Outbound dialing digit (fo
  - Per location
  2. Internal steering digit for
  - Different from PSTN
  3. Uniform location code le
  - Location code includes leadi
  4. Uniform extension length

- Uniform inter-site dialing:
  - Example: 8-496-9764

Edit External Dialing for Dallas

Outbound Dialing

Outbound Dial Digit

Specify the number which users must dial before placing an external call.
8 is set as the internal dialing steering digit and cannot be used as the outbound digit.

9	∧
1	
2	
3	
4	
5	
6	
7	
9	

Dialing Preview

Format for external dialing

9 - (external number)

Cancel   Save

Enterprise Best Practices

- Goal: optimize dial plan handling
  1. Outbound dialing digit (for exa...
     - Per location
  2. Internal steering digit for inter-...
     - Different from PSTN
  3. Uniform location code length (
     - Location code includes leading inte...
  4. Uniform extension length (for ...

- Uniform inter-site dialing: steer...
  - Example: 8-496-9764

Edit Internal Dialing

Routing Prefix

The format of the digits used for all location routing prefixes.

Location Routing Prefix Length

Choose the number of digits to be used to connect with users at other locations.

4

Set Steering Digit in Routing Prefix

Choose the number which will be set as the first digit of every routing prefix.

8

Extension

The format of the digits used for extensions within locations.

Internal Extension Length

Choose the number of digits for an internal call.

4

Dialing Preview

Format for internal dialing digits

8XXX – XXXX

Routing Prefix   Extension

Cancel   Save

Conflicts

- To avoid timeouts conflicts need to be avoided between:
  - First digit of extensions
  - Internal steering digit
  - Outbound dial digit

- Example: steering digit 8, 4D extensions, 4D location code

- What if Alice lifts the handset and starts to dials 8, 2, 0, 2? Bob, Charlie?

Location	Location Code
LA	8201
NY	8202
Montreal	8251

Widgets, Inc.

LA

Alice
8001
82018001
+13105558001

Bob
8202
82018202
+13105558202

NY

Charlie
6001
82026001
+12125556001

Montreal

Dave
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82514001
+15145554001
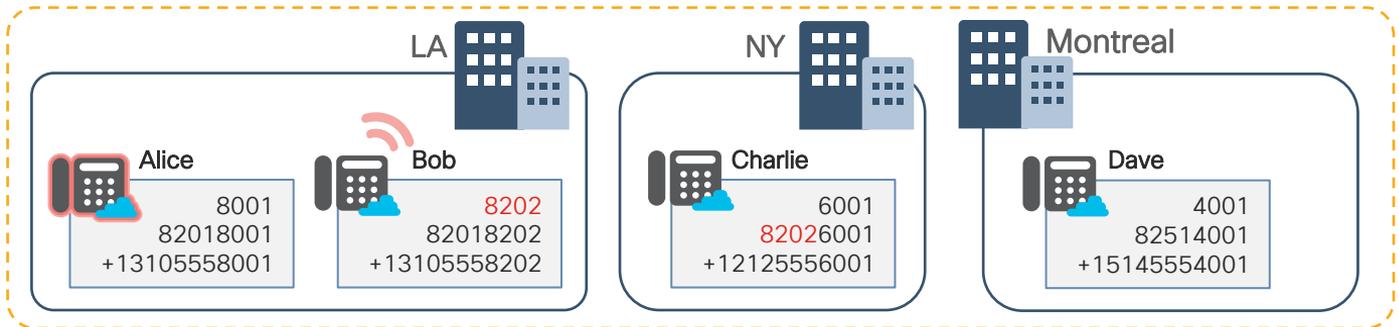
Local Gateway Dial Plan Integration
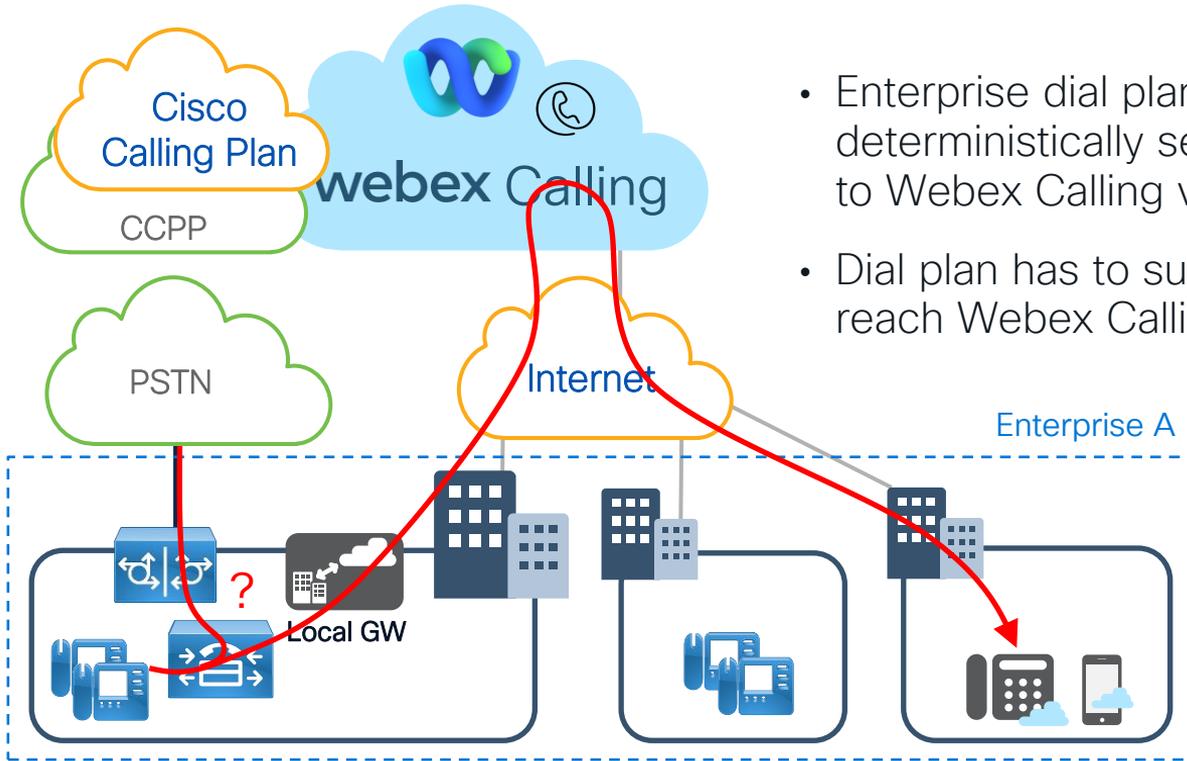
- Enterprise dial plan on Unified CM needs to deterministically send Webex Calling destinations to Webex Calling via Local Gateway

- Dial plan has to support "typical" dialing habits to reach Webex Calling destinations

- Webex Calling destinations need to be regularly updated during transition period as users move to Webex Calling

LGW Dial Plan Integration

- With a single Egress LGW selection not site specific → no LRG based LGW selection required[*]

- Multiple LGWs in multiple locations: RL and LRG

- Can can use multiple LGWs for scale and redundancy

- Webex Calling destinations provisioned as +E.164 route patterns

CSSs	Partitions	Route Lists	Route Groups

NYCInternational

DN
All IP Phone DNs (+E.164)

DN

NYCtoE164
1XX, Prefix +12125550
9.[2-9]XXXXXX, Pre-Dot, Prefix +1212

WebexCalling
+E.164 RPs for all Webex Calling destinations

Remaining Partitions

Webex Calling RL
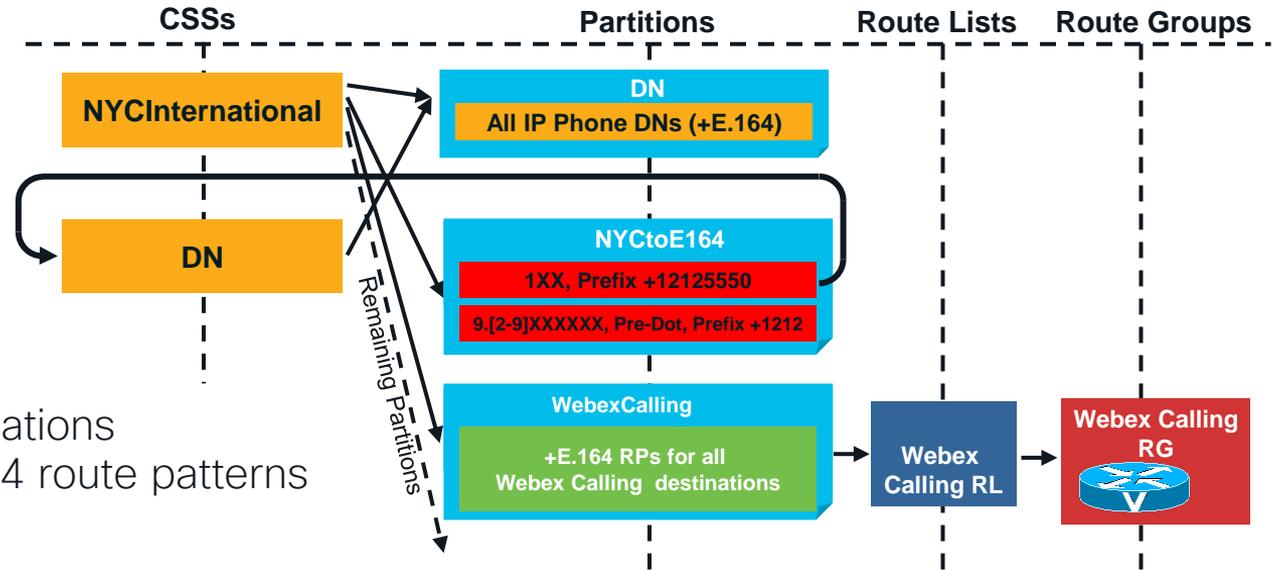
Webex Calling RG

[*]For extension dialling w/ non-unique extensions site specific trunks are required so that Webex Calling can establish proper dialling context. LRG can be used for site specific egress trunk selection

CISCO Live!

