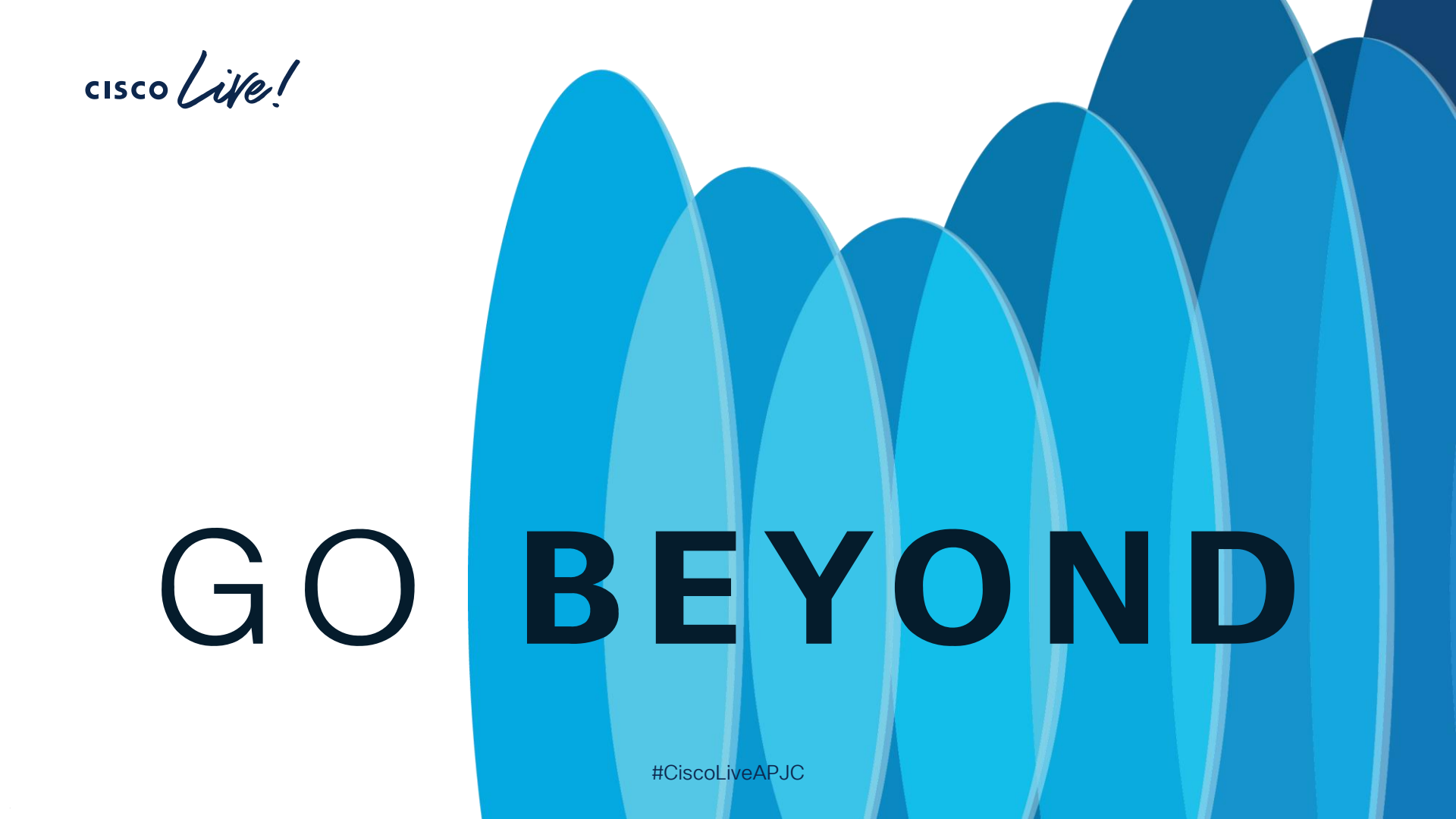

cisco Live!
GO BEYOND
#CiscoLiveAPJC

"Reconciliation"- Dustin Koa Art

Collaboration Rooms

Design and Customizations

Charlie Thorpe
Technical Marketing Engineer

BRKCOL-2533

Cisco Webex App

https://ciscolive.ciscoevents.com/ciscolivebot/#BRKCOL-2533

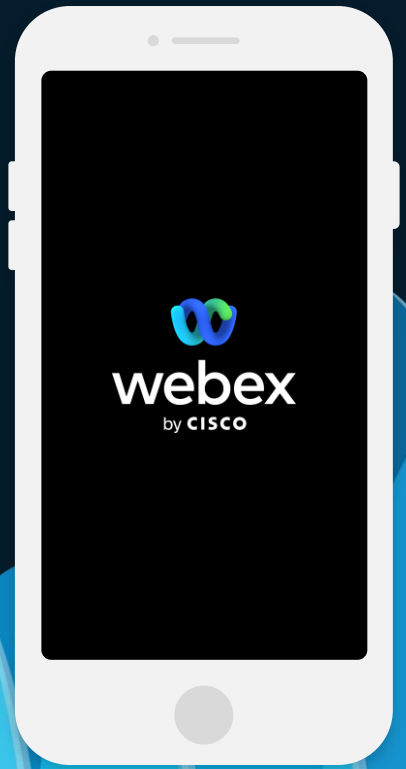
Questions?

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 by the speaker until November 15, 2024.



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Agenda

- Introduction
- Cisco video devices
- Designing Workspaces
- Workspace Designer
- Integration tools
- Let's build a customisation
- Deployment options
- CE-Deploy

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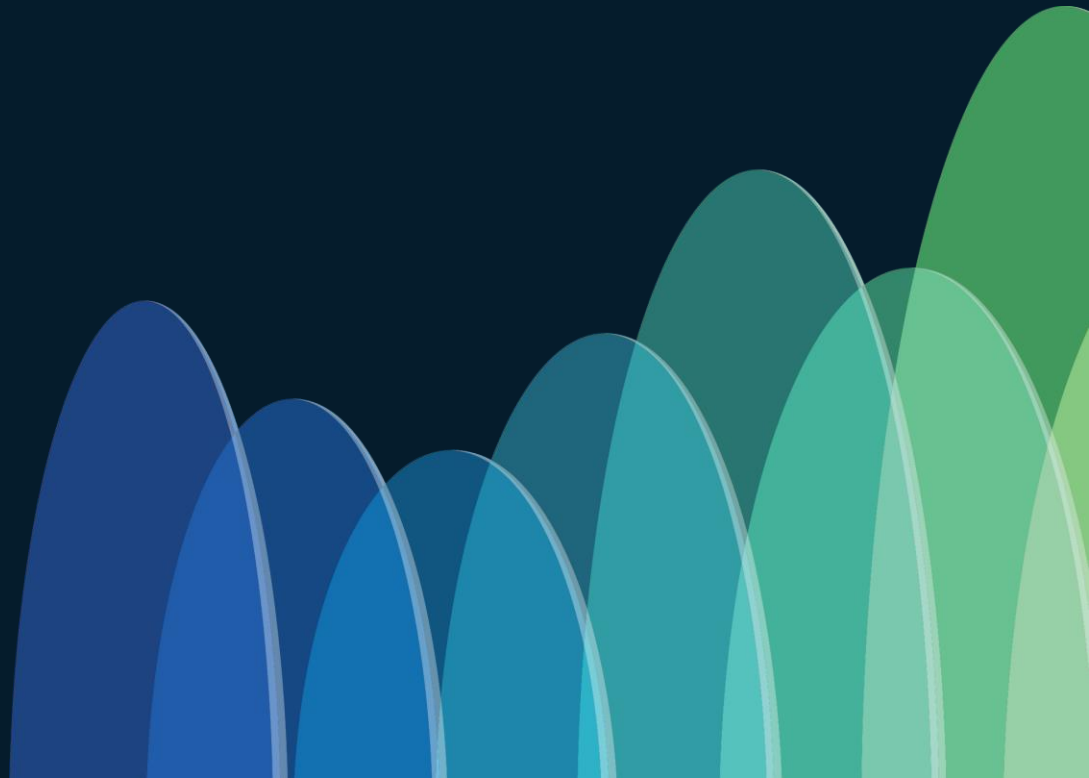
Designing Workspaces



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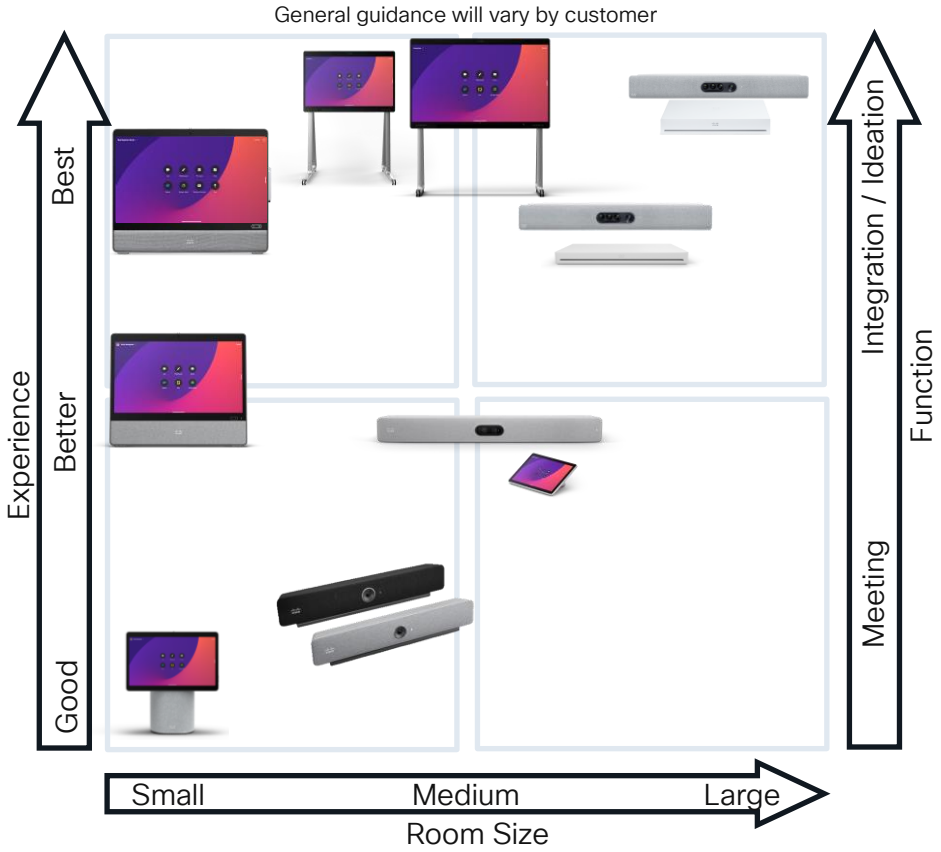
Designing your workspaces

Decision factors to select correct room devices

- What does the device need to do?
  - Meetings?
  - Ideation?
  - Both?
- What is the function of the room?
  - Open space?
  - Ad-hoc jump space?
  - Collaboration/ideation?
  - Formal meeting room?
- Budget
  - Device types and numbers per location



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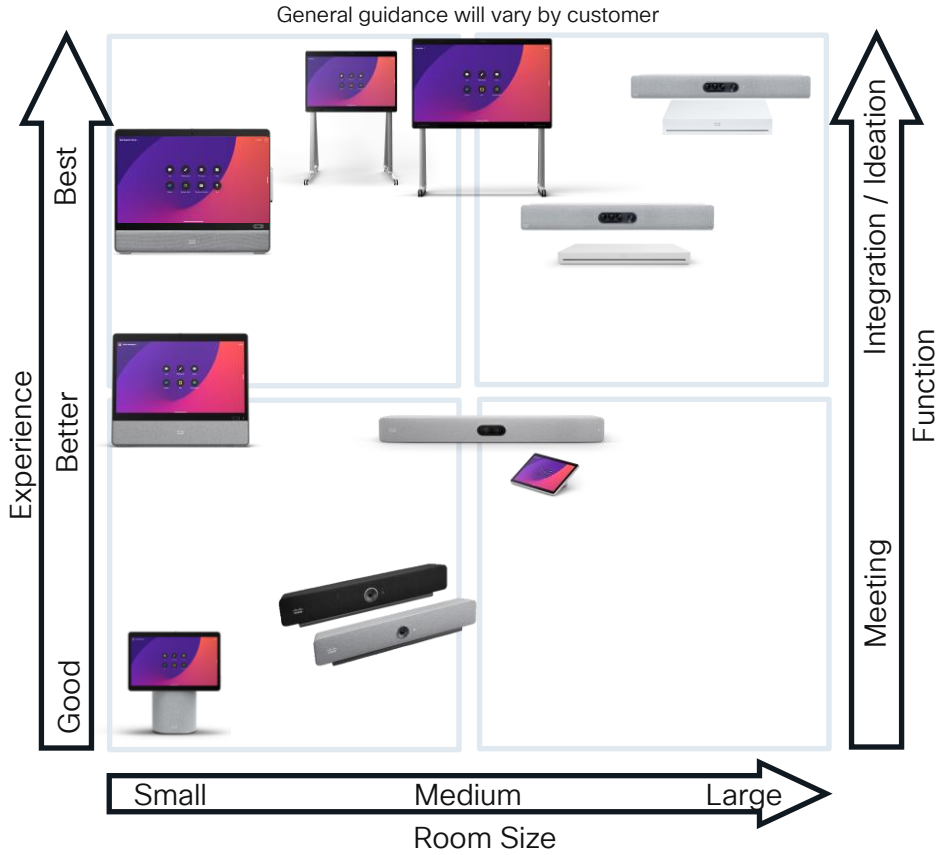
Designing your workspaces

Each workspace will vary in function and size

- Size – room size and number of users
- Screens – does one exist?
- Design – treatments
  - Lighting, sound, heating
  - Furniture
  - Audio – speakers and microphones
- Booking – free space, adhoc, general, proxy controlled



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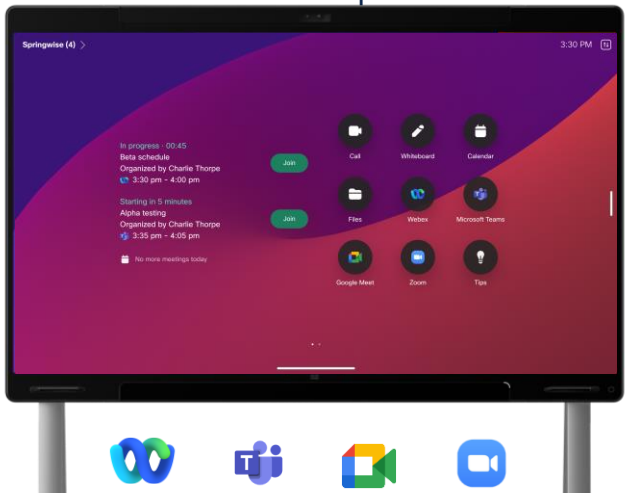
Designing your workspaces

Let's also not forget the type of experience

cisco

RoomOS experience

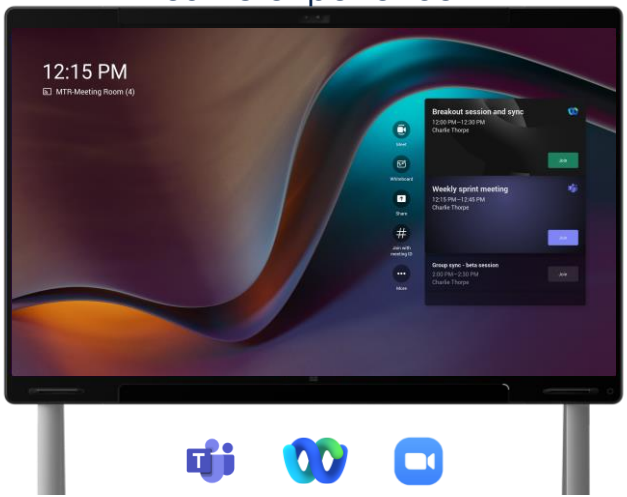


Includes native Webex Meetings and Events
with interop support for Microsoft Teams, Google, and Zoom

OR

Microsoft

Teams experience



Includes native Microsoft Teams and Webex Meetings* and Events* with support for Zoom

*with Control Hub registration

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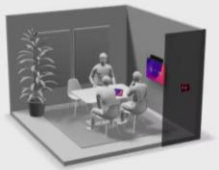
Designing your workspaces

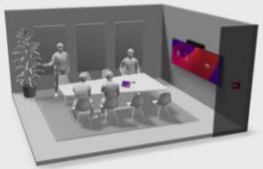
Small Room

4-6



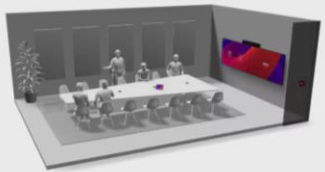
Medium Room

6-10



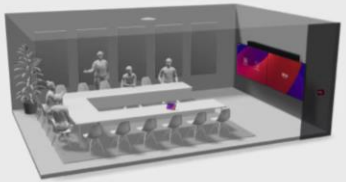
Large Room

11-24



Executive Boardroom

11-24



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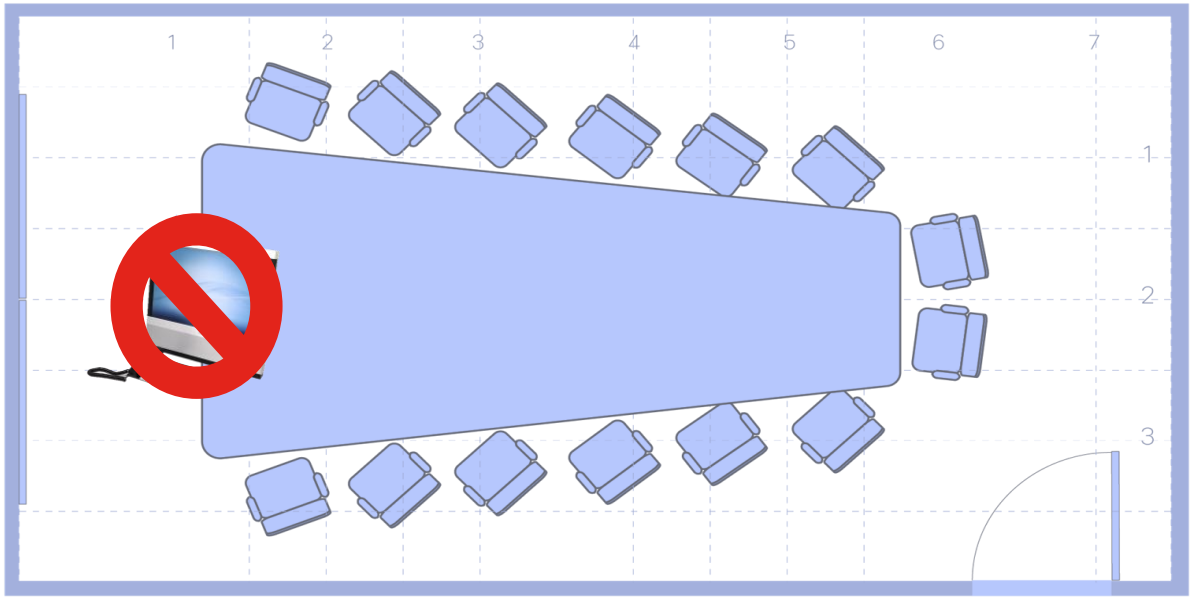
What would an incorrect device/room combination look like?