UCM to WxC – ESN Outbound Route Patterns

- Any dialing habit can be transformed to +E.164 using dialing normalisation translations

- Dialing normalisation for Webex Calling ESN ranges to +E.164 in same partition as Webex Calling route patterns
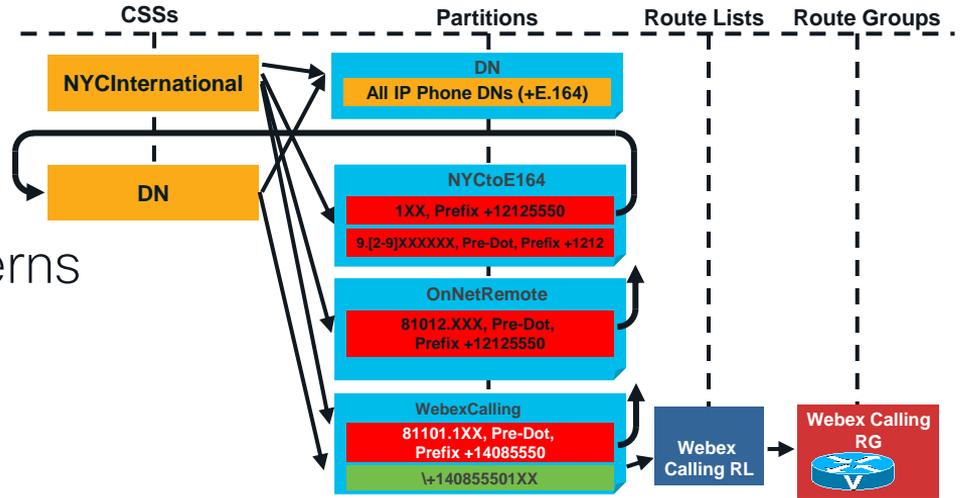
UCM to WxC – ESN Outbound Route Patterns

- Any dialing habit can be transformed to +E.164 using dialing normalisation translations

- Dialing normalisation for Webex Calling ESN ranges to +E.164 in same partition as Webex Calling route patterns

- Better solution: use ESN route patterns for Webex Calling ESN ranges → also works with extension only Webex Calling destinations

Diagram elements:
- NYCInternational
- DN
- **DN** — All IP Phone DNs (+E.164)
- **NYCtoE164** — 1XX, Prefix +12125550 / 9.[2-9]XXXXXX, Pre-Dot, Prefix +1212
- **OnNetRemote** — 81012.XXX, Pre-Dot, Prefix +12125550
- **WebexCalling** — 81101.1XX / \+140855501XX
- Webex Calling RL
- Webex Calling RG
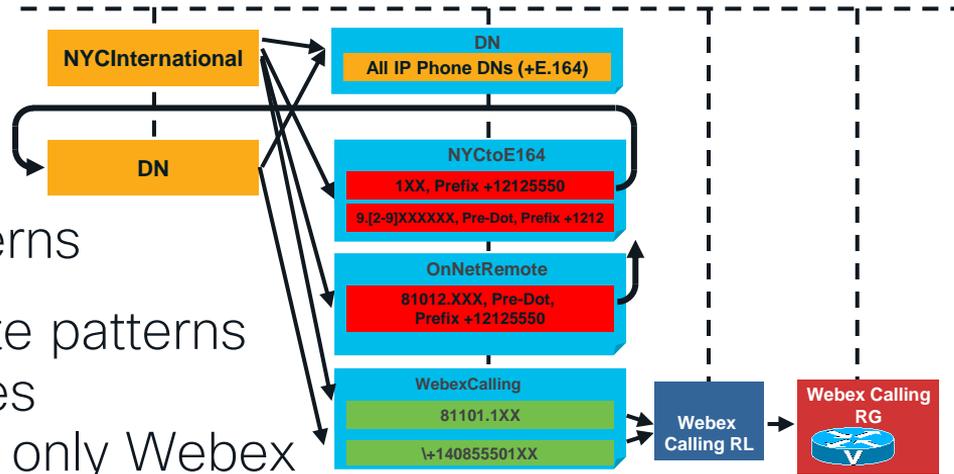
UCM to WxC – PSTN Routing to Webex Calling

- PSTN Dial Plan can utilize the same Route Patterns for +E.164 dialing as UCM users.

- Called party globalization to +E.164 required if no +E.164 received from PSTN

- Multiple ways to do on UCM:

  - Incoming Called Party Transformation Patterns (preferred)

  - Translation Pattern

  - Route Patterns
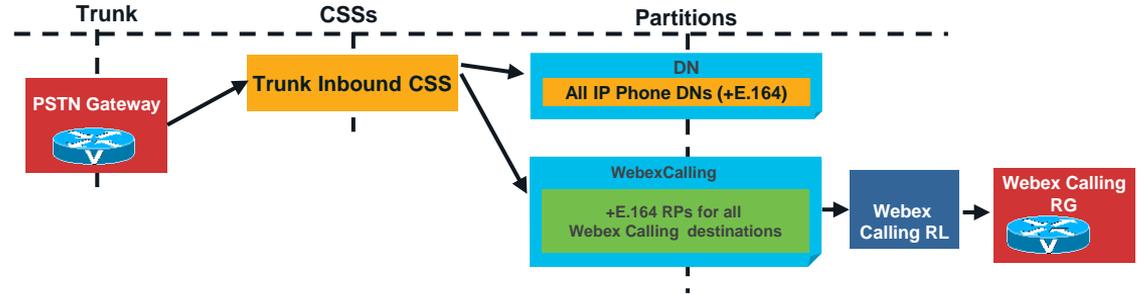
Routing from Webex Calling to Unified CM

Enterprise Dial Plans

- Load balancing and failover across trunks to premises (scale, redundancy)

- Deterministic routing based on ESN and +E.164 patterns in enterprise dial plan

- Webex Calling locations can use cloud PSTN or premises PSTN
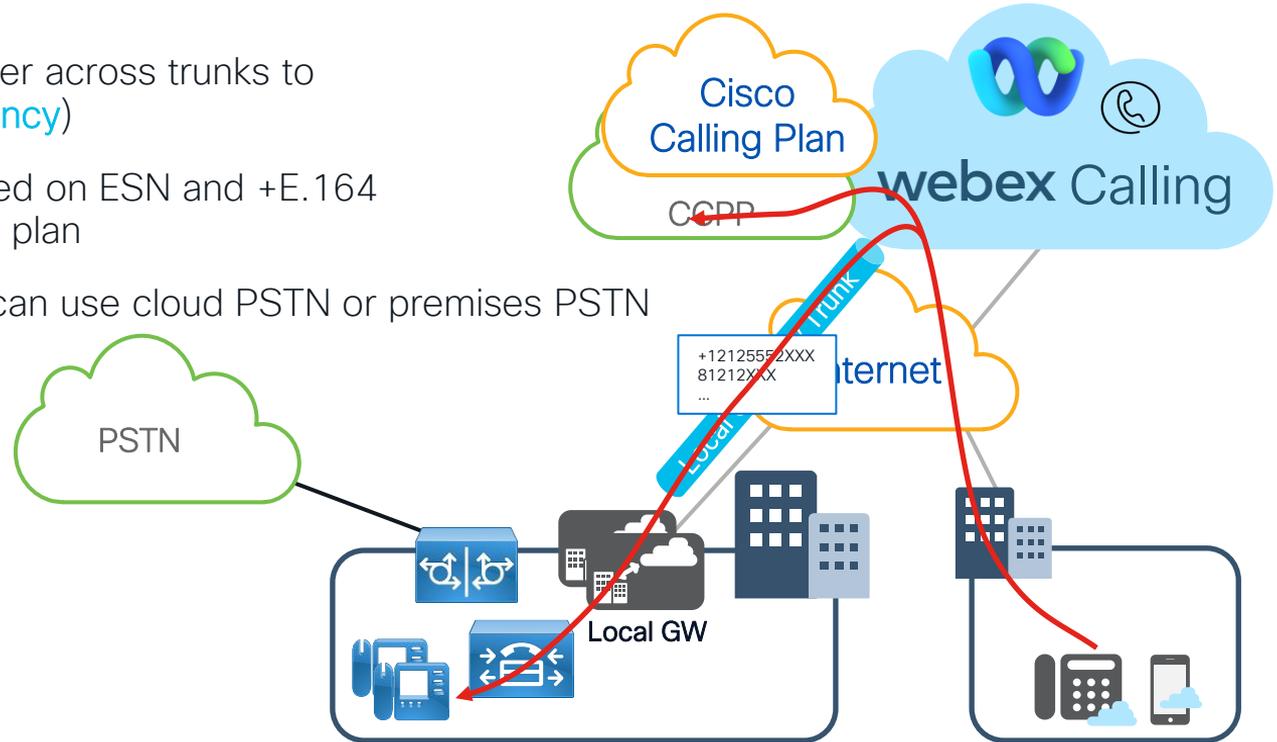
Caller ID Normalization

Calling Party Transformation Pattern Configuration

- Tool: Calling Party Transformation Patterns

- Can be done either
  - inbound on Trunk from Webex Calling
  - Outbound on Unified CM registered device

- Best practice: globalize on ingress, localize on egress

- … but customer might have implemented other dial plans

- Unified CM caller ID is always based on RPID or From (in this priority)

- On dual identity trunks from Webex Calling profiles on CUBE or SIP normalization scripts (Lua) on Unified CM can be used to (selectively) copy From: to PAI

Reference:

Interworking Limitations

- Local Gateway (registering) concurrent session limitations

- Integration between Webex Calling and Unified CM is pure call routing integration
  - No concept of sharing call state nor user (line) presence

- Impact on any feature relying on call state or presence:
  - Call pick-up (notifications)
  - Hunt: no way to determine state of line
  - BLF
  - ..

- Keep users of these features together on a single call control instance

Cisco UCM and Webex Calling coexistence

- Proper dial plan design (see Enterprise PA[*] for details) enables seamless transition of DNs from UCM to Webex Calling

  - All dialing habits are possible: ESN, DN and +E.164

- Detailed information in

  - "Transitioning from Cisco UCM to Webex Calling Deployment Guide" https://www.cisco.com/c/dam/en/us/td/docs/solutions/PA/mcp/DEPLOYMENT_CALLING_Unified_CM_to_Webex_Calling.pdf

  - "Cisco Preferred Architecture for Webex Calling Overview" https://www.cisco.com/c/dam/en/us/td/docs/solutions/CVD/Collaboration/hybrid/AltDesigns/PA-WbxCall.pdf

*https://www.cisco.com/c/en/us/td/docs/solutions/CVD/Collaboration/enterprise/12x/120/collbcvd.html

Advanced Call Handling Group Functions

Inbound Call Handling Options

- User's TN

- Receptionist Client

- Auto Attendant

- Call Queue   Building block for "advanced" call handling

- Hunt Group

- …

https://help.webex.com/en-us/0r7a2z

Auto Attendant

- Primary and up to 10 alternate numbers

- (Selective) call forwarding

- (Custom) greeting

- Schedules: business/after Hours, holiday

- DTMF menu per schedule
  - Function per DTMF key

- Optional: DTMF extension dialing

- Transfer to: user, call queue, hunt group, …

- Common use case:
  - Two-stage dialing if not all users have TNs
  - Callers select intent and get sent to intent specific group

- Adoption/acceptance depending on region/market

Business Hours   After Hours

Business Hours Menu
Assign different functions to each keypad number. These settings direct your customers where they need to go when they enter a specific number on their phone.

☑ Enable extension dialling without requiring a menu item.

Press 0 to	Dial by name ⌄
Press 1 to	Transfer call without prompt
Press 2 to	Transfer call with prompt
Press 3 to	Transfer call to operator
Press 4 to	
Press 5 to	Dial by name
Press 6 to	Dial by extension
Press 7 to	Repeat menu
Press 8 to	Exit menu
Press 9 to	Transfer call to voicemail
Press * to	
Press # to	Not Used ⌄

https://help.webex.com/en-us/nsioxoi

Hunt Group, Call Queue: Common Features

- Agents: users and workspaces from any location
  - Can be extension only
- Call routing pattern
  - Circular
  - Top Down
  - Longest Idle
  - Weighted
  - Simultaneous
- Call queues also support skill based routing

Circular (Max 1,000 agents)
Send calls to the next available agent, cycling through all agents after the last one has taken a call.

Top Down (Max 1,000 agents)
Send calls through the queue of agents in order, starting from the top each time.

Longest Idle (Max 1,000 agents)
Send calls to the agent who has been idle the longest. If they don't answer, proceed to the next agent who has been idle for the second longest, and so on until the call is answered.

Weighted (Max 100 agents)
Send calls to idle agents based on the percentages you assign to each member of the hunt group. The total percentage of distributed calls must equal 100%.

Simultaneous (Max 50 agents)
Send calls to all the agents on call queue at once.

Hunt Group, Call Queue: Call Forwarding

- Always or selective

- Selective based on schedule and calling party
  - Use case: switch call handling between groups based on schedule

- Destination can be any number or extension
  - .. But only in the same location

- Forward targets:
  - User, auto attendant, call queue, hunt group
  - Allows to build complex linked call handling
  - For example: set up night service handling

Grup Call Management Enhancing Call Queue Functionality

Group Call Management
Enhancing Call Queue Functionality

Out-of-box <u>informal</u> call center capabilities

- Easy setup and **included with Webex Calling**

- Advanced call queue capabilities (request call-back, skills-based routing)

- Supervisor managed: monitor, coach, barge-in, takeover

- Reporting & Analytics dashboard in Control Hub

- Use existing Webex Calling devices and app for agent & supervisor functions
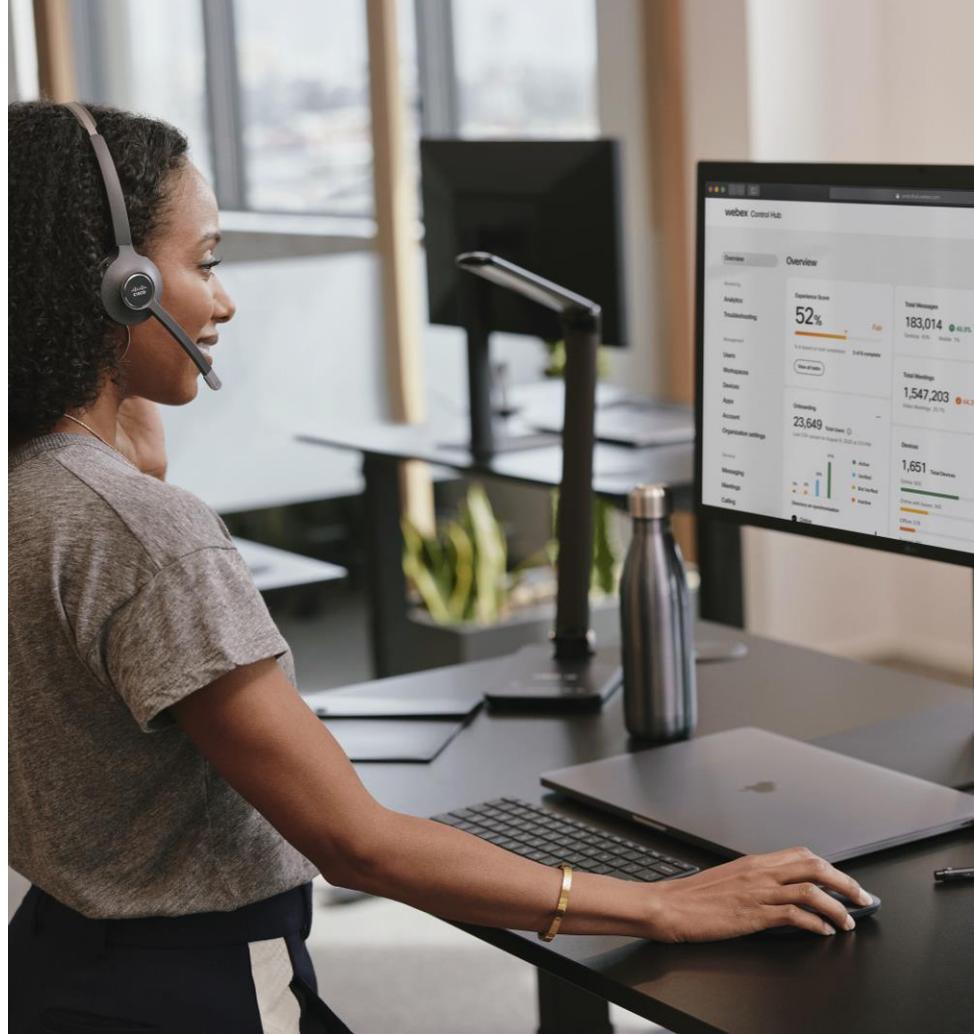
Benefits of a native experience

- Single pane of glass for administration

- No additional cost

- Use existing Webex App for agent and supervisor

- Self administered with limited special admin skills needed

- Scale agents as required

What's available today ?

- Queues for up to 50 calls

- Circular, Top Down, Longest Idle, Weighted and Simultaneous routing policies

- Overflow configuration for size and time

- Bounce calls from non-responsive agents

Treatments for callers in queue
- "Entrance" messages
- "Estimated wait time" messages
- "Comfort" messages
- Request callback
- Music on hold

Group Call Management features

Supervisor features

- Associate Agents to Supervisor(s)
- Supervisor functionality (Monitor, Coach, Barge, Take-Over) via feature access code

Call queue policy

- Policy (Night Service, Holiday Service, Forced Forward, Stranded calls)
- Announcements (Call whisper, Comfort bypass)
- Skill-based routing
- Outbound caller id selection for agent
- Customer call back

App experience

- Enhanced agent sign-in experience
- Enhanced agent join/unjoin experience

Analytics

- Call queue stats
- Call queue agent stats
- Live queue stats

Positioning

- Intended use
  - Help Desks
  - IT Support
  - Small number of users to monitor calls from customers
  - Primarily audio focused callers

- What it is not
  - A replacement for Webex Contact Center
  - A stand-alone service (requires WxC License)

- Doesn't include the following:
  - Omni-channel media handling
  - Work Force Management
  - Predictive Dialing
  - Advanced analytics
  - Artificial Intelligence / Chat bots
  - CRM integration

Feature
Overview

Supervisor Functions

- Enable a user to be Supervisor for Agents

- Supervisor can manage agents for a seamless customer experience

- Supervisor to have additional capabilities such as Monitoring, Coaching, Barge-In, and Take-Over of Agents calls

- Supervisor functions via FACs and a dedicated app experience*

Supervisor Functions
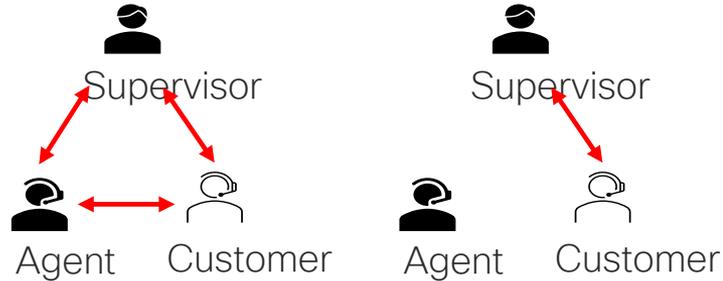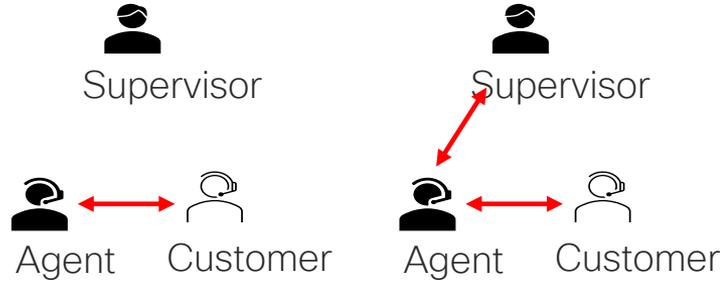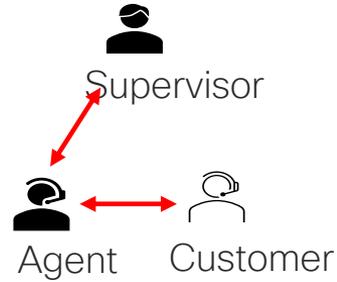
Barge   Take Over