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Cisco video devices

Desk Series

- All in one Desktop Solution
- Built in Camera, Microphones Speakers
- Personal Spaces, Huddle Rooms, Video Booths, Virtual Rounding

Room Series

- Integration Kits
- Bring your own Display
- Integrated or External Cameras
- Integrated or External Audio

Board Series

- All in one Collaboration Solution
- Built in Camera, Microphones Speakers
- Support for external Cameras, Audio and Displays

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Cisco video devices

Cisco Room Kit EQX

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Cisco peripherals

Cameras

Quadcamera

- Speakertracking, Frames, PeopleCounting, Integrated Speakers (ARC or Line In), HDMI 1080p@60, 5x Digital

PTZ4K

- PresenterTracking, 20x Optical, 12x Digital, HDMI 1080p@60 or 4k@30, POE+

Microphones

Table Mic J/E

- Balanced omnidirectional, boundary layer

Ceiling G2

- Balanced Directional Microphone

Table Mic Pro

- AVoIP, POE, 4 Channel Directional

Touch Panels

Table Navigator

Wall Navigator

- Both support
  - Controller, Booking and PWA Modes and POE

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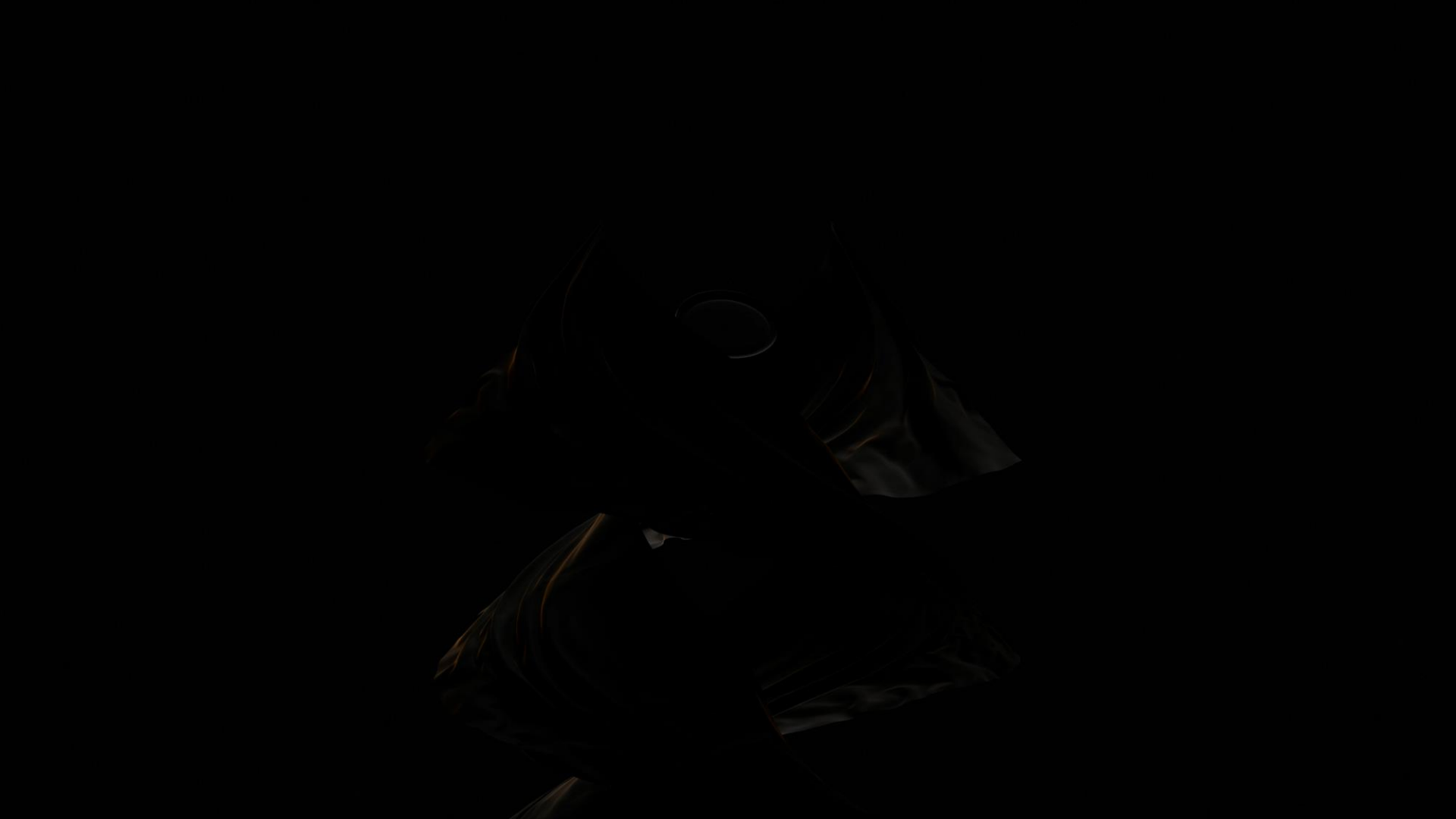

Cisco peripherals

Cisco Ceiling Microphone Pro – headlines

- 64 omnidirectional microphones
- 8 AI Adaptive Audio Beams
- 3.5m/12ft Audio Pickup Radius
- 3 Ultrasound Speakers
- PoE (8 watts)

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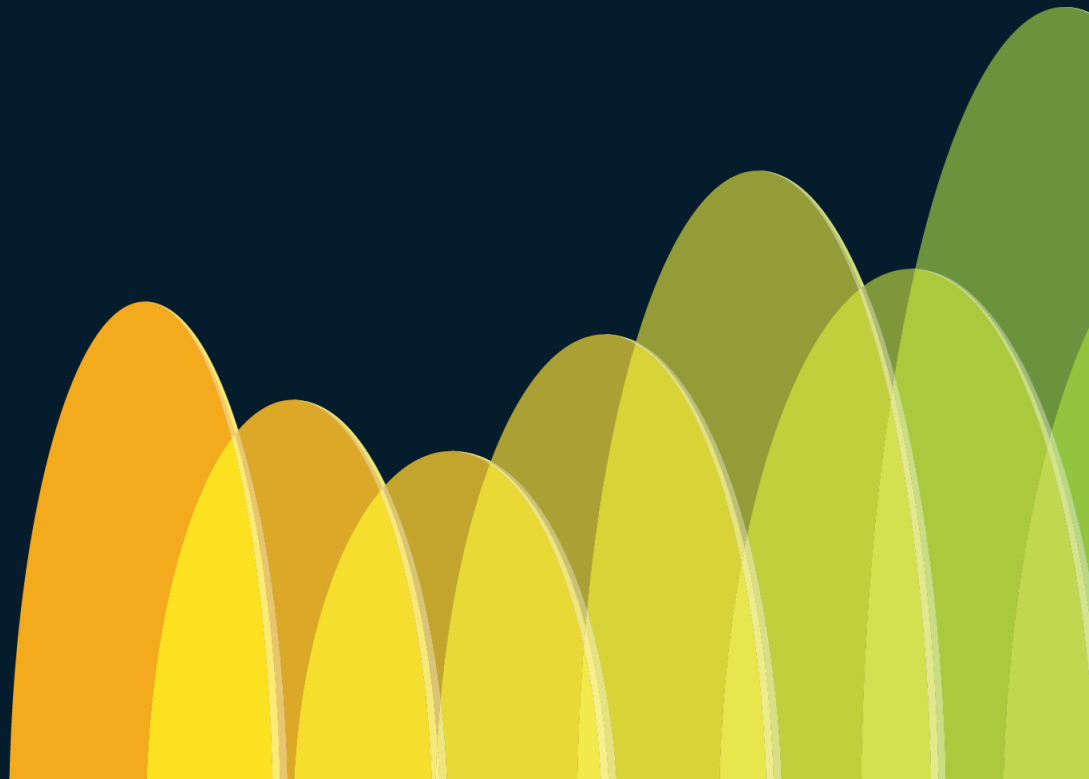
Audio



Internal/External Microphones

- Integrated devices such as Desk Series, Board Series and Room Bar/Room Bar Pro have integrated microphones.
  - You will often see x element microphone array stated.
  - For example, the Room Bar Pro details a 16-element microphone array
    - Elements can be used for Speaker Tracking and Speech pickup (up to 4 meters in the case of the Room Bar Pro)
    - Additional external microphones may be needed in the case of the Board Pro Series and the Room Bar/Room Bar Pro to supplement speech pickup outside of the integrated microphones
    - Table Mic/Table Mic Pro (on supported devices)
    - Ceiling mic/Ceiling Mic Pro (on supported devices)
    - USB DSP resource to 3rd party mic solution (for example Shure)
    - AES67 standards-based mic (on supported devices) – example Shure MXA920

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Internal/External Microphones?

- Room Kit EQ, Room Kit EQX, Room Kit Pro, Room Panorama
  - EQ and Pro have options for Quad Camera or PTZ4K build
  - EQX and Panorama only build with Quad Camera
- It is safe to assume that you will need microphones to go with the above systems.
  - Quad Camera does have an on-board microphone array
  - This is only used for Speaker Tracking – it is not used for Speech pickup
  - Table Mic, Table Mic Pro, Ceiling Mic. Ceiling Mic Pro, AES67 Mic, USB DSP resource

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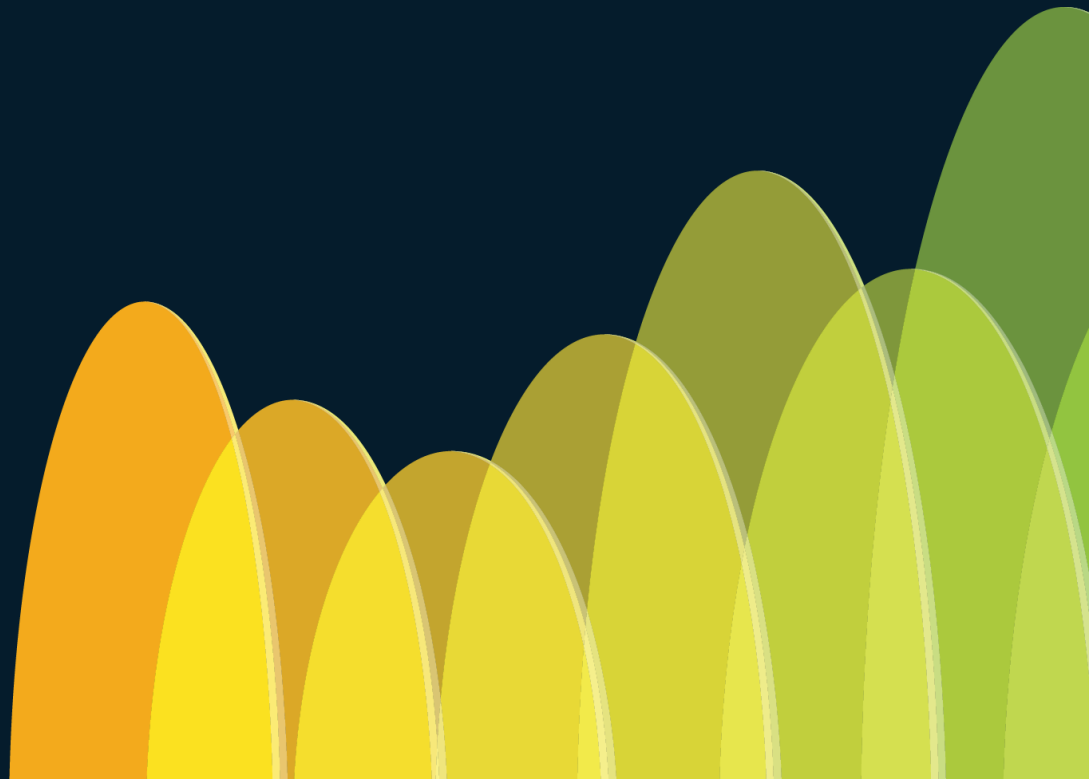
Analogue Microphones

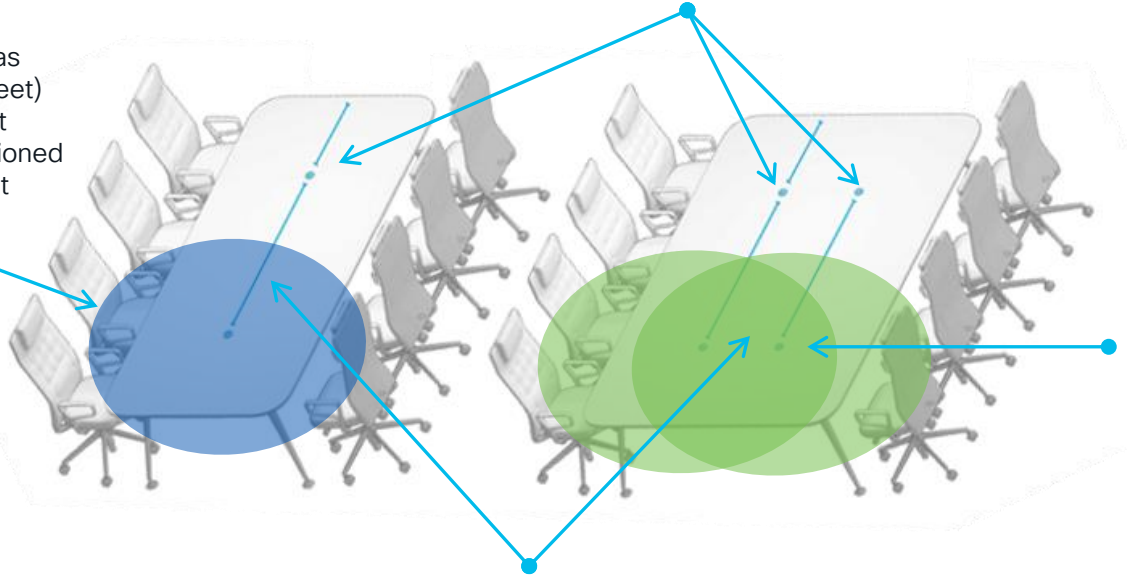


Cisco Table Microphone

Placement best practice

Microphones should be no less than 15cm(~6 inches) from the edge of the table

Cisco Table Mic has around a 1m (~3 feet) pickup radius. Best placement is positioned between seats (not directly in front of)



Wider tables may require a second row of microphones to maintain the pickup radius in relationship to the microphone<->chair

Follow the centerline of the table for even placements.