Additional queue policies

- Accounts for special circumstances
  - Night Service – defines queue routing for non-business hours
  - Holiday Service – defines queue routing during holidays
  - Forced Forwarding – defines a "force forward" destination, in case of an emergency, or other event
  - Stranded – defines a routing destination in the event a call is in a queue with no agents staffing it
- Supports the existing policies
  - Call Back
  - Overflow (Size and Time)
  - Bounced
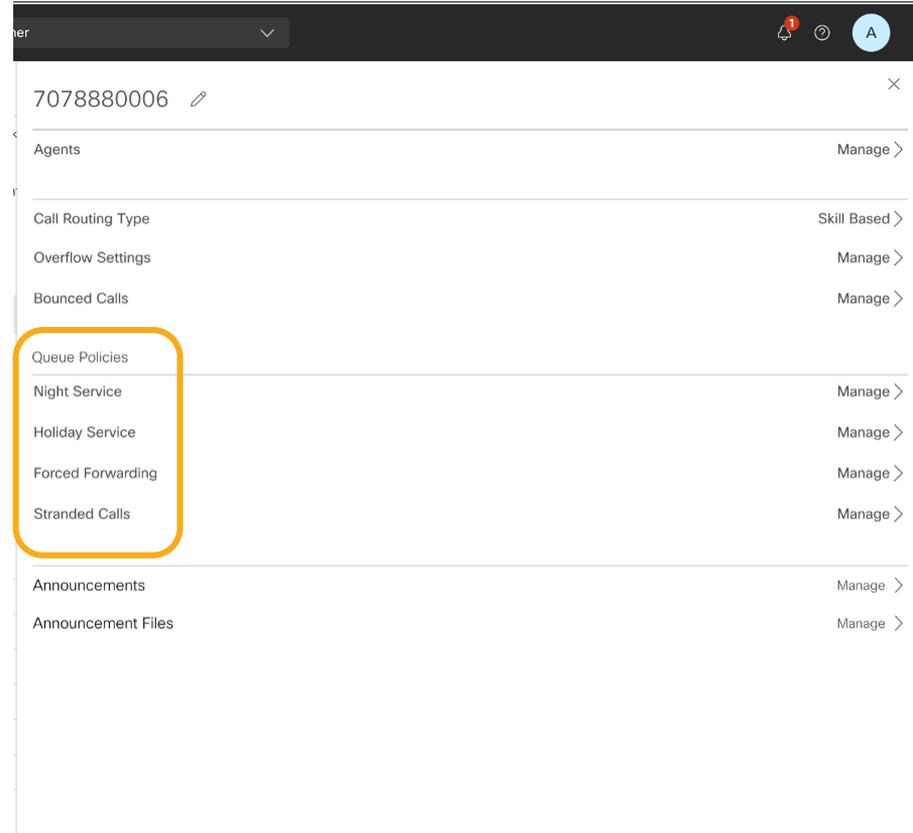
Customer Call Back

- Allows customers in queues to request a call back instead of waiting
- Configurable based on estimated wait time

Customer

Queue

Wait time in queue is long, customer decides to request a call back

Time passes when customer is not on phone

Queue

Once it's the customers "turn", the queue will call the customer back

Customer is connected to the next available agent
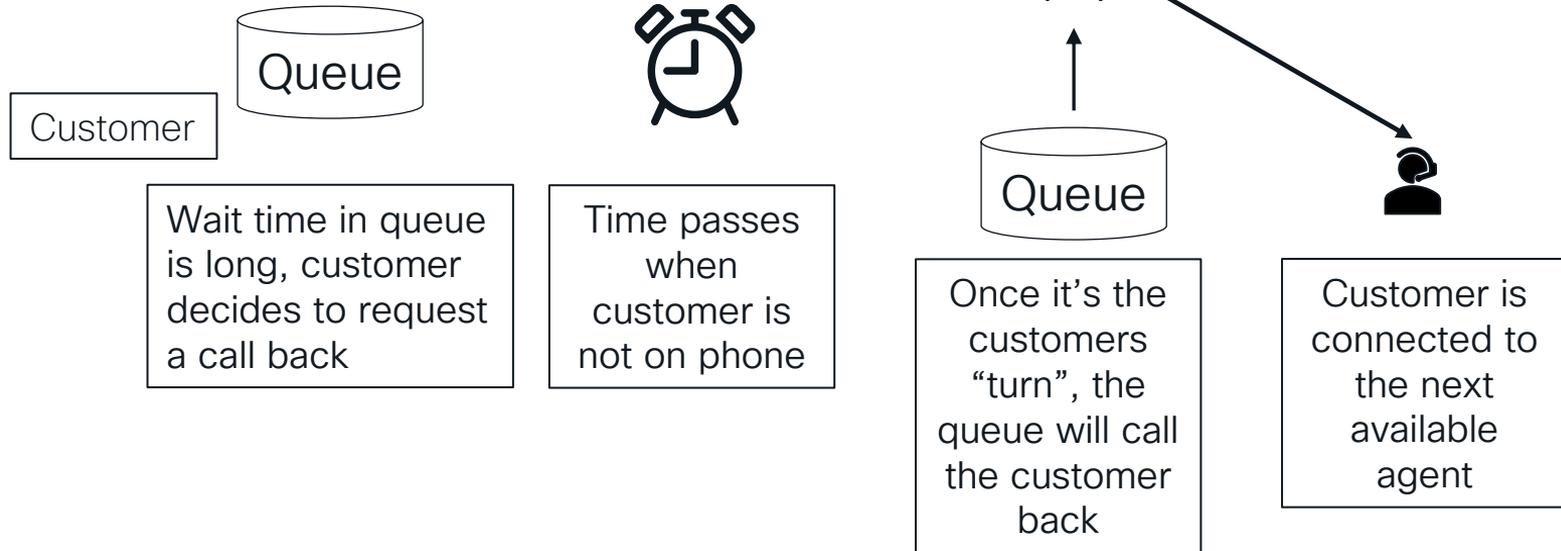
Proper callback number for outbound call support
Allows agents to make outgoing calls using CLID of a call queue

Agent → Customer

For customer callbacks, staff can present the business CLID of their call queue

- If you don't want the customer to call staff directly

- And want the customer to have the ability to reach an available, qualified staff member

FAC codes
Agent uses FAC Code to "override" the persistent configuration or input the queue CLID desired to be sent.
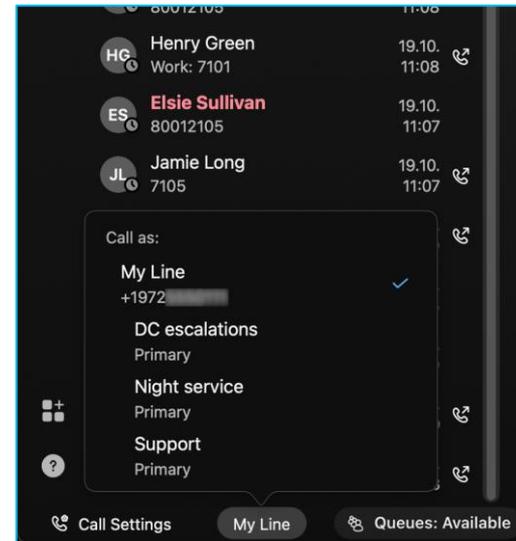
Skills-based routing

- Call routing prioritization is based on agent skill level

  - Sends calls to the most "skilled" agent, instead of the "next" agent

  - Agents are rated on a 1-20 scale

  - Second layer routing algorithm options include Circular, Top Down and Longest Idle

- Agents can be staffed in skills-based and priority-based queues simultaneously
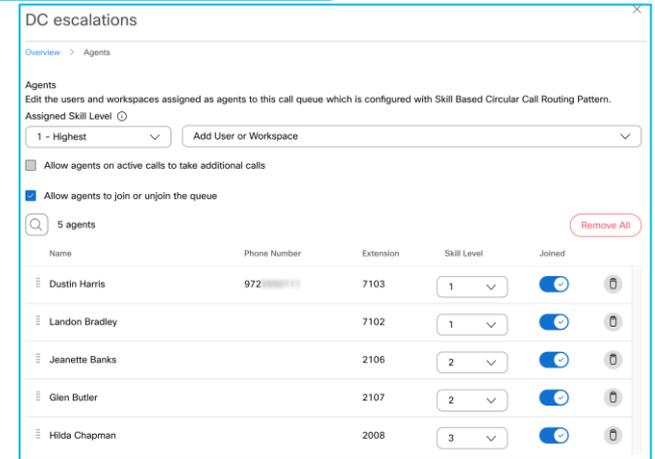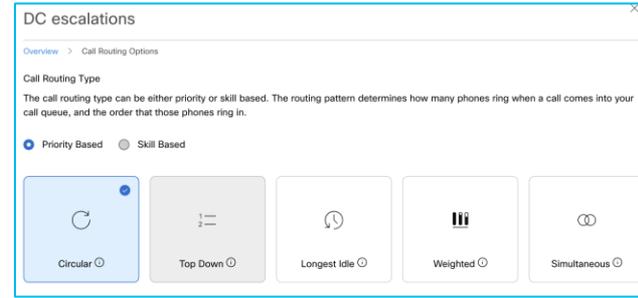
Agent Join/Unjoin for specific call queues

- Allows agents to indicate which queues to receive / not receive a call from

- Administrators configure in Control Hub

- Agents may configure in App

- Improves user experience for agents
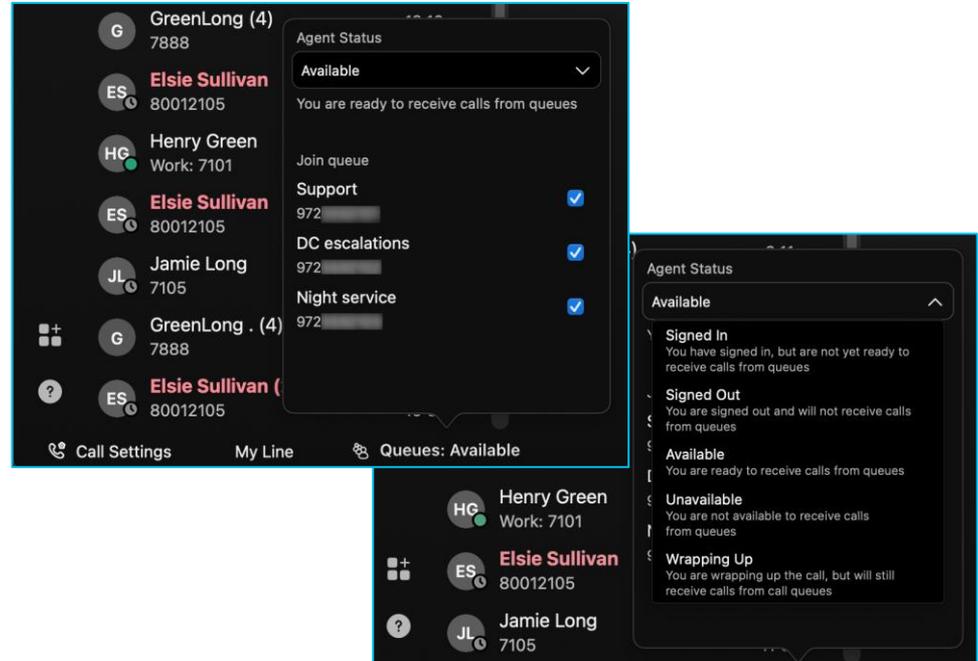
Enhanced queue IVR capabilities

- Additional announcements to provide better management of incoming calls
  - Comfort Bypass – Provides an alternative comfort handling when calls are expected to be answered quickly
  - Whisper – Provides an announcement to the agent answering a call, indicating the queue the call is coming from

- Supports the existing announcements
  - Welcome (including mandatory)
  - Estimated Wait
  - Comfort
  - Music on hold

Analytics

- Provides call queue performance reports for administrators

- Call Queue Stats

- Call Queue Agent Stats

- Live Queue Stats

Additional resources available

- [Group Call Management for Webex Calling FAQ](#)

- [Group Call Management At-a-Glance](#)

- [Configure and modify device settings in Webex Calling (Enable Softkeys on MPP)](#)

Extension Dialing Considerations

Extension Dialling Between Locations

- User A in location A can call inter-location to user B in location B by dialing "2304"
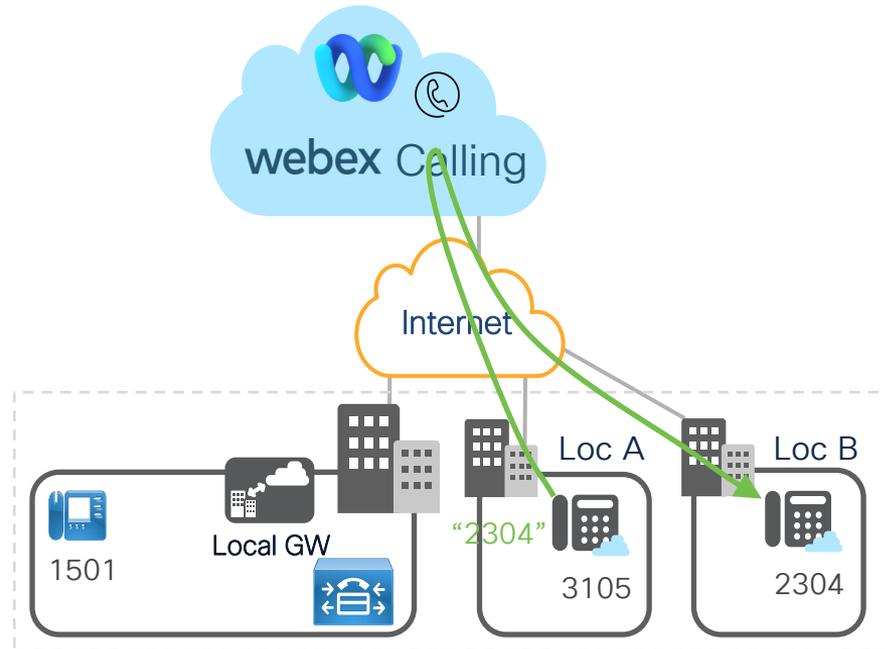
Challenge 1: Overlap on Webex Calling

- User A in location A dials "2304", an extension that exists in multiple locations

- The call is routed to one of the extensions, Location B or C

  - Deterministic: in contrast to stochastic the same destination will ring for every call

  - Hard to predict: preference hidden from admin/customer

- If overlapping extension ranges exist then cross-location extension dialling should not be advertised
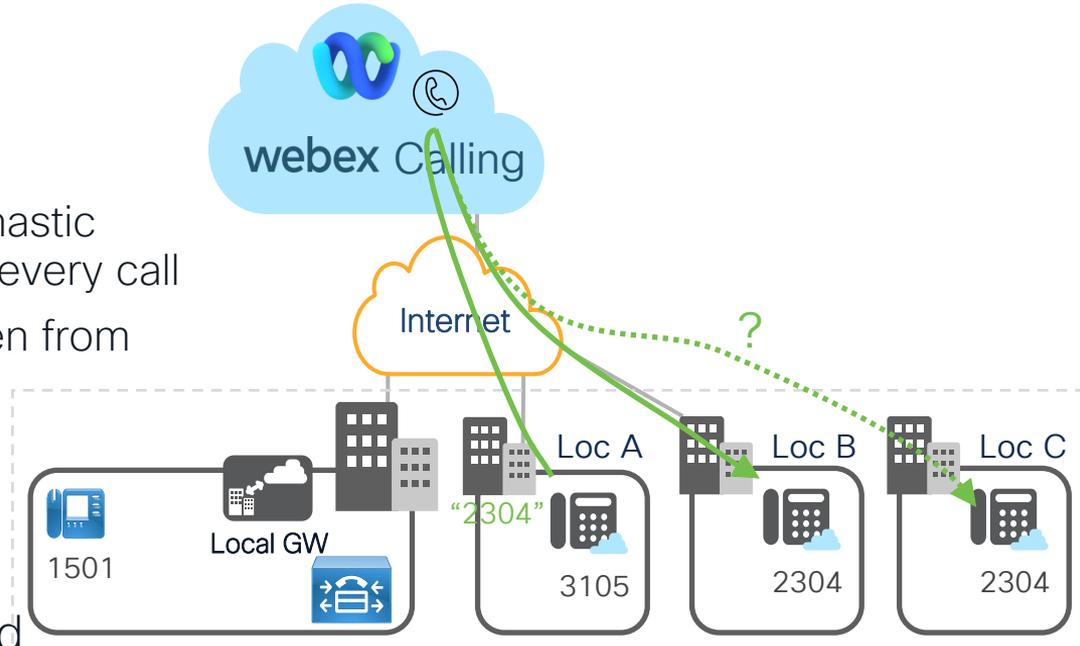
Extension Dialling to Unified CM (Split Sites)

- User A in location A can call user C on Unified CM by dialing "1501"

- Unknown extension routing enabled on location A, routing choice trunk

- Unified CM dial plan routes based on extension
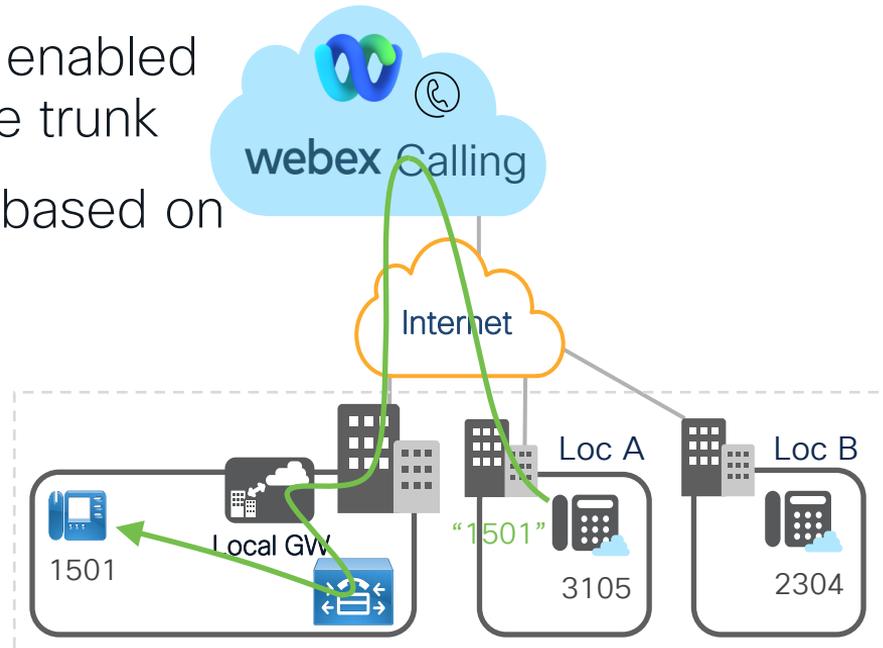
webex Calling

Internet

Loc A

Loc B

Local GW

"1501"

1501

3105

2304

Special Case: Multiple Split Sites
Calling from Webex Calling to Unified CM

- Locations with users on UCM and WxC

Special Case: Multiple Split Sites
Calling from Webex Calling to Unified CM

- Locations with users on UCM and WxC

- Unknown extension routig enabled on each location with location specific routing choice

- Location specific trunks on UCM to (re-)stablish site routing context

- Alternative: re-establish routing context on Unified CM based on ESN caller ID

  - Possible but from the "department of dirty tricks"

  - .. and does not address the reverse direction

Special Case: Multiple Split Sites
Calling from Webex Calling to Unified CM

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Special Case: Multiple Split Sites
Calling from Unified CM to Webex Calling

- Locations with users on UCM and WxC

- Unknown extension routig enabled on each location with location specific routing choice