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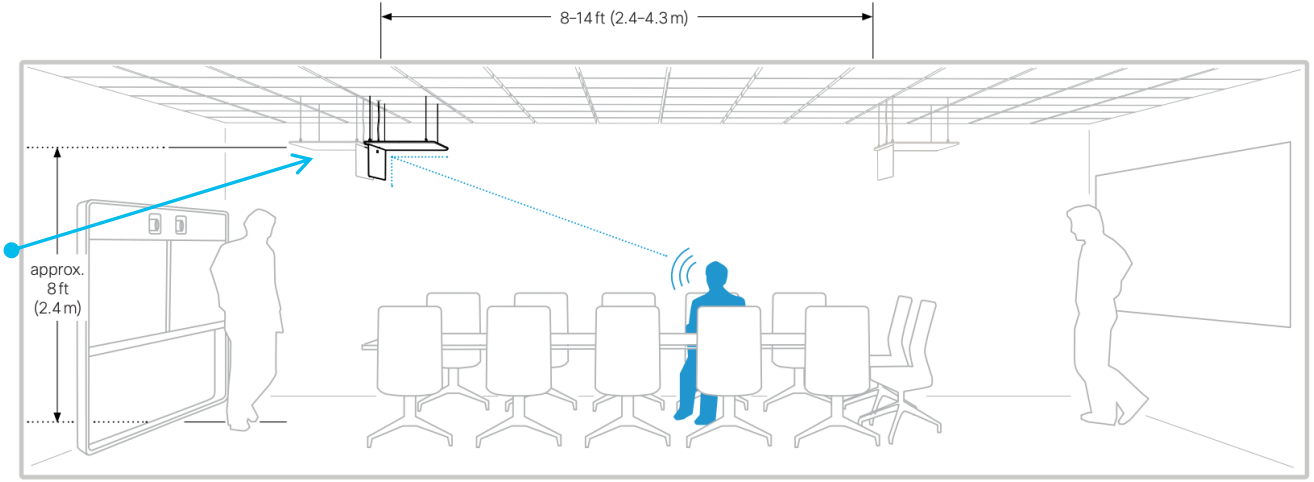
Cisco Ceiling Microphone

Placement best practice

Presenter mic
(reverse orientated)



Whereas the Table Mic has a circular pickup pattern covering a full 360-degrees, the Ceiling Mic is designed with a semi-circular pickup pattern covering 180-degrees. Maximum radius is approx. 4m (~14 feet). Ceiling height is also an important consideration with the ideal height being between 2.1m-2.4m (~7 feet to ~8 feet).

Remember: If installing as a Presenter mic, then approx. 1.5m (~5 feet) from the device is recommended.
Acoustic damping in the workspace also plays a key part. Rooms with less damping may require that the microphones are placed closer together (this may also mean additional microphones are needed)

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IP Microphones

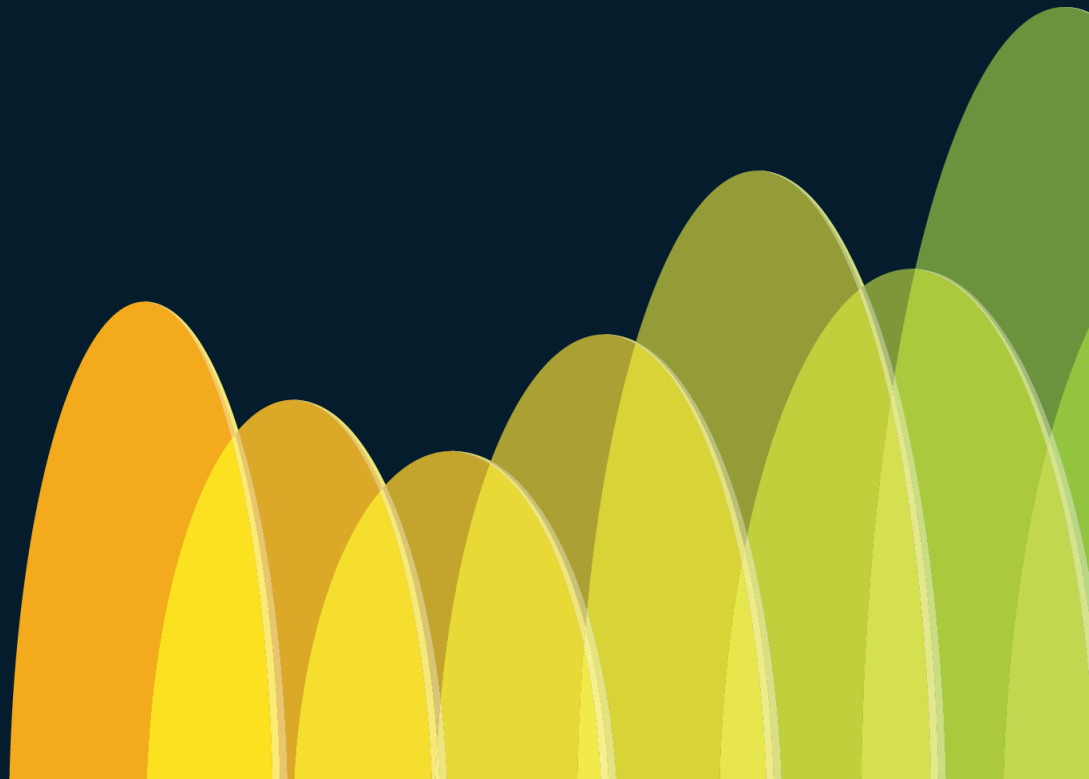
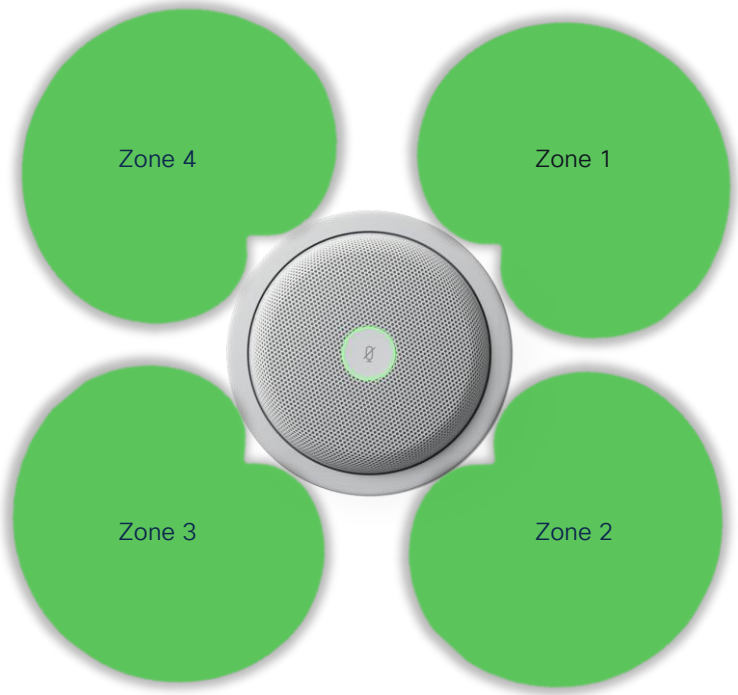


Table Microphone Pro



Some important details:

- The four pickup zones are orientated in a clock-wise fashion from there the cable connects to the microphone with the mute button correctly orientated.
- Each zone can be configured independently (for example you might want to disable zones 3&4)
- The Table Mic Pro send back one (1) AES67 stream with four (4) channels to the codec.

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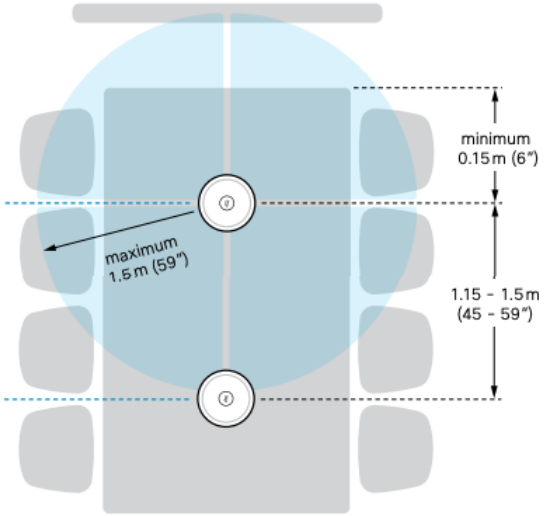
Table Microphone Pro

Microphone placement

Cisco Table Mic have around a 1.5m (~59”) pickup radius. Best placement is positioned between seats (not directly in front of)

Ideal placement for Table Mic Pro is recessed into the table. This makes calculation of number of mics and placement even more critical



Microphones should be no less than 15cm(~6 inches) from the edge of the table

Wider tables may require a second row of microphones to maintain the pickup radius in relationship to the microphone<->chair.

Point to note: Table Mic Pro has a larger pickup area vs Table Mic which can allow for wider spaces between microphone placement

Follow the centerline of the table for even placements

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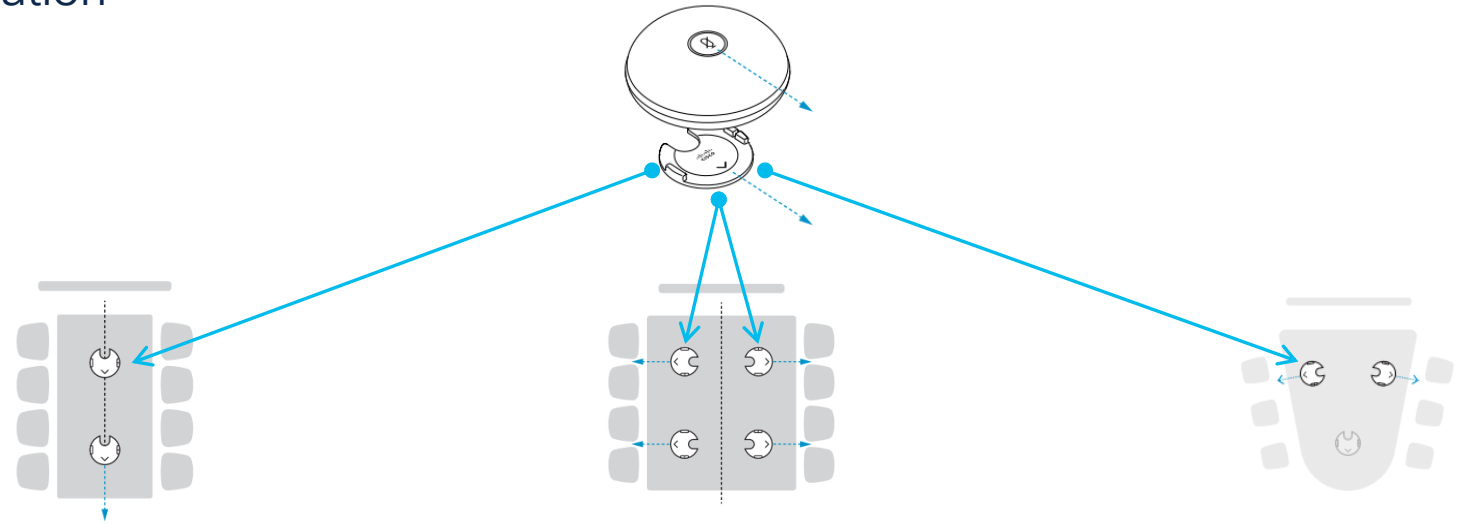
Table Microphone Pro

Orientation



As mentioned already, the Table Mic Pro is a multi-directional device which makes orientation, and the fixing of the orientation very important especially as intelligence features are added to the microphone software.
Please also note the orientation differences when mounted in a single row vs double row vs angled table. This allows for zones to be disabled when not needed to improve the overall quality of experience.

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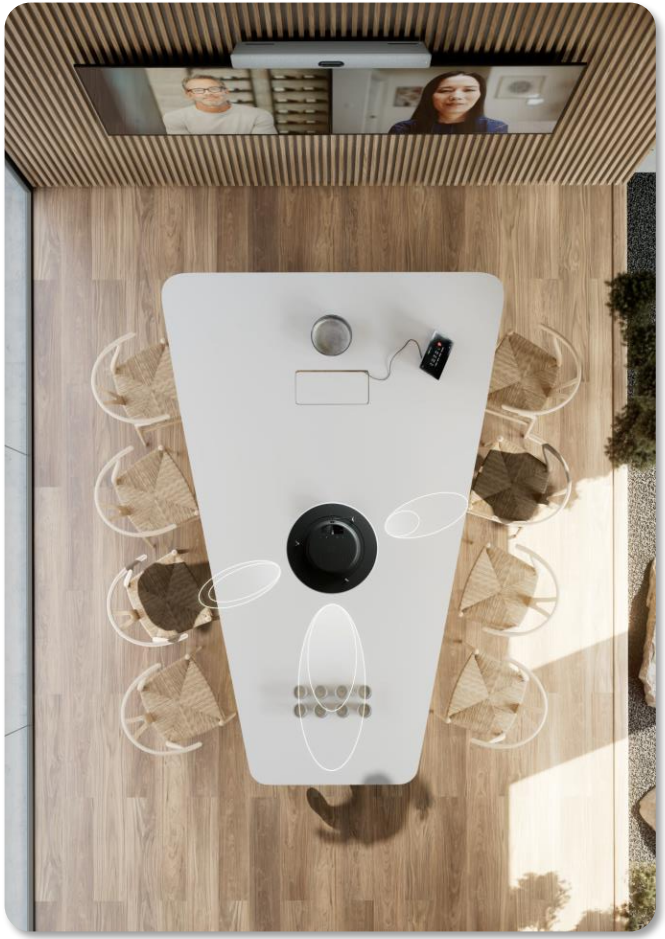
Ceiling Microphone Pro

Software overview

- Automatic Pairing to Codec
- Data Encrypted
- Automatic Microphone Positioning
- Management and Updates via Control hub
- Room Analytics via Control hub
- Automatic health checks
- 8 AI Driven Audio Beams
  - An AI Neural Network Voice Activity Detector aids the adaptive beams to avoid noise in a space
- Beam Steering via our AI Camera Director



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Ceiling Microphone Pro

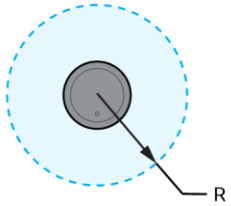
Microphone placement

The size, layout and acoustics of the room determines the number of microphones needed for optimal coverage.

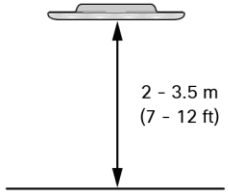
Single microphones are recommended to mount towards the front of the table. Introduce additional microphones for long tables.

The Ceiling Microphone Pro can extend the pickup range and improve speech pickup for participants in the back of the room when it's paired with video systems with internal microphones.

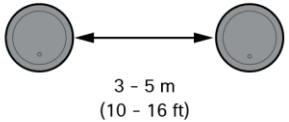
Distances



Optimal range
max R3.5 m (12 ft)

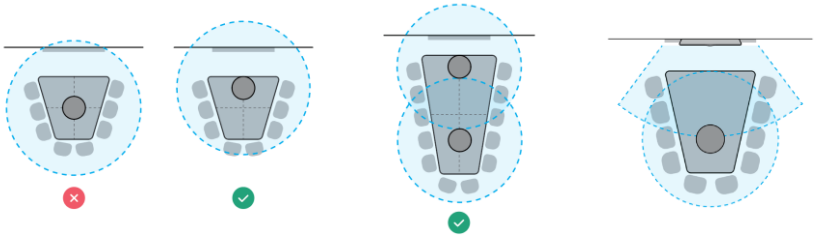


Distance to floor



Distance between microphones

Placement relevant to participants



Video system with internal microphones for speech

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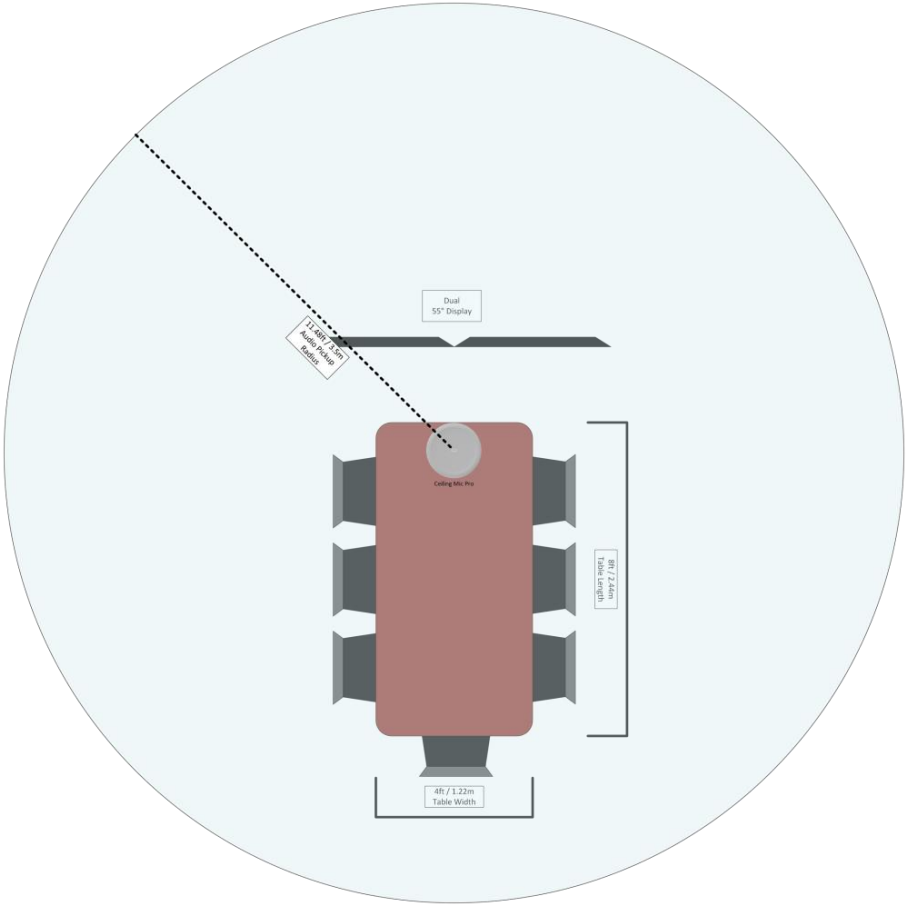
Ceiling Microphone Pro

Audio pickup radius

- The Ceiling Microphone Pro has a 12ft (3.5m) audio pickup radius
- Placement of the microphone should still consider where the audience sits in the space. The more direct the orator is facing the Ceiling Microphone Pro, the better.