- Location specific trunks on UCM to (re-)stablish site routing context

- Site specific egress GW selection on UCM based on LRG

- Routing context on WxC based on location specific trunk and pilot user

- Unified CM could also globalize the called address to ESN so that Webex Calling can route on that address
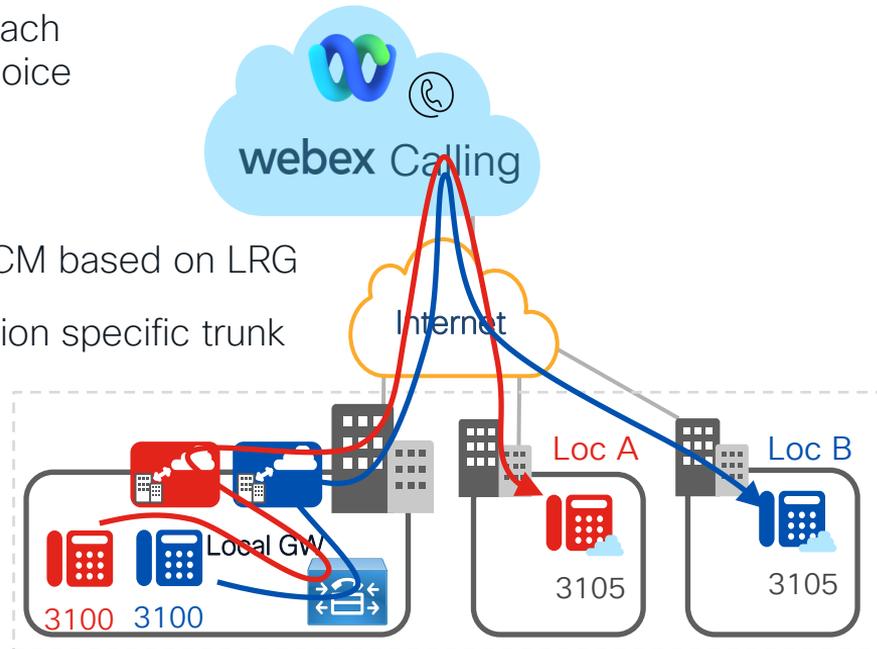
Challenge: Inter-Location Overlap between Unified CM and Webex Calling

- Locations with users on UCM and Webex Calling

- User 3100 in location A tries to call UCM user 3105

- Unknown extension policy on location A not triggered b/c there is an inter-location match for 3105 (in location B)

- Impossible to use unknown extension dialling to reach users on Unified CM if the same extension also exists in Webex Calling
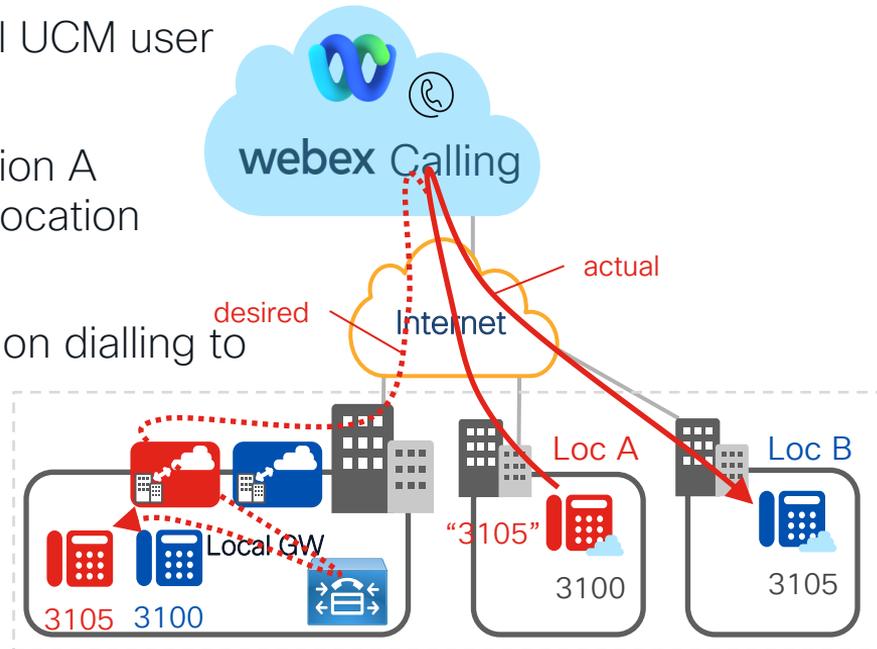
Sharing Numbers

Ways to share a number for inbound calls with multiple users

- Hunt Group
  - Simplest of configurations

- Call Queue
  - More options than Hunt Group (see Group Call Management section)

- Shared Line Appearance
  - Number of another licensed user in your organisation as an additional line
  - Must be a line within the same location as the user

- Executive Assistant Feature
  - Assistants may support multiple Executives
  - Assistants may place outbound calls for executives

Users in Hunt Group or Call Queue

Niki #2345

Ed #2356

Pat #3456

Call to group # 9876
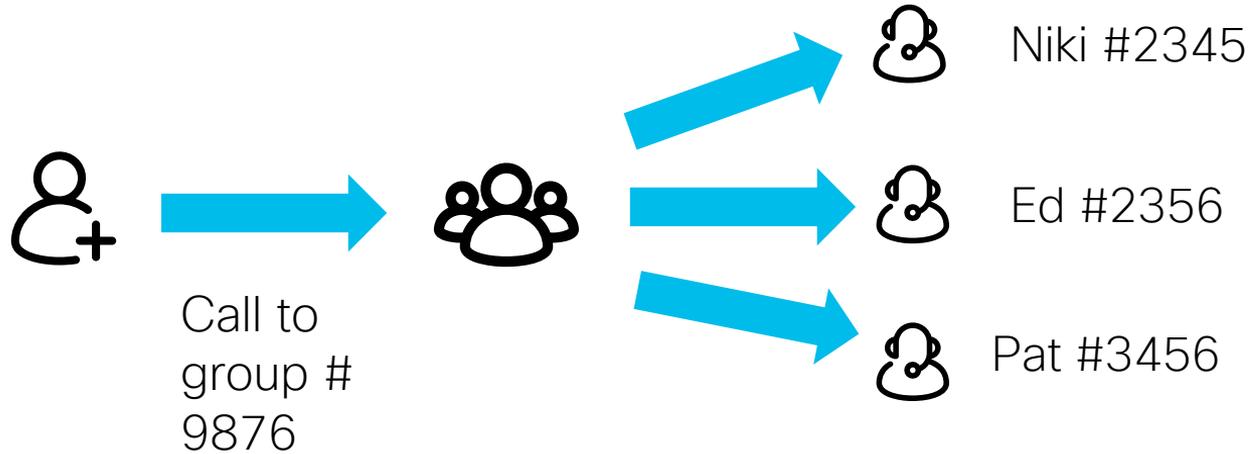
Directs calls to Niki, Ed, or Pat on both MPP phones and Webex app

Hunt Group configuration
Call Queue configuration

Shared Line Appearance- Inbound calls

Will also ring on Jaden's soft client and mobile

Jaden #0401

Anika calls Jaden

Ed #8528
with a shared appearance for Jaden
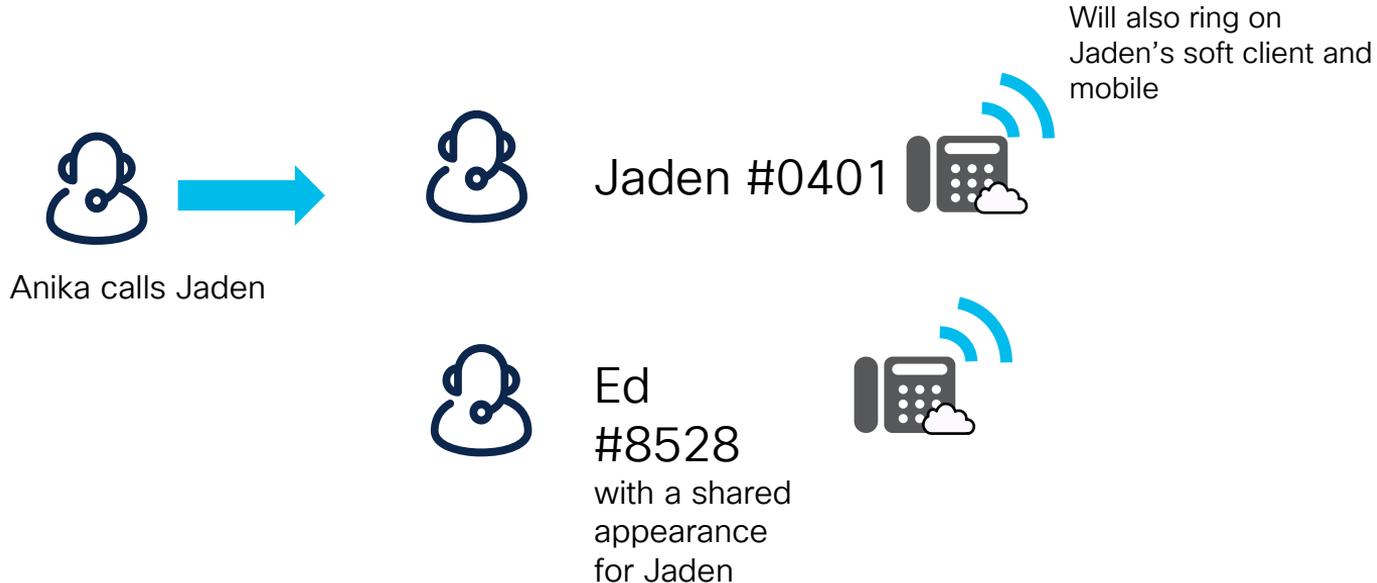
Both devices ring and can answer on either device

Shared Line Appearance configuration

Shared Line Appearance – Outbound calling

Jaden
#0401

Ed
#8528
with a shared
appearance
for Jaden

Ed places call to Anika
using Shared Line
Appearance for Jaden

Jaden is able to
"Pull Call" once the
call is placed

"Jaden is
calling me"

Anika

Note: It is not possible today for a user to have 2 different numbers of their
own identity to make outbound calls

Shared Line Appearance configuration

Shared Line Appearance maximum use

Maximum of 35 devices for a single user's number
(with a Professional User license)

*Changing the number of user's personal devices will adjust number available to be shared with other user's phones

Sample user's devices (5)

Office   Home   Computer   Tablet   Mobile

*One of each type concurrently
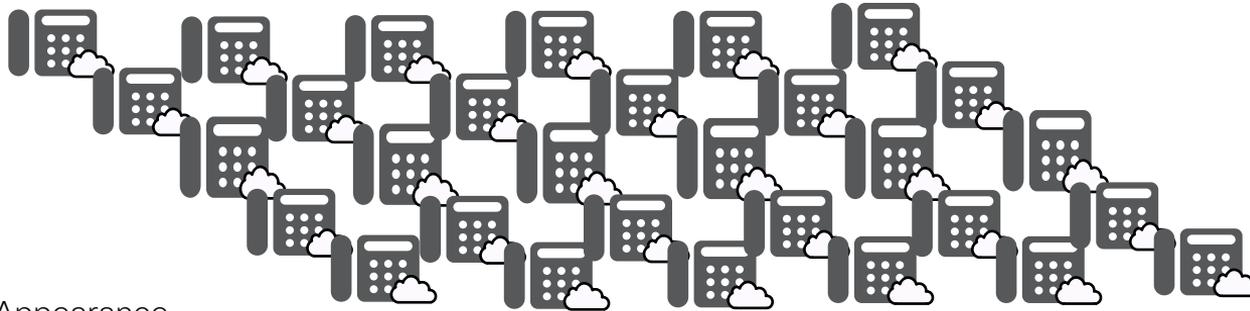
Shared Line Appearance on other phones(30)

Executive Assistant Function

Jaden configured as executive and Ed as assistant with Call Filtering enabled

Kelly calls Jaden

Jaden
#2345

Ed
#2356

The incoming call will appear on all of Ed's phone or apps

Executive and Assistant do not need to be in the same defined location

Configuration steps

Executive Assistant Function

In addition to filtering calls, the function provides additional value to the users

Kelly calls
Jaden

Jaden
#2345

Ed
#2356
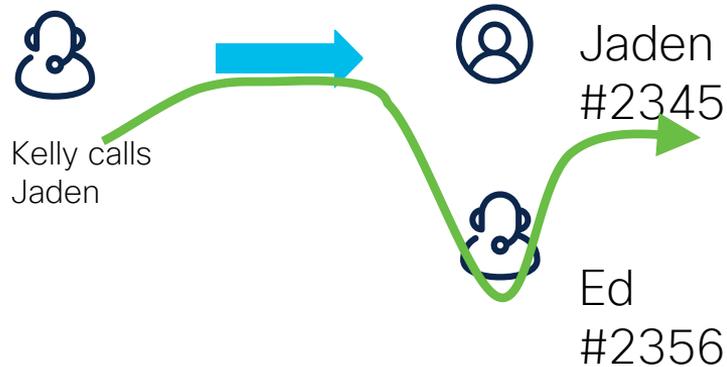
Even when Ed (the assistant) answer's Jaden's call, the call is still anchored on Jaden's user
- Call Pull
- Webex for Developers events

Assistant may also use Feature Access Codes on behalf of executive

Feature Access Codes

Executive Assistant Function

Ed places outbound calls for Jaden

Jaden #0401

Anika #2127

"Jaden is calling me"

Ed #8528
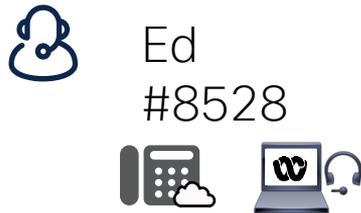
Ed places call to Anika for Jaden

Jaden is able to "Pull Call" once the call is placed

Ed is able to push the call to Jaden's phone

"Executive" as Flexible Shared Line

- Create "dummy" exec

"Exec"
+1 972 555 0145
4045

"Executive" as Flexible Shared Line

- Create "dummy" exec

- .. and assign a bunch of assistants

Alice
+1 212 555 0123
1003

"Exec"
+1 972 555 0145
4045

Bob
+1 414 555 0134
2034

"Exec"
+1 972 555 0145
4045

Charlie
+1 414 555 0142
2042

"Exec"
+1 972 555 0145
4045

Dave
+1 972 555 0152
3052

"Exec"
+1 972 555 0145
4045

"Exec"
+1 972 555 0145
4045
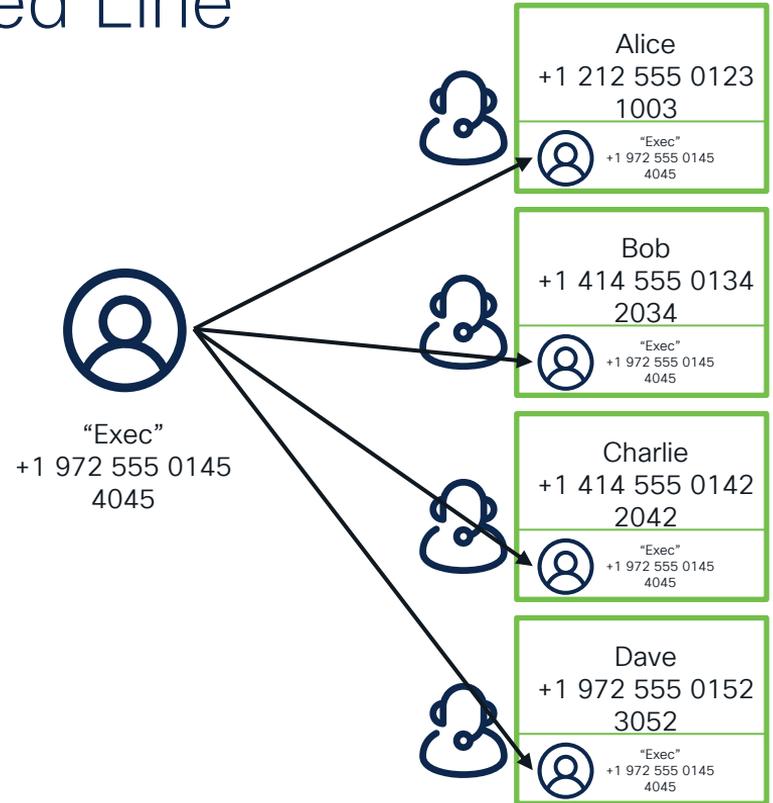
"Executive" as Flexible Shared Line

- Create "dummy" exec

- .. and assign a bunch of assistants

- Assistants can place calls on behalf of Executive

- Assistants get notification for incoming calls to Executive
  → can answer calls

- Exec and assistants don't need to be in same location

"Exec"
+1 972 555 0145
4045

Alice
+1 212 555 0123
1003
"Exec"
+1 972 555 0145
4045

Bob
+1 414 555 0134
2034
"Exec"
+1 972 555 0145
4045

Charlie
+1 414 555 0142
2042
"Exec"
+1 972 555 0145
4045

Dave
+1 972 555 0152
3052
"Exec"
+1 972 555 0145
4045
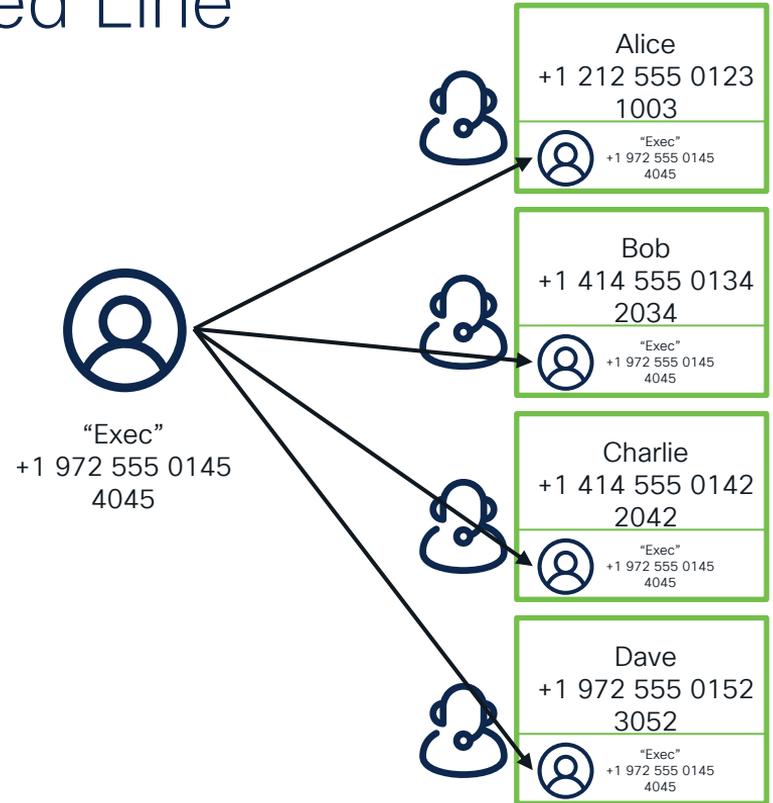
Outbound Calling with Different Caller ID

- Some options are available for Webex Calling users to dial out with a different caller ID than the users assigned number
  - Defined outbound caller ID for user in Control Hub by administrator as explained [here](#)
  - Shared Line Appearance on MPP or app
  - Virtual Line on MPP or app
  - With Executive Assistant feature configured and using Shared Line Appearance or Feature Access Codes
  - Caller ID of call queue (see Group Call Management)

Virtual Lines

- Virtual Lines act like "dummy" users
  - Attributes: first/last/display name, TN and/or extension
  - Live in a location
  - Settings: caller ID, ECBN, incoming/outgoing permissions, intercept, barge, ...
  - ... like calling settings of a user
- Virtual lines can be added to MPPs and app instances as additional lines
- Can be used for incoming/outgoing calls
- No location restriction: MPP and app can have lines from multiple locations
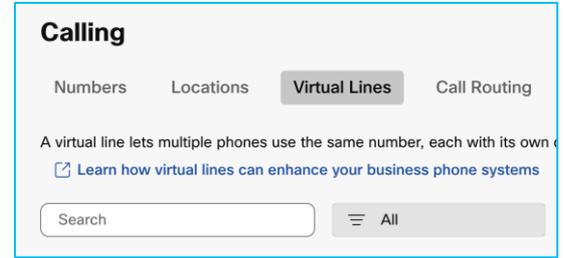
Virtial Lines vs Shared Lines