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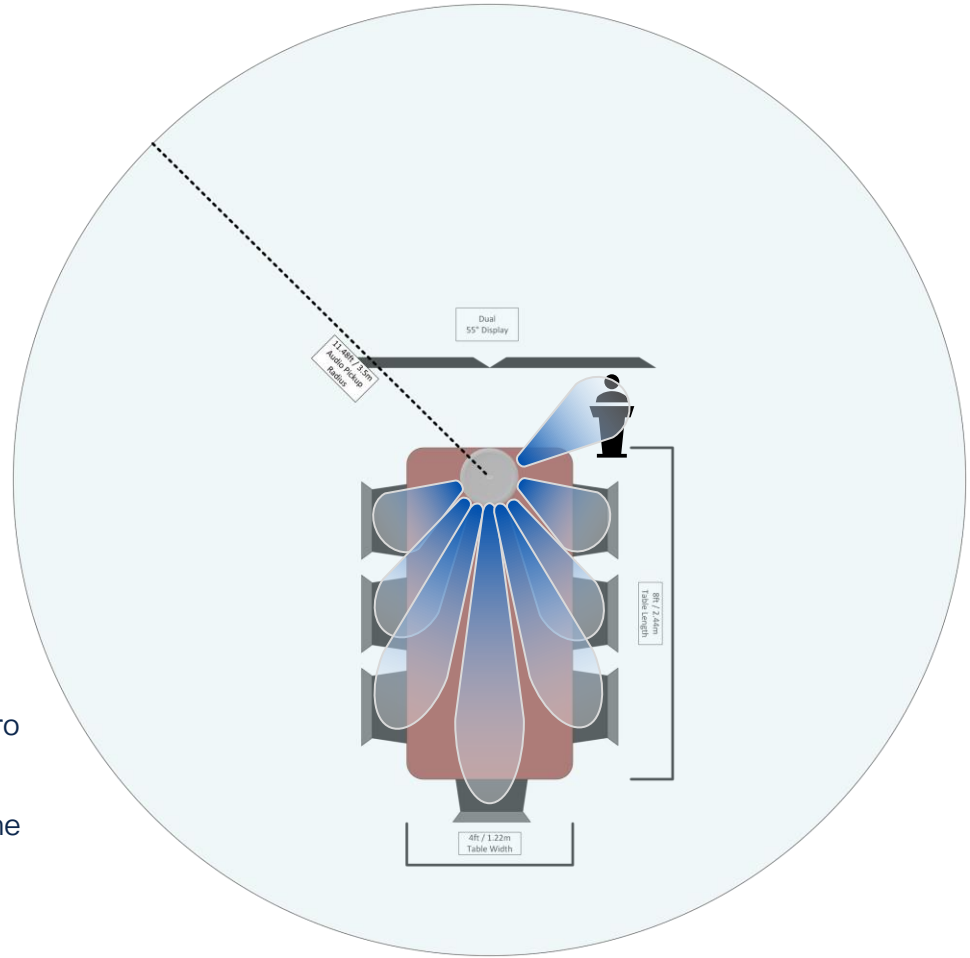
Ceiling Microphone Pro

AI Adaptive Beam Forming

- The Ceiling Mic Pro's AI Adaptive beams will mitigate excess noise by homing in on the speaking participant.
- They'll continuously adapt and follow that speaking participant, capture new participants as they join the conversation and re-enforces our Camera AI Director's Speakertracking capabilities.
- The Ceiling Mic Pro leverages an AI neural network built directly in the software of the microphone tasked to avoid noise and coupled with a built in DSP, we pre-process noise and echo before it reaches the codec.
- The AI Camera Director built into a current Cisco Video Codec using either its integrated Speakertracking camera or the Quadcamera will be able to steer the Ceiling Mic Pro beams to a participant we can see speaking in a space.
- The AI Camera Director assists the Ceiling Mic Pro, and the Ceiling Mic Pro Assists the AI Camera Director.



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Cisco Microphone Comparison

Intelligent IP microphones

Cisco Ceiling Microphone Pro

- Multi-directional, digital ceiling mic for meeting, learning & flex spaces
- AI adaptive beamforming to follow room dynamics and design changes
- Zero-touch, automatic positioning and embedded digital signal processing
- Discrete design, color & mounting options

Cisco Table Microphone Pro

- Multi-directional, digital table mic
- 4x adjustable microphone lobes
- Flexible mounting and color options & intuitive mute controls
- Advanced noise cancellation & embedded digital signal processing

AUDIO OVER IP | SCALABLE VIA SWITCH | INTEGRATED DEVICE INTELLIGENCE

UNIFIED MANAGEMENT | FEATURE UPGRADES | SECURE ENCRYPTION

Analog microphones

Cisco Ceiling Microphone

- 180-degree, omni-directional pickup
- Entry-level analog ceiling mic for any workspace
- Suspended ceiling mount

Cisco Table Microphone

- 360-degree, omni-directional pickup
- Entry-level analog table mic with flexible mounting options
- Smart mute controls

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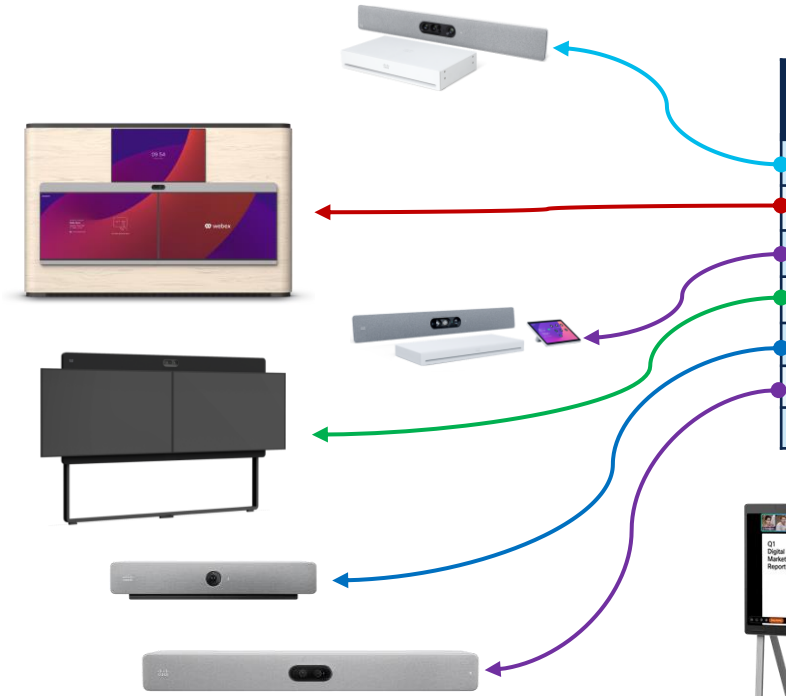
Audio over IP

Cisco collaboration device support



Codec	Maximum Ethernet Mic* Connections
Codec Pro	8
Room Panorama	8
Codec EQ	8
Room Kit EQX	8
Room Bar	1
Room Bar Pro	8
Board Pro G1/G2	8

* The Cisco Table Mic Pro, the Cisco Ceiling Mic Pro and 3rd party AES67 microphones each consume 1 ethernet microphone connection when paired to a compatible endpoint.
Ceiling Mic Pro will not provide Panorama experience.
AES67 Mics not supported with Room Panorama or Room Bar.

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AV Integrator License

Audio over IP

Certain capabilities are enabled with the AV integrator license key being present.

Devices that the AV integrator license key applies to are the Room Bar Pro and Codec EQ based systems.

Devices without the AV integrator license support:

- Up to 3 Cisco Mic Pro
- Standard set of audio commands

Devices with AV integrator license support:

- Up to 8 Cisco Mic Pro or 8 third party AES67 streams
- Full integrator Audio API
- Audio Console application (applies to Codec EQ based systems only)
  - Please note for devices that are deployed with MTR, they will need to be dual registered for the Audio Console to be available

xConfiguration Audio Ethernet Encryption

Applies to: RoomBarPro RoomKitEQX CodecEQ CodecPro Room70G2 RoomPanorama/ Room70Panorama

Requires user role: ADMIN

Decide whether to allow unencrypted audio streams on the video device's internal network.

Note that the AES67 standard doesn't support encrypted media streams. Therefore, this setting must be set to Optional to allow AES67 audio.

Codec EQ, Codec EQX, Room Bar Pro: AVIntegrator option required.

USAGE:

```
xConfiguration Audio Ethernet Encryption: Encryption
```

where

Encryption:

Optional/Required

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News just in!

- As of RoomOS November, Cisco IP microphones attached to a supported Cisco codec will no longer require the AV Integrator license to support up to 8 Cisco IP microphones.
- AV Integrator license will still be required on Codec EQ, Board Pro and Room Bar Pro for the following scenarios
  - Codec EQ – Support for Audio Console.
  - Codec EQ, Board Pro, Room Bar Pro – Support for 3rd party AES67 microphones.

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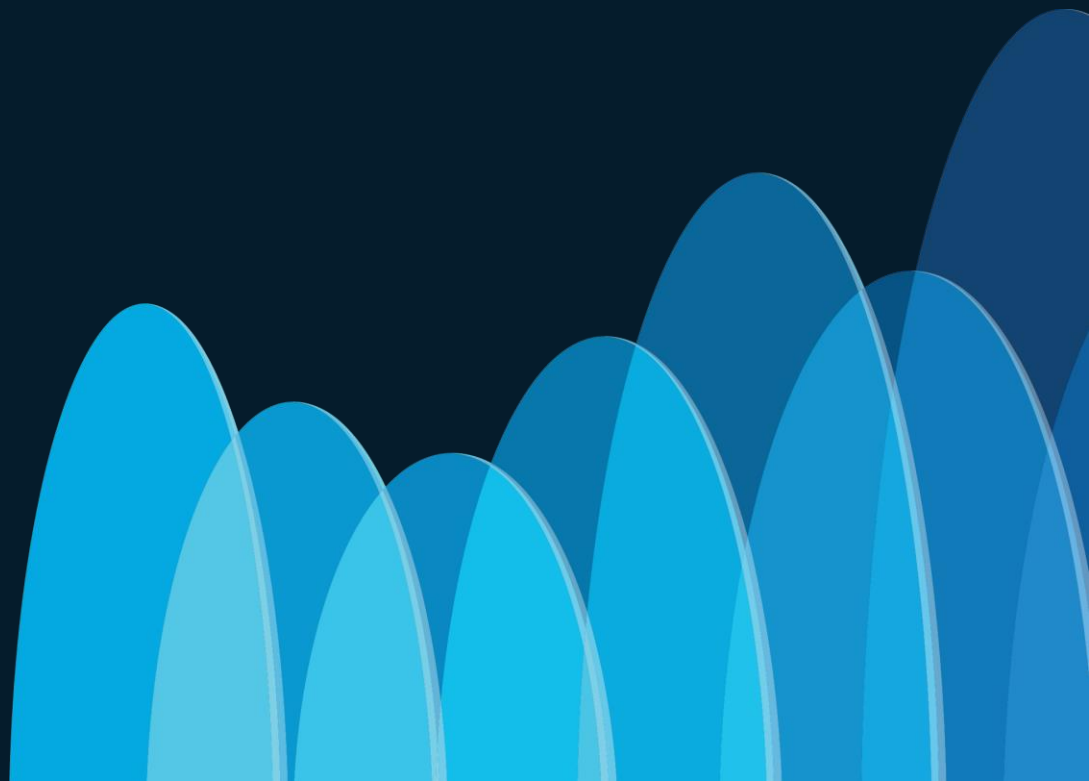
Video



Codec and Cameras

Camera capability is also another key factor when it comes to right device in the right workspace to give the right experience. Remember the situation with the EX90 at the top of the meeting table?

Participants in the workspace need to be seen as well as heard. Having an equitable view of participants in the meeting is key to collaboration and interactivity.

This also includes the positioning of the device to ensure the optimal view.

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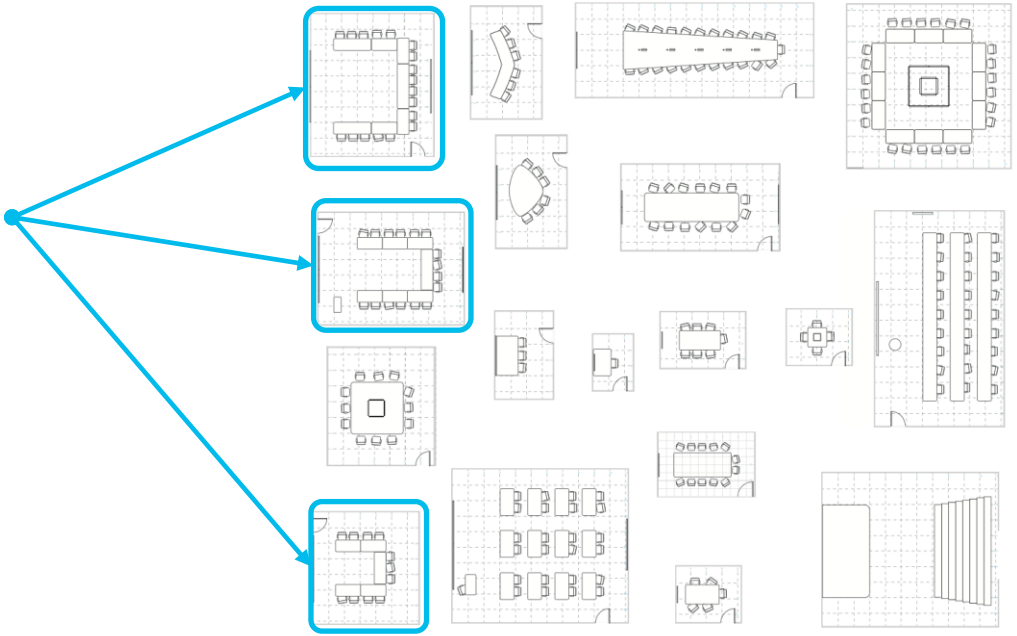
Different sizes

You can have the same layout in the workspace….but it can be at a different scale.

As we can see here, there are several horseshoe style spaces …but at different scale

- Seat count
- Width
- Depth



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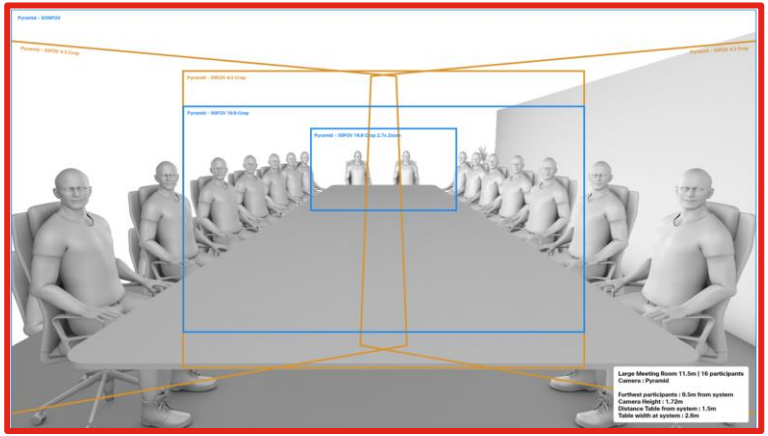
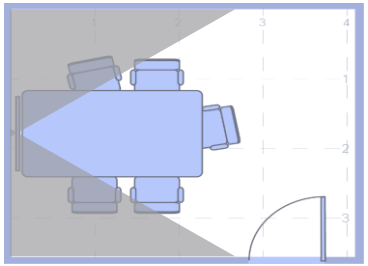
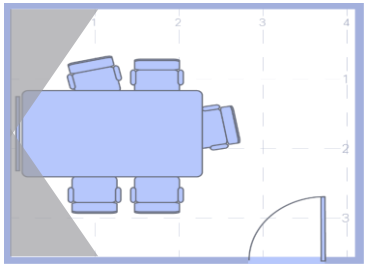
How close/far away?



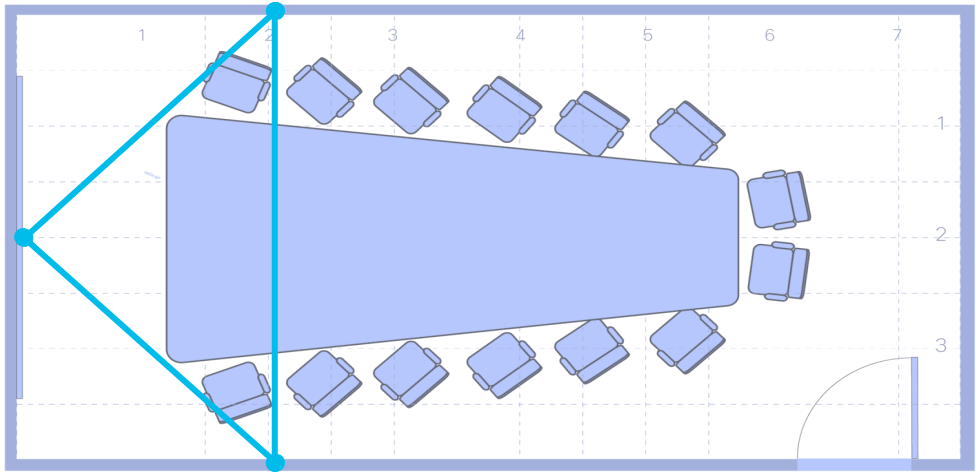


70 deg FOV



120 deg FOV

Best Overview



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Workspace Design

- Can be a complex process
- Lots of data points to consider:
  - Audio
  - Video
  - Lighting
  - Acoustic treatments
- Time consuming

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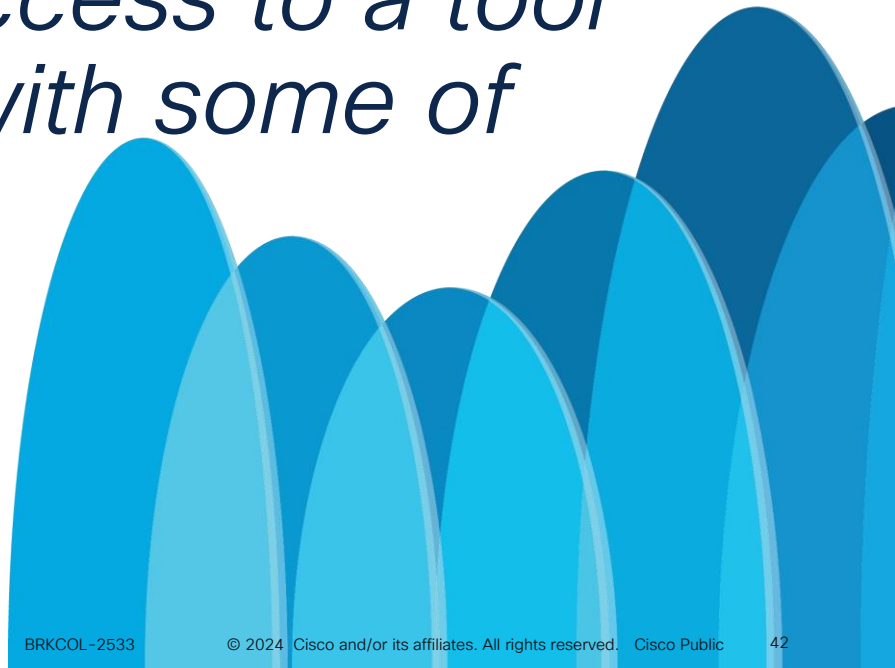
But what if you had access to a tool that could help you with some of these complexities?



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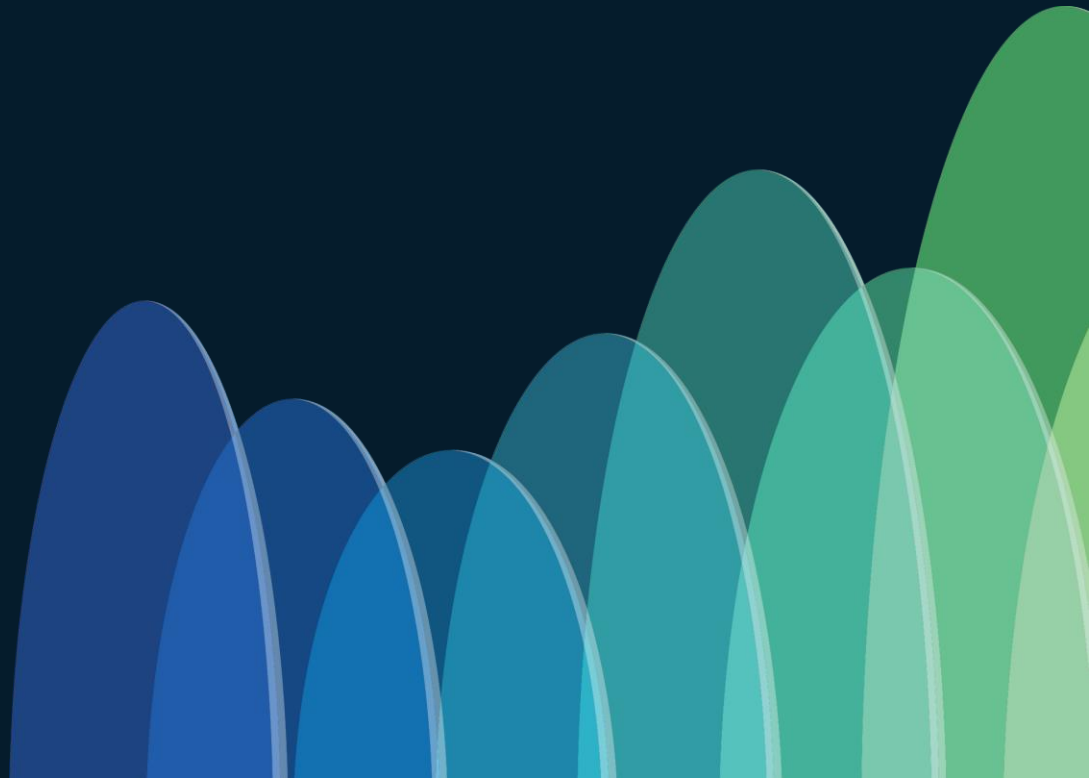
Workspace Designer



cisco Live!

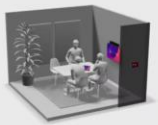
Workspace Designer

Design your workspace.

Explore our interactive configurator and design your spaces for exceptional outcomes.

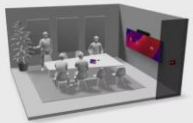
Small Room

4-6



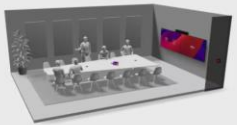
Medium Room

6-10



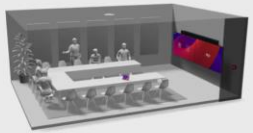
Large Room

11-24



Executive Boardroom

11-24



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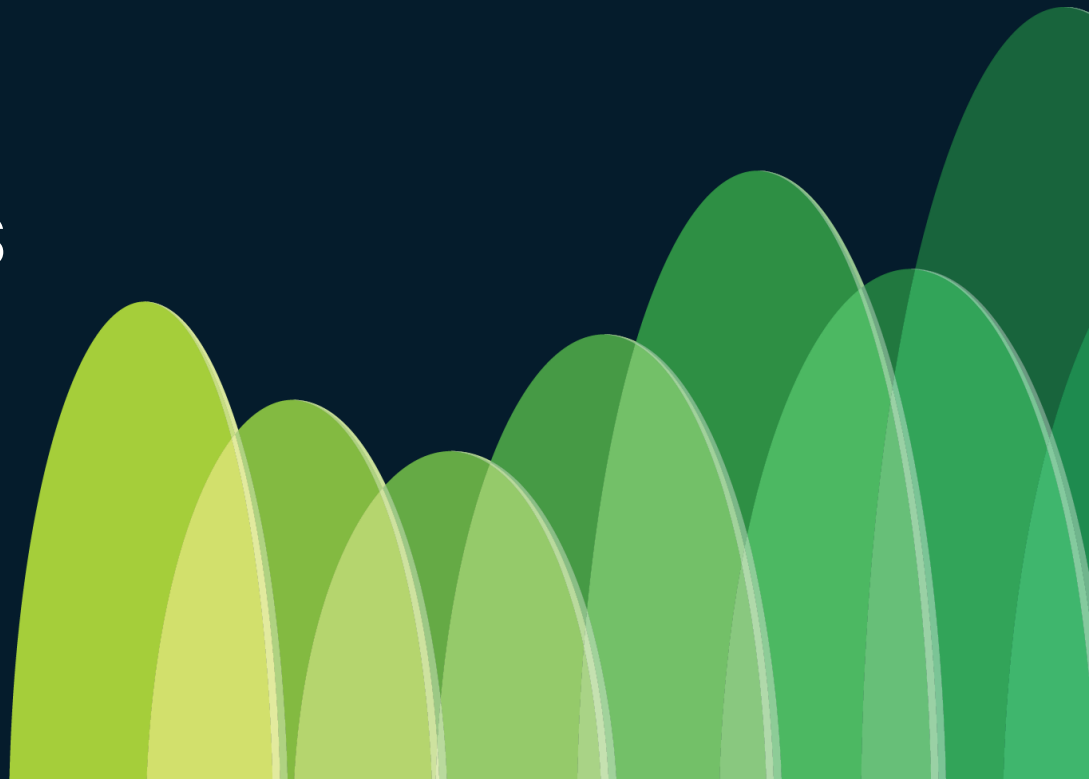
Workspace Designer Demo

cisco Live!

What else can I do?

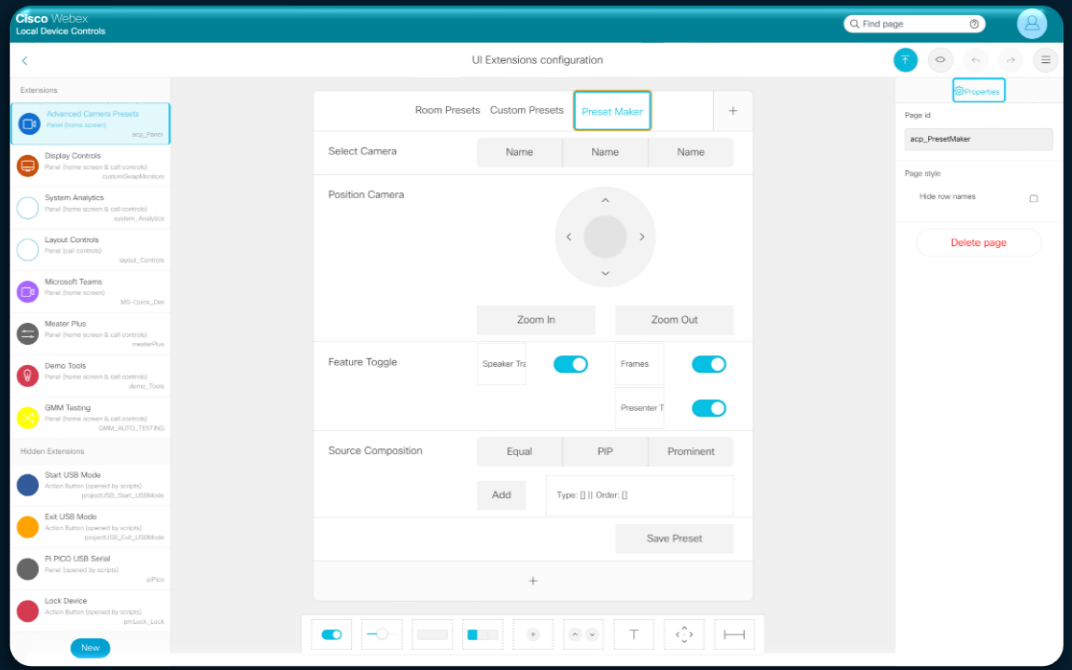
Integration Tools



User Interface Elements

User Interface Extensions Editor

- Built into Each Device
- Create custom interfaces such as
  - Buttons, Toggle Switches, Sliders, Control Wheels, Text boxes
- Provides Event triggers for any backend service that leverages our xAPI to build new automations and experiences



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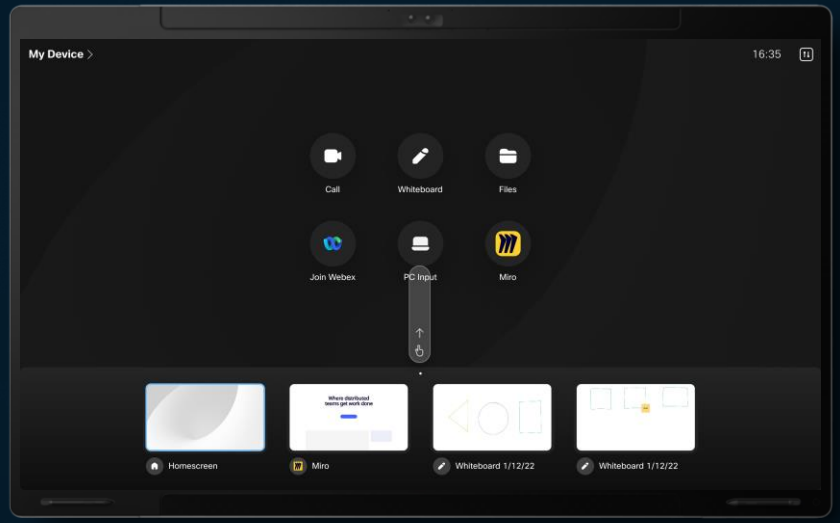
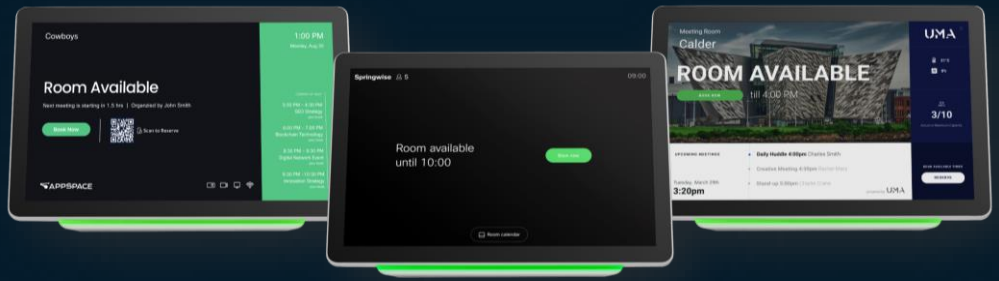
User Interface Elements

Web Applications

- Render Web pages on a Touch OSD or Touch Controller
- Great for simple agnostic applications such as Weather, Stocks, Visual Collaboration Apps, booking solutions
- Leveraging our xAPI, can serve as a fully customized front end and control our devices





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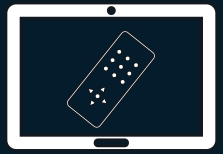
Integration Methods

Take advantage of our vast xAPI

Macros

- Built into Every Device
- Dedicated Runtime Environment
- ES6 Javascript
- Supports HTTP Control for accessing services/devices on the network

Room Controllers



- Can extend a devices access to other integrations
  - Rs232/485, Relays, TCP/UDP, Etc
- Can help coordinate vast Audio Visual arrangements

External Services

- Can extend a device's access to other services in and out of your environment
- Can simplify, centralise and scale your solutions
- Common Tools include
  - NodeJs and the JsxApi Module
  - PutXML Requests
  - Workspace Integrations

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Let’s Build a Customisation!

Where to start

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Outline your project

Who’s your audience?

- Business Analysts

What’s are the challenges?

- The Touch Panel interface is “difficult” to operate, which disrupts their daily standup call
- We don’t have a compatible Calendar Service for OBTP

Which integration tool is best to solve with?

- UI Extensions and a Macro

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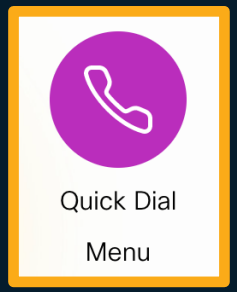
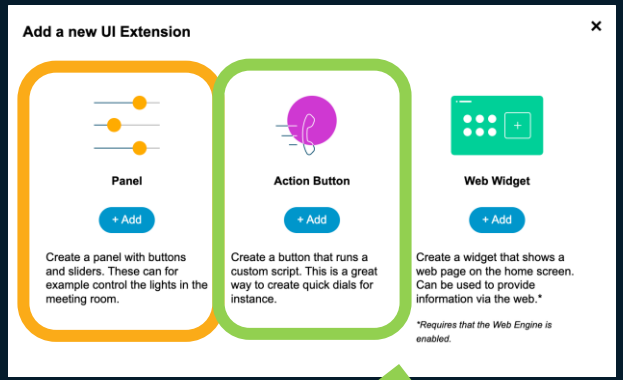
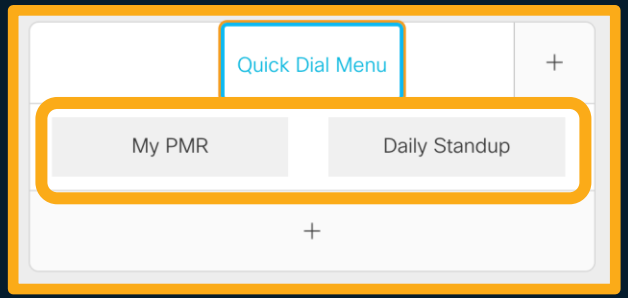
Design the UX

Quick Dial Macro







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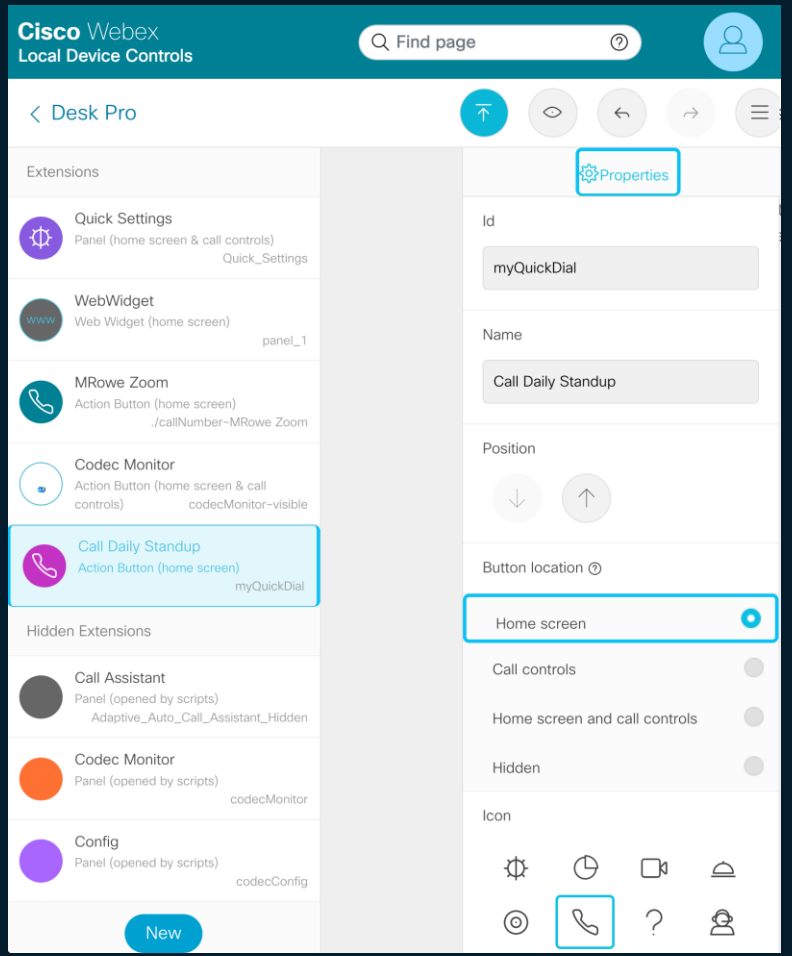
Assigning UI properties

- Set Unique IDs for All Elements
- Assign a Location
- Customise the Icon



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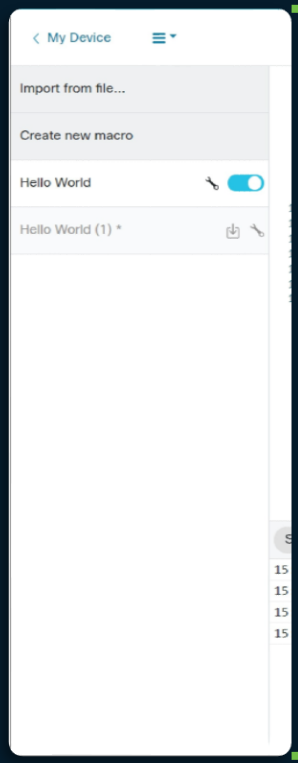
The Macro Editor IDE

Quick Dial Macro



File Menu

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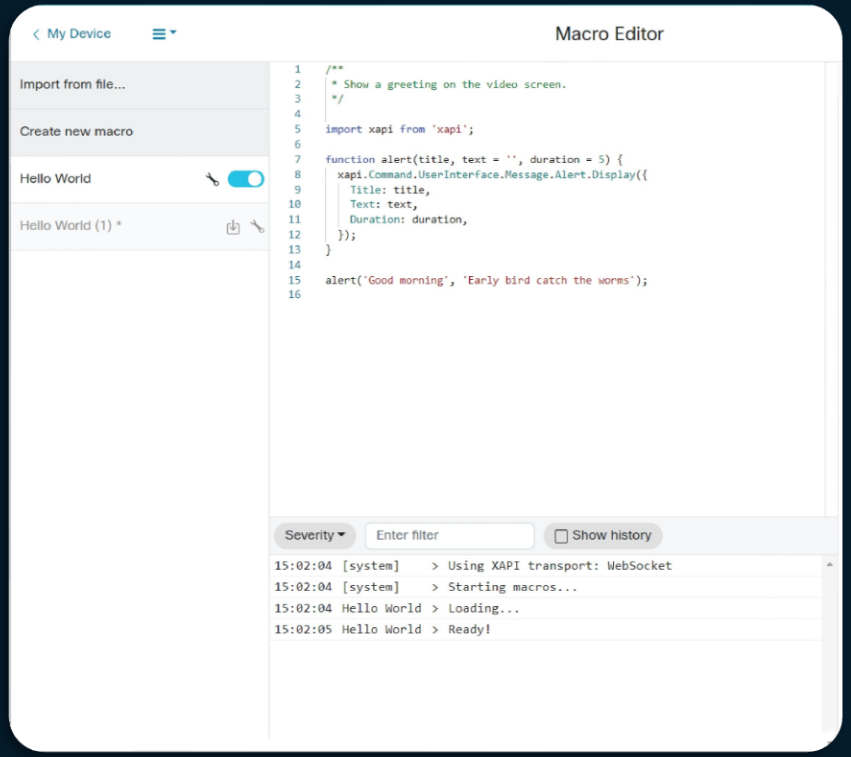
The Macro Editor IDE

Quick Dial Macro



Integrated Development Environment

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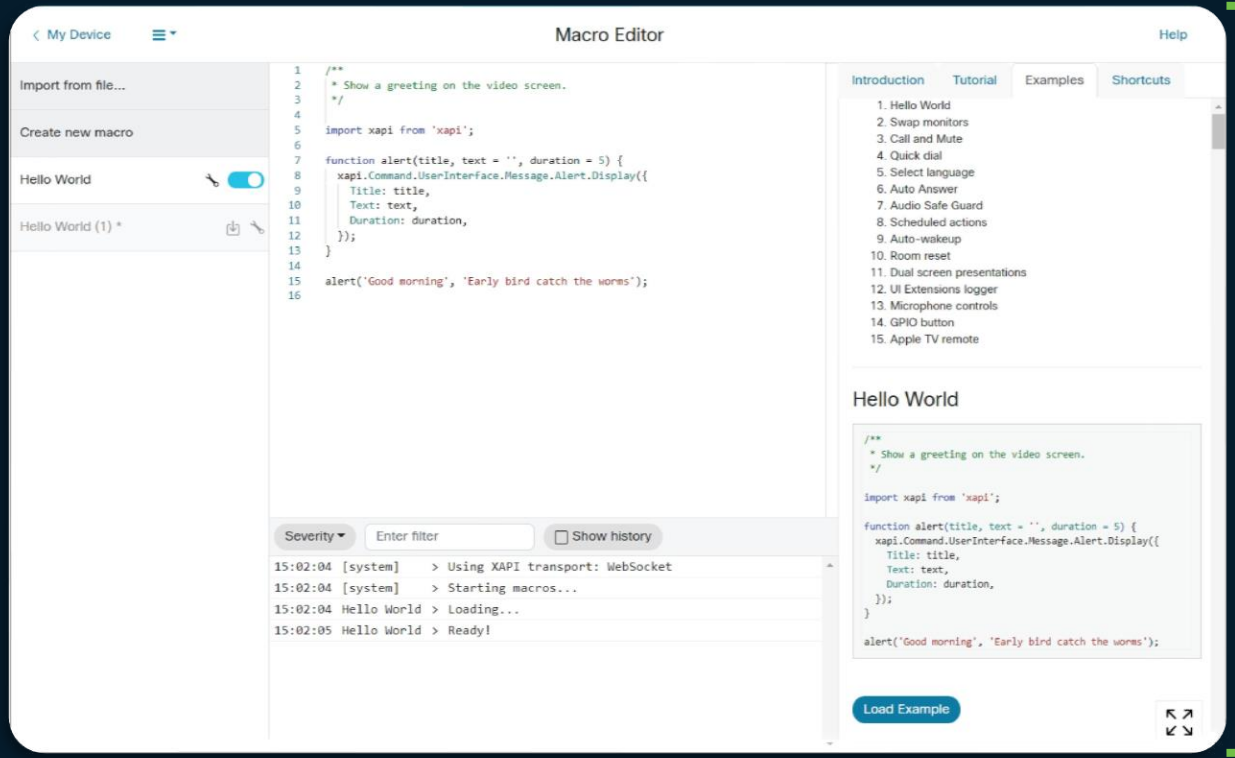
The Macro Editor IDE

Quick Dial Macro



Help
And
Examples

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Writing the script

Quick Dial Macro

First Try

```
1| import xapi from `xapi`;
2|
3| xapi.Event.UserInterface.Extensions.Panel.Clicked.on(event => {
4|     if (event.PanelId == `myQuickDial`){
5|         xapi.Command.Dial({Number: `sampleNumber@domain.webex.com`})
6|     }
7| })
```

Provides function for a UI Extension Panel ID'd as myQuickDial

Simplified

```
 1| import xapi from `xapi`;
 2|
 3| const quickDialNumber = `sampleNumber@domain.webex.com`
 4|
 5| //Skip a few dozen lines...
...
61| xapi.Event.UserInterface.Extensions.Panel.Clicked.on(event => {
62|     if (event.PanelId == `myQuickDial`){
63|         xapi.Command.Dial({Number: quickDialNumber})
64|     }
65| })
```

Provides the same function as above, but the number was elevated, making it easier to edit in the future as the need changes

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Quick Dial Macro

Amplified

```
import xapi from `xapi`;

const quickDial_ID_Header= `./callNumber~`;

const quickDialNumbers = [
    { name: `My PMR`, uri: `myPMR@domain.webex.com`},
    { name: `Daily Standup`, uri: `dailyCall@webex.com`}
];

async function init(){ await buildQuickDialPanels();}

init();

//Skip a few dozen lines...

async function buildQuickDialPanels() {
  let currentPanelList = await generateExistingPanelsList();
  let quickDialList = generateQuickDialPanelList();
  let panelsToAdd = quickDialList.filter(x => !currentPanelList.includes(x));
  let panelsToRemove = currentPanelList.filter(x => !quickDialList.includes(x));
  for (let i = 0; i < panelsToRemove.length; i++) {
    await xapi.Command.UserInterface.Extensions.Panel.Remove({ PanelId: panelsToRemove[i] });
    console.warn({ Message: `Panel [${panelsToRemove[i]}] removed` })
  }
  for (let j = 0; j < panelsToAdd.length; j++) {
    for (let q = 0; q < quickDialNumbers.length; q++) {
      if (panelsToAdd[j] == quickDialNumbers[q].panelId) {
        console.log({ Message: `Building new Quick Dial Panel [${panelsToAdd[j]}]` })
        await xapi.Command.UserInterface.Extensions.Panel.Save({
          PanelId: panelsToAdd[j]
        }, `<Extensions>
        <Panel>
          <Type>Home</Type>
          <Icon>Handset</Icon>
          <Color>#008094</Color>
          <Name>${quickDialNumbers[q].name}</Name>
          <ActivityType>Custom</ActivityType>
        </Panel>
      </Extensions>`);
      }
    }
  }
};
```

Provides the same quick dialing user experience, but with an expanded feature set

- Simpler Setup
- Multiple Quick Dial button support
- Automatic UI Extension Management
- Detailed Logging

The solution continues to grow

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Quick Dial Macro

Amplified

```
import xapi from 'xapi';

const quickDial_ID_Header= `./callNumber~`;

const quickDialNumbers = [
    { name: `My PMR`, uri: `myPMR@domain.webex.com`},
    { name: `Daily Standup`, uri: `dailyCall@webex.com`}
];

async function init(){ await buildQuickDialPanels();}

init();

//Skip a few dozen lines...

async function buildQuickDialPanels() {
  let currentPanelList = await generateExistingPanelsList();
  let quickDialList = generateQuickDialPanelList();
  let panelsToAdd = quickDialList.filter(x => !currentPanelList.includes(x));
  let panelsToRemove = currentPanelList.filter(x => !quickDialList.includes(x));
  for (let i = 0; i < panelsToRemove.length; i++) {
    await xapi.Command.UserInterface.Extensions.Panel.Remove({ PanelId: panelsToRemove[i] });
    console.warn({ Message: `Panel [${panelsToRemove[i]}] removed` })
  }
  for (let j = 0; j < panelsToAdd.length; j++) {
    for (let q = 0; q < quickDialNumbers.length; q++) {
      if (panelsToAdd[j] == quickDialNumbers[q].panelId) {
        console.log({ Message: `Building new Quick Dial Panel [${panelsToAdd[j]}]` })
        await xapi.Command.UserInterface.Extensions.Panel.Save({
          PanelId: panelsToAdd[j]
        }, `<Extensions>
        <Panel>
          <Type>Home</Type>
          <Icon>Handset</Icon>
          <Color>#008094</Color>
          <Name>${quickDialNumbers[q].name}</Name>
          <ActivityType>Custom</ActivityType>
        </Panel>
      </Extensions>`);
      }
    }
  }
};
```

Simpler Setup with
support for Multiple Quick Dial Buttons

```
const quickDialNumbers = [
    { name: `My PMR`, uri: `myPMR@dm.webex.com`},
    { name: `Standup`, uri: `dailyCall@webex.com`}
];
```


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Quick Dial Macro

Amplified

```
async function buildQuickDialPanels() {
  let currentPanelList = await generateExistingPanelsList();
  let quickDialList = generateQuickDialPanelList();
  let panelsToAdd = quickDialList.filter(x => !currentPanelList.includes(x));
  let panelsToRemove = currentPanelList.filter(x => !quickDialList.includes(x));
  for (let i = 0; i < panelsToRemove.length; i++) {
    await xapi.Command.UserInterface.Extensions.Panel.Remove({ PanelId: panelsToRemove[i] });
    console.warn({ Message: `Panel [${panelsToRemove[i]}] removed` })
  }
  for (let j = 0; j < panelsToAdd.length; j++) {
    for (let q = 0; q < quickDialNumbers.length; q++) {
      if (panelsToAdd[j] == quickDialNumbers[q].panelId) {
        console.log({ Message: `Building new Quick Dial Panel [${panelsToAdd[j]}]` })
        await xapi.Command.UserInterface.Extensions.Panel.Save({
          PanelId: panelsToAdd[j]
        }, `<Extensions>
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          <Type>Home</Type>
          <Icon>Handset</Icon>
          <Color>#008094</Color>
          <Name>${quickDialNumbers[q].name}</Name>
          <ActivityType>Custom</ActivityType>
        </Panel>
      </Extensions>`);
      }
    }
  }
};
```

Automatic UI Extension Management

Compare existing UI against quickDialNumbers object and remove outliers

Build any new panels introduced in the quickDialNumbers object

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Congrats! You just built a button 🎉

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Cinematic Views

Cinematic Meeting Experiences

Meeting zones

Enable distraction-free meetings in glass-walled meeting rooms by only framing and tracking people within predefined perimeters

Multi-camera speaker view

Dynamic switching between the built-in camera system and the PTZ 4K Camera for extended reach and high-quality framing

Multi-camera cross-view

Show the best view of in-room participants across the table through adaptive, AI-directed framing for true-to-life meetings.

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Cinematic Meeting Experiences

Presenter & audience view

Run engaging local, remote and hybrid sessions with AI presenter tracking, camera switching and multi-stream video intelligence

Frames & people focus

Ensure everyone is equally seen in the meeting with AI people cropping and augment the experience with intelligent video layouts on Webex

Campfire

Bring an inclusive experience to executive meetings with a purpose-designed setup with multiple codecs, cameras and screens.

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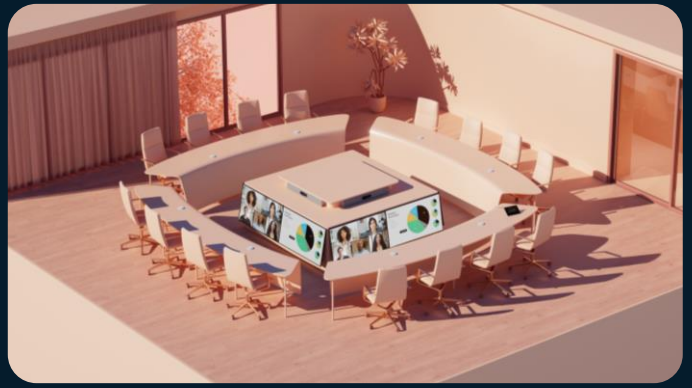
The new challenge

Campfire Blueprint



Who's your audience?

- The executive leadership team

What's are the challenges?

- A conference room with a square table and a hollow center
- A want to see guests across the table and on the call
- Speaker tracking should capture all in room guests, but you have a 360 Degree view
  - A Codec can only support 1 Speakertracking Camera at a time…

Which integration tool is best to solve with?

- Macros

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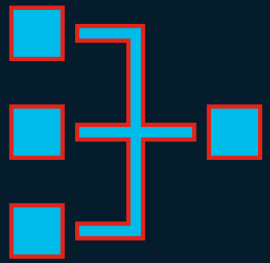
How do we solve for this space?

Campfire Room

Room Kit EQ



Room Kit Pro

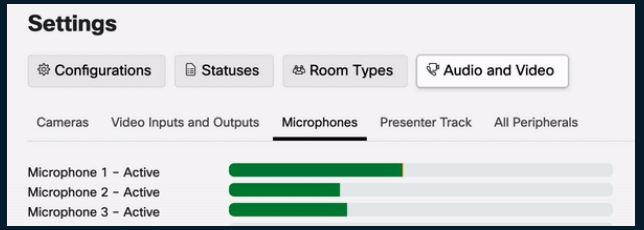


Table Mic Pro

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Campfire Room

Quad Camera

Center
Island

Table 1

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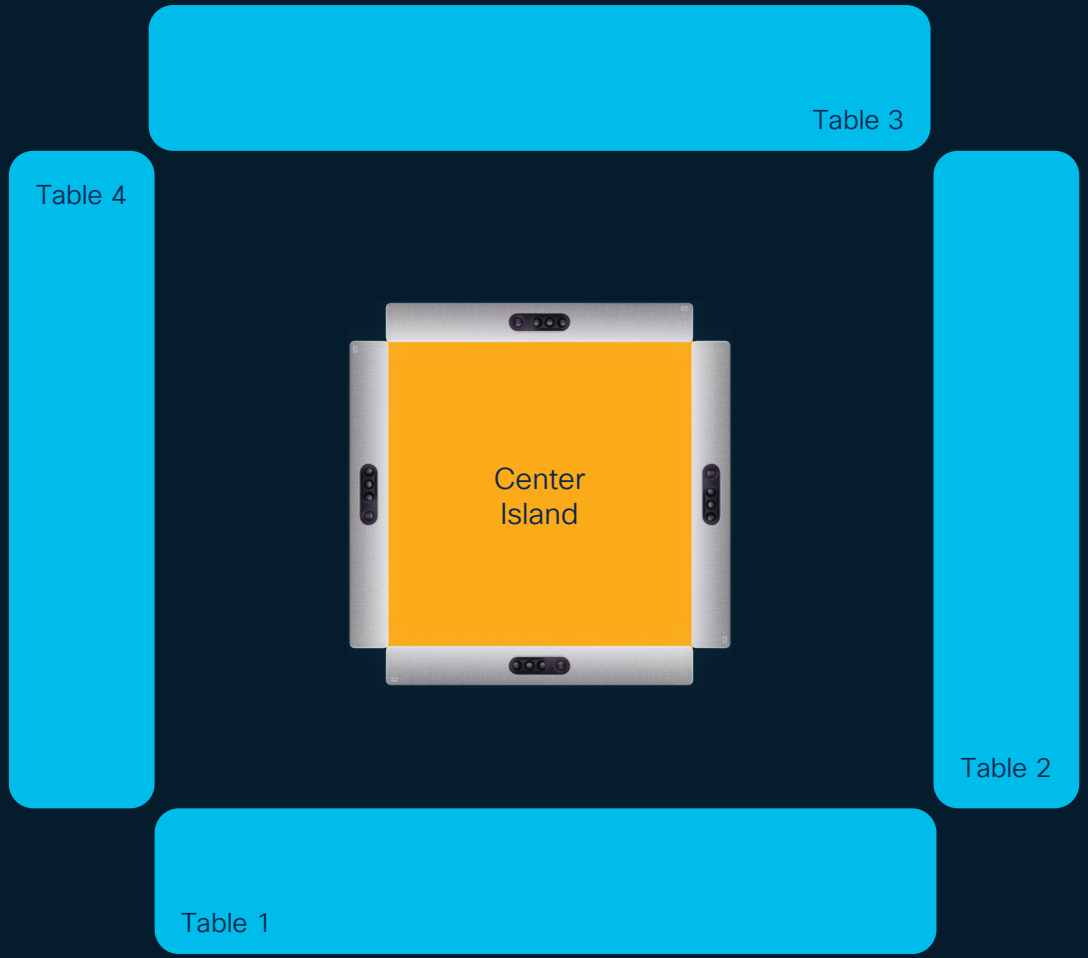

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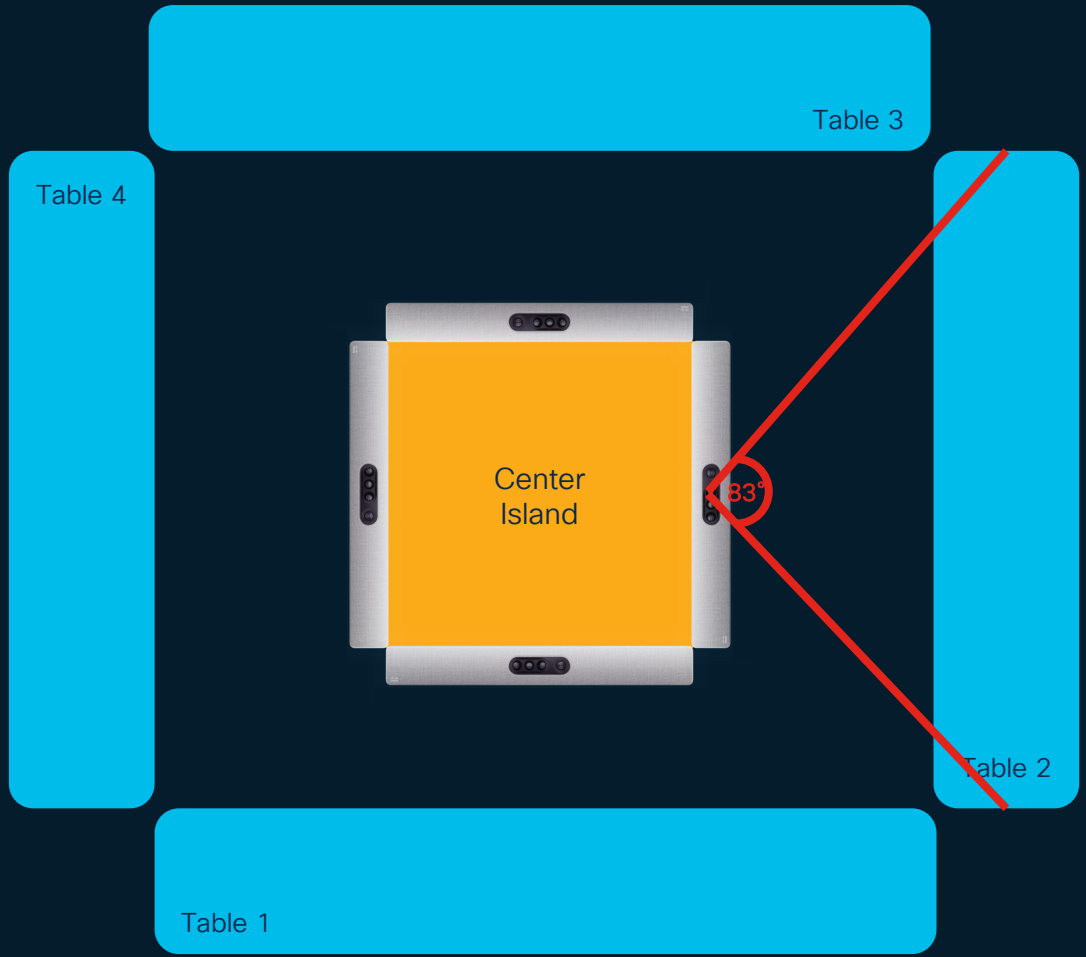

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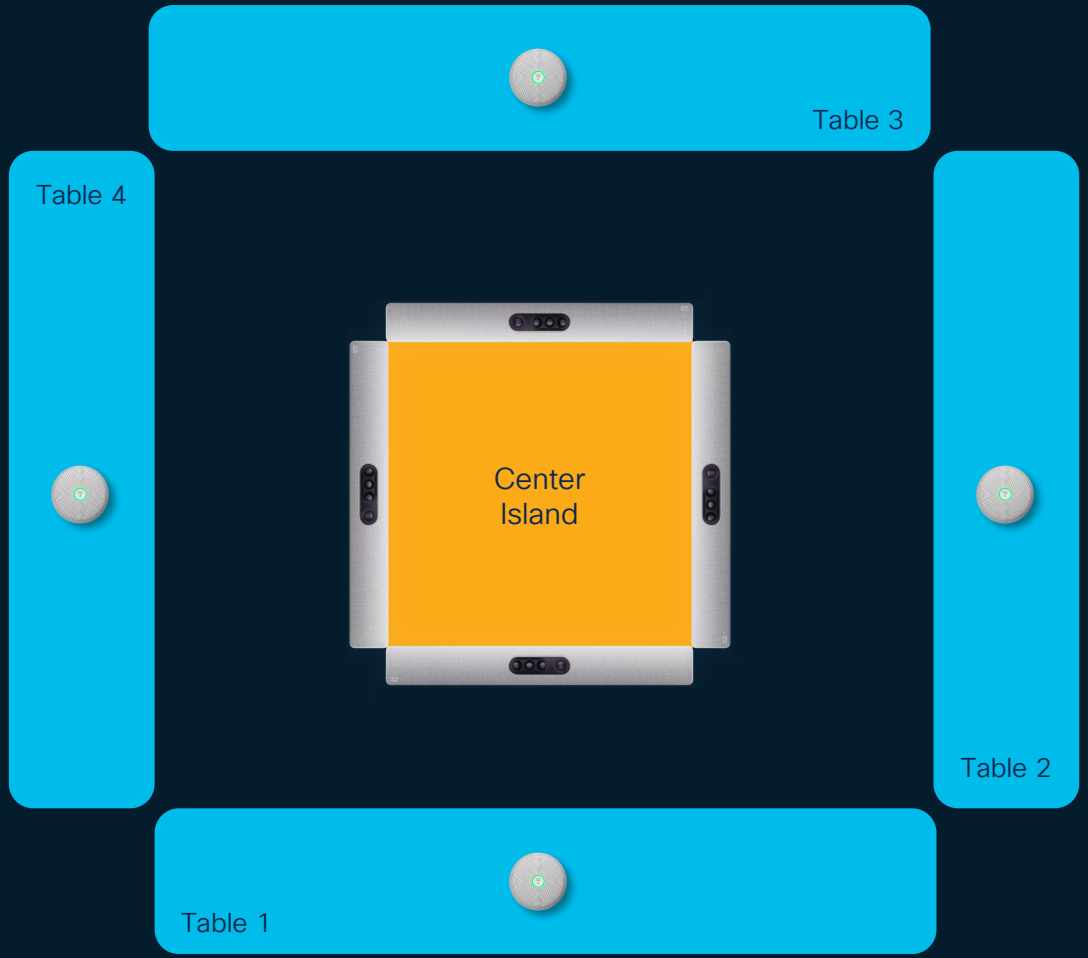

Table Microphone Pro

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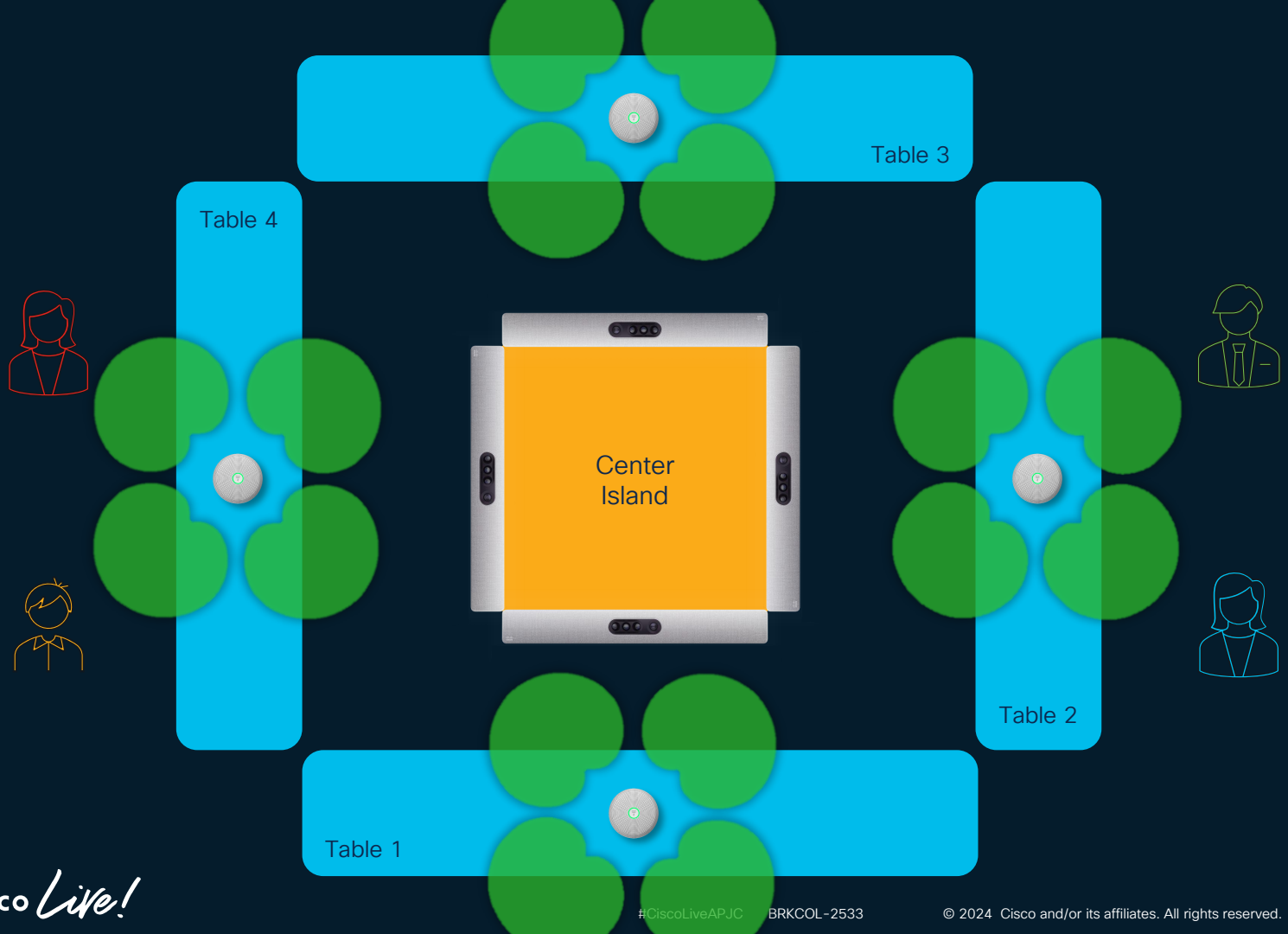

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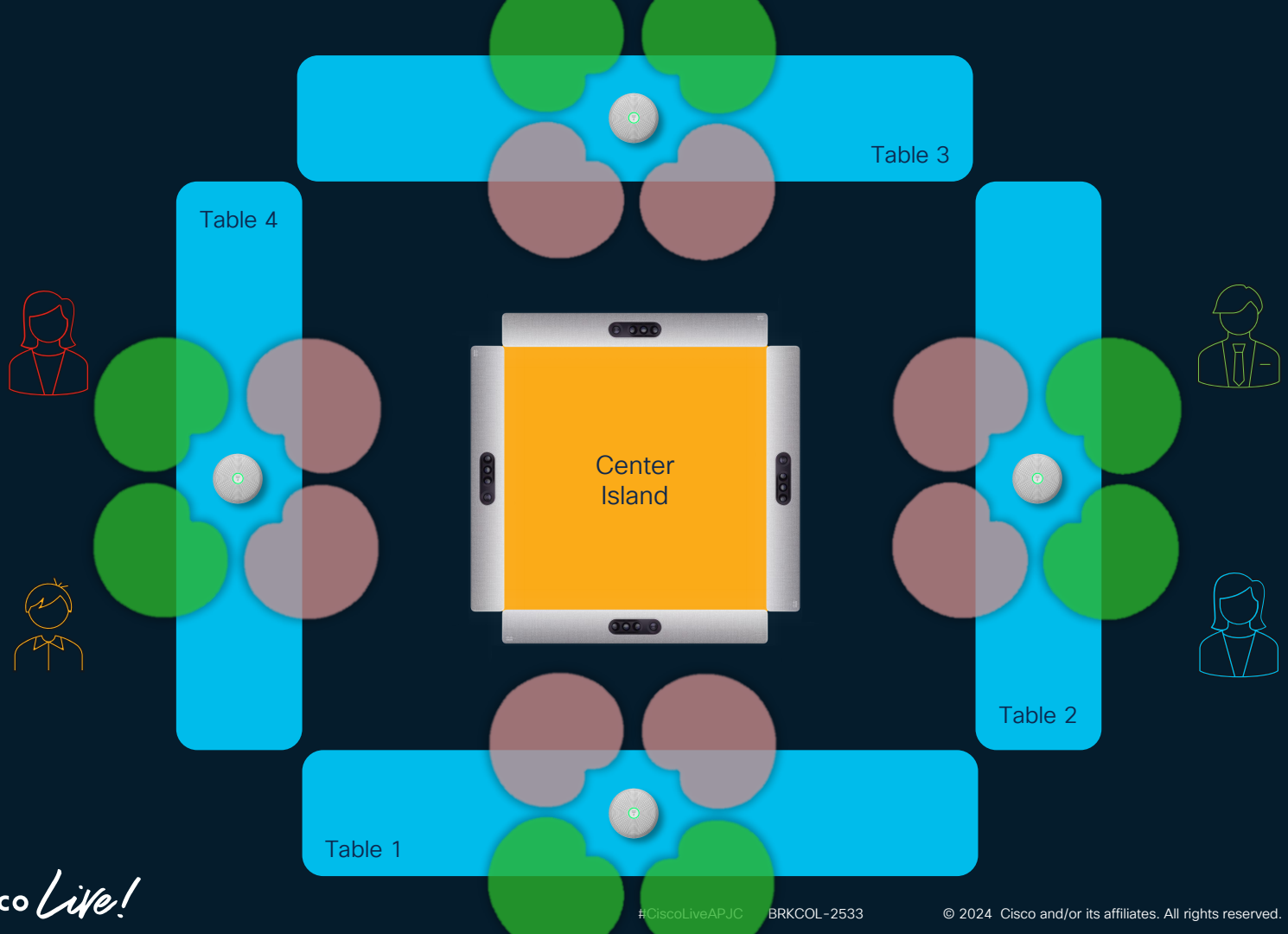

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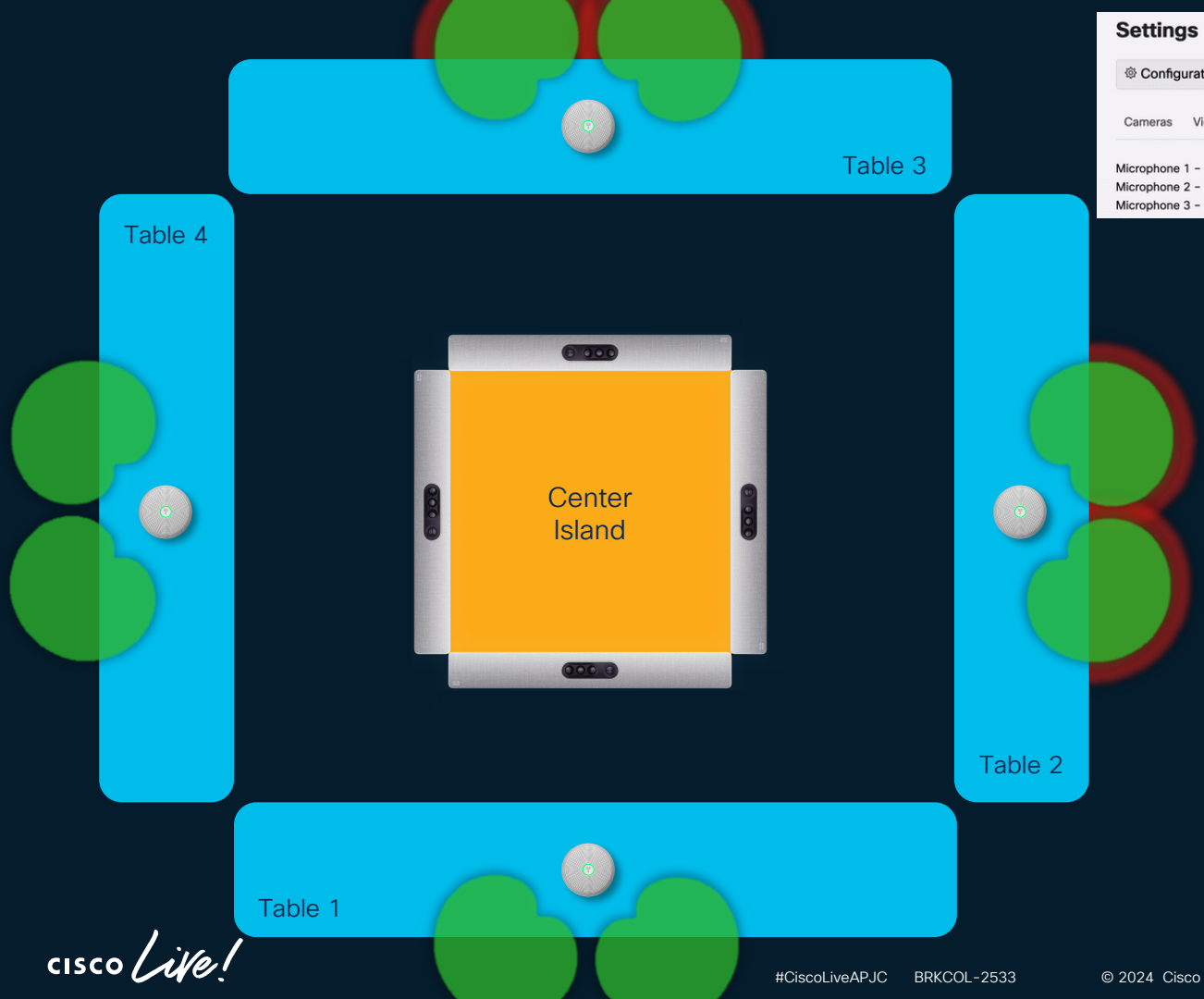
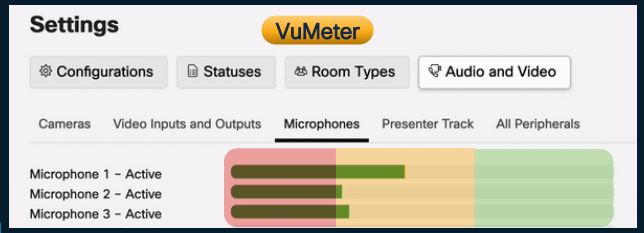
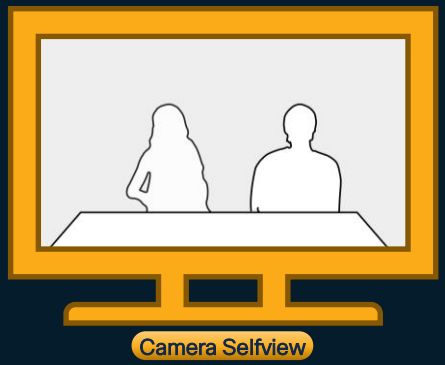




Low

Middle

High



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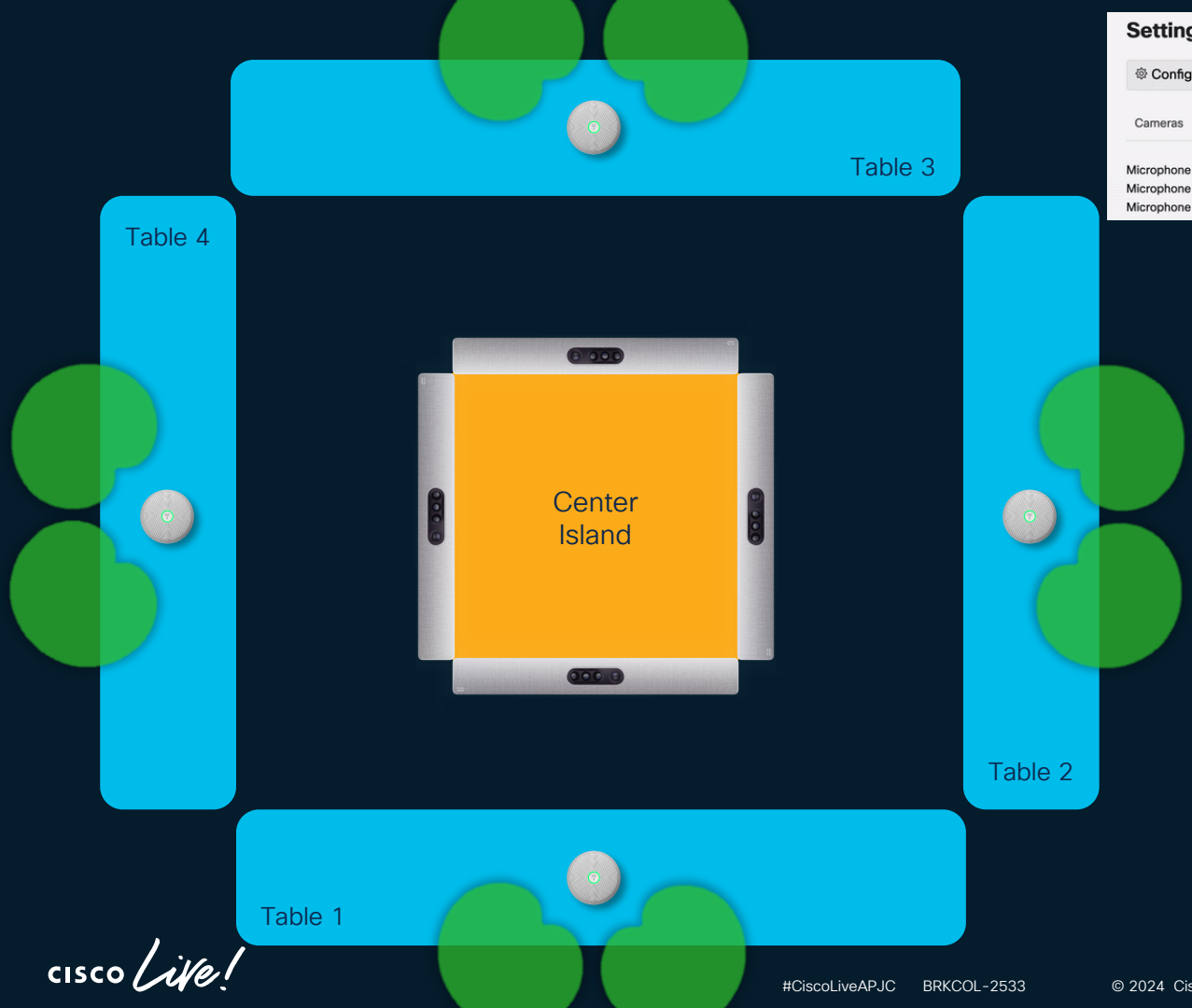

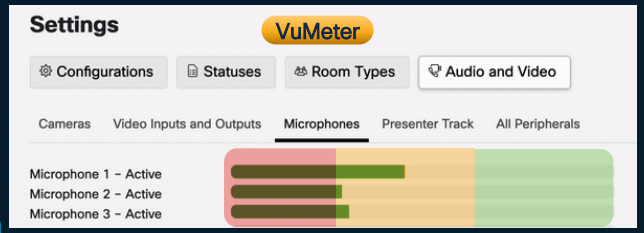

Low

Middle

High

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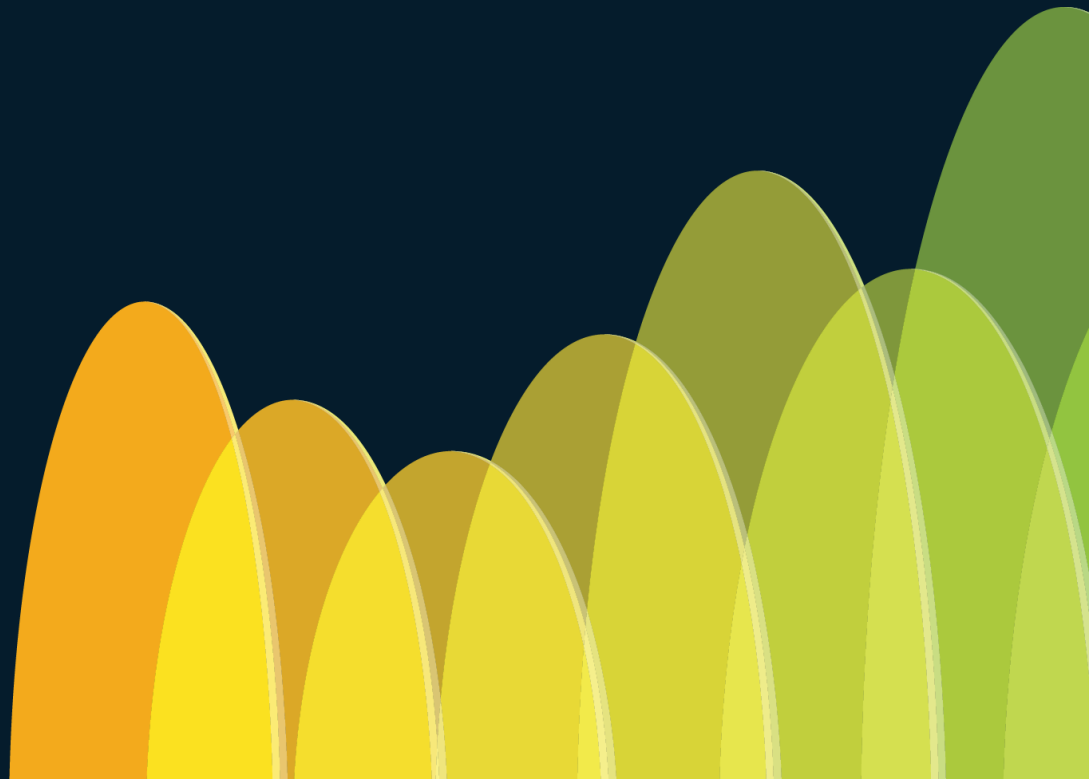
Ready to Deploy?



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Customisation Deployment Options

Control Hub

Endpoint API's

Device Backups

Automation, CE-Deploy and 3rd Party

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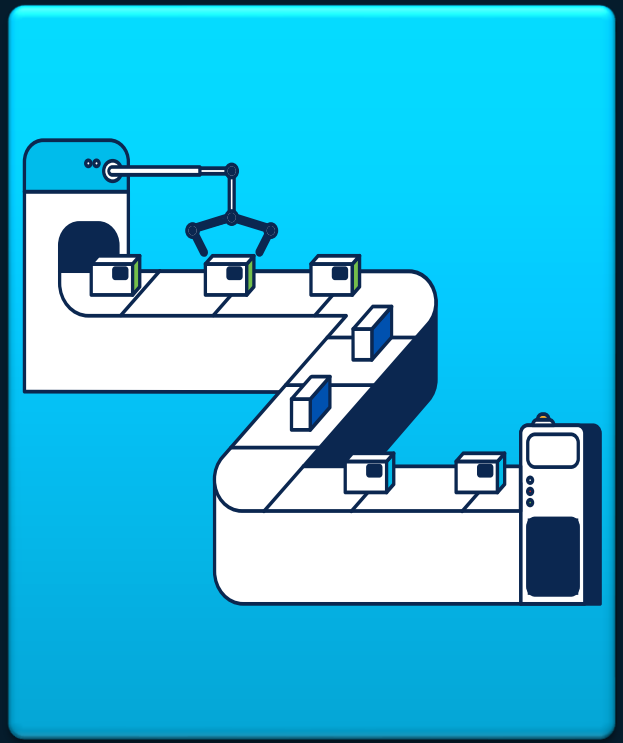
Customisation Deployment Assets

Commands
Enable Macro Engine
Push Macros
Activate Macros
Push Extensions
Viewable Extensions

Data
Macro JavaScript
Custom Extension XML



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Customisation Deployment Options

Configurations	Macro's	UI Extensions
Device Web Portal	Device Web Portal	Device Web Portal
Control Hub(Bulk)	Control Hub(single)	Cloud xAPI
Cloud xAPI	Cloud xAPI	Endpoint xAPI
Endpoint xAPI	Endpoint xAPI	CE-Deploy(Bulk)
CE-Deploy(Bulk)	CE-Deploy(Bulk)	

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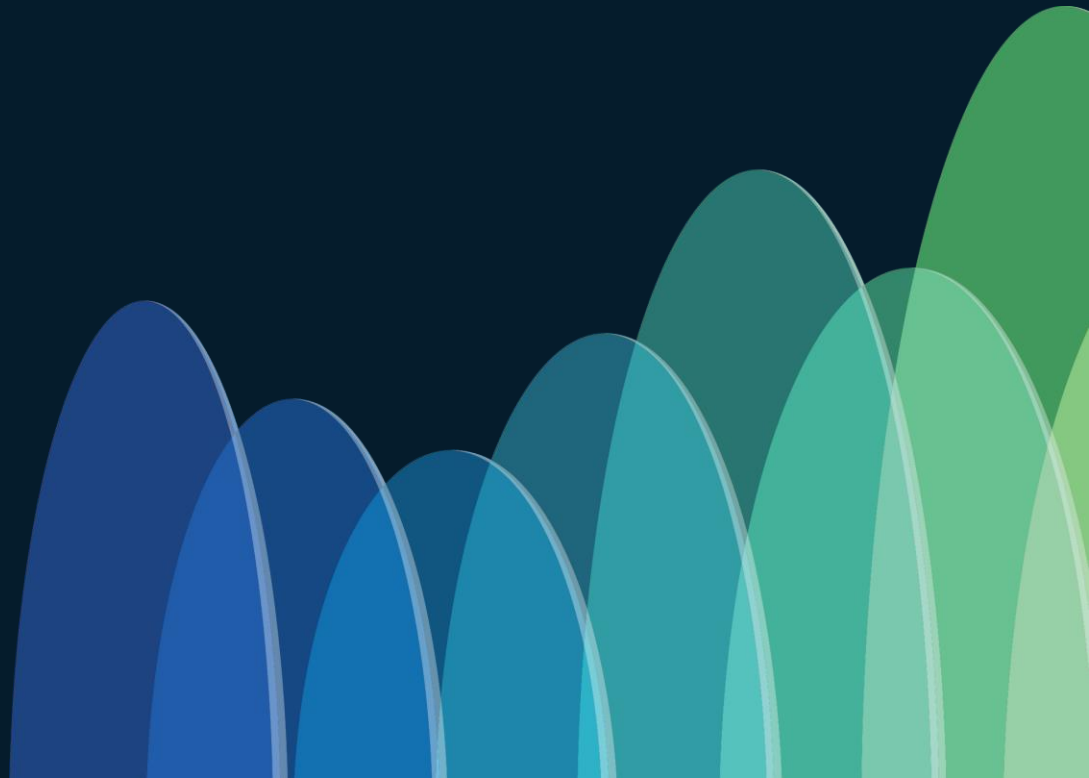