- Virtual lines don't remove the user centric concept of Webex Calling

- ... but remove a lot of the original restrictions

- For example: sharing a helpdesk line across a group of users now is really easy

| Alice
+1 972 555 0152
3052 | Bob
+1 972 555 0151
3051 | Charlie
+1 972 555 0153
3053 |
| "Helpdesk"
+1 972 555 0145
4045 | "Helpdesk"
+1 972 555 0145
4045 | "Helpdesk"
+1 972 555 0145
4045 |

Virtual line
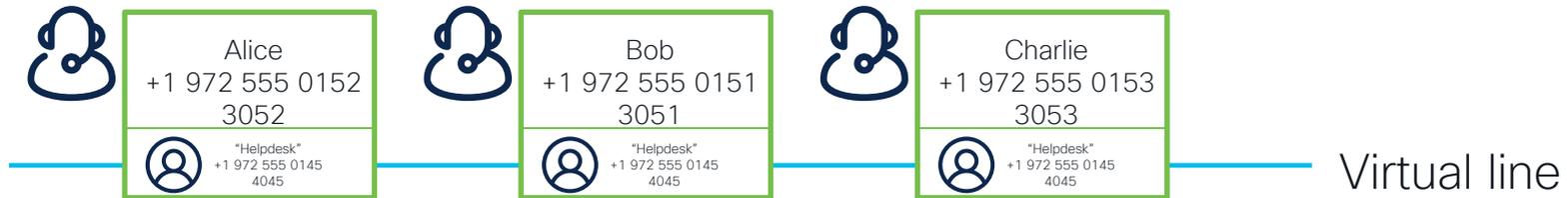
Comprehensive Set of Provisioning APIs

- Locations, People

- Organisation Settings
  - announcement language, auto attendants, call parks, call park extensions, call pickups, call queues, call recording settings, hunt groups, location intercept, location internal dialing, location incoming/outgoing permissions, paging groups, phone numbers, schedules, voicemail settings, voice portal, MoH, voicemail groups, dial plans, trunks, route groups, route lists

- Person Settings
  - calling behaviour, barge settings, call forwarding, call intercept, recording, caller id, DND, voicemail, schedules, monitoring, phone numbers, privacy, executive assistant, PTT, hoteling, incoming/outgoing permissions, call queue caller id

- Voice Messaging

Reference: https://developer.webex.com

Using Webex APIs

- Documentation at:
  https://developer.webex.com/

- But: Steep learning curve

- A lot of concepts to master

- SDK helps to abstract from the "dirty details"

- https://pypi.org/project/webexteamssdk/: great framework, but no support for Webex Calling specific provisioning
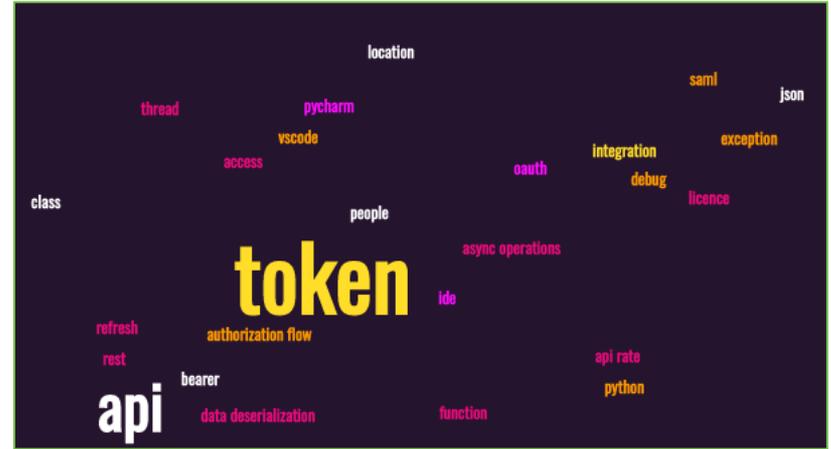
Calling an Webex API Endpoint
Listing Webex Calling Locations

List Locations

List locations for an organization.
Use query parameters to filter the response.
Long result sets will be split into pages.

`GET` `/v1/locations`

```python
def main():
    # load .env file
    load_dotenv()

    # after reading .env file all variables defined in the file are accessible as environment variables
    access_token = os.getenv('WEBEX_TOKEN')
    if access_token is None:
        raise

    url = 'https://webexapis.com/v1/locations'
    with requests.Session() as session:
        headers = {'Authorization': f'Bearer {access_token}'}
        response = session.get(url=url, headers=headers)
        response.raise_for_status()
        data = response.json()
        print(f'{len(data["items"])} locations found')
        for location in data['items']:
            print(location)

        # look for locations in California
        ca_locations = [location for location in data['items']
                        if location['address']['state'] == 'CA']
        print(f'{len(ca_locations)} locations in CA')
        print(', '.join(loc['name'] for loc in ca_locations))
```

URL of the endpoint

Session() from requests module is used

Fabricate the Authorization header

Call the endpoint

Check for errors

Parse the JSON response into a dict

Accessing the response values as dict keys

Calling an Webex API Endpoint
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        print(f'{len(data["it
        for location in data[
            print(location)

        # look for locations
        ca_locations = [locat
                        if lo
        print(f'{len(ca_locat
        print(', '.join(loc['name'] for loc in ca_locations))
```

That was easy, but..
- Accessing dictionary values by key is hard and error prone
- Missing handling of 429 responses (throttling)
- Missing pagination handling
- Handling of additional parameters (name, id)

There has to be a better way?!

sts module is used

sation header

onse into a dict
nse values as dict keys

wxc_sdk: SDK for Webex Calling APIs

- PyPi: https://pypi.org/project/wxc-sdk/

- Homepage: https://github.com/jeokrohn/wxc_sdk

- Documentation: https://wxc-sdk.readthedocs.io/en/latest/

- Simple SDK to work with Webex APIs
  - Focus on Webex Calling specific endpoints ... and more

- Takes care of all the "ugly" stuff
  - JSON (de-)serialisation, authentication, 429 retries,
  - Pagination, …
  - Logging

- Python objects for all API objects
  - Tab completion → efficient coding

- Actively maintained
  - New API endpoints will be added

- Foundation for your provisioning automation and other projects around Webex Calling

```python
"""
Example script
Get all calling users within the org
"""


from dotenv import load_dotenv


from wxc_sdk import WebexSimpleApi


load_dotenv()


api = WebexSimpleApi()


calling_users = [user for user in api.people.list(calling_data=True)
                 if user.location_id]
print(f'{len(calling_users)} users:')
print('\n'.join(user.display_name for user in calling_users))
```

wxc_sdk: Comprehensive Coverage

- SDK covers all Webex Calling specific API endpoints

- Additionally:
  - Licenses, memberships, messages, people, teams, team memberships, webhooks, …

- Easy token management

https://wxc-sdk.readthedocs.io/en/latest/

Examples

- Examples available at:
  https://wxc-sdk.readthedocs.io/en/latest/examples.html
  https://github.com/jeokrohn/wxc_sdk/tree/master/examples

```
(wxc-sdk-NNVrdgRm-py3.9) jkrohn@JKROHN-M-942M examples % ./reset_call_forwarding.py
```

```python
api = WebexSimpleApi()

# get all calling users
start = time.perf_counter_ns()
calling_users = [user for user in api.people.list(calling_data=True)
                 if user.location_id]
print(f'Got {len(calling_users)} calling users in '
      f'{(time.perf_counter_ns() - start) / 1e6:.3f} ms')

# set call forwarding to default for all users
with ThreadPoolExecutor() as pool:
    # default call forwarding settings
    forwarding = PersonForwardingSetting.default()

    # schedule update for each user and wait for completion
    start = time.perf_counter_ns()
    list(pool.map(
        lambda user: api.person_settings.forwarding.configure(person_id=user.person_id,
                                                               forwarding=forwarding),
        calling_users))
    print(f'Reset call forwarding to default for {len(calling_users)} users in '
          f'{(time.perf_counter_ns() - start) / 1e6:.3f} ms')
```

Closing

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Recap / Q & A

- Webex Calling PSTN options

- Regional footprint, design considerations

- Location considerations

- Interworking between Unified CM and Webex Calling

- Call Handling Group Functions – Group Call Management

- Extension Dialing Considerations

- Sharing Numbers

- Provisioning APIs

Collaboration

Cloud Calling and Phones

Learn about cloud and hybrid calling design and troubleshooting, calling endpoints for those seeking to use cloud calling or migrating from an existing on-premise environment.

START

Feb 6 | 08:45
TECCOL-2191
Troubleshooting Cisco Webex Calling

Feb 6 | 14:15
TECCOL-2010
News in Webex Cloud Collaboration Security

START

Feb 6 | 14:15
TECCOL-2180
Webex Collaboration Interoperability – Video and Calling Integrations

Feb 7 | 11:30
BRKCOL-3818
Troubleshooting UCM Calling in the Webex App

Feb 7 | 17:00
BRKCOL-2787
Planning and Designing Successful Cloud Calling Deployments with Webex Calling

Feb 8 | 08:30
BRKCOL-2198
Deploying the Webex App to your Organization

Feb 8 | 10:30
BRKCOL-2312
High Capacity Premises-based PSTN Option for Webex Calling

Feb 8 | 11:45
IBOCOL-2420
Calling Migrations: an Interactive Session to Share Experiences, Ideas, Solutions, and Best Practices

Feb 9 | 08:30
BRKCOL-2812
Troubleshooting Webex Calling Premises-based PSTN

Feb 9 | 10:45
BRKCOL-2481
Successful Migrations from Unified CM to Webex Calling

Feb 9 | 12:00
BRKCOL-2993
Enabling Site Survivability for Webex Calling

Feb 9 | 12:30
BRKCOL-2066
Top Ten Tips for Deploying Cisco Phones in the Cloud

FINISH
Feb 9 | 13:45
BRKCOL-2990
Webex platform infrastructure: Where, How and Why we do it like this?

Learning maps online : https://www.ciscolive.com/emea/learn/technical-education/learning-maps.html

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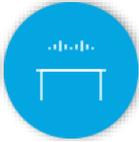
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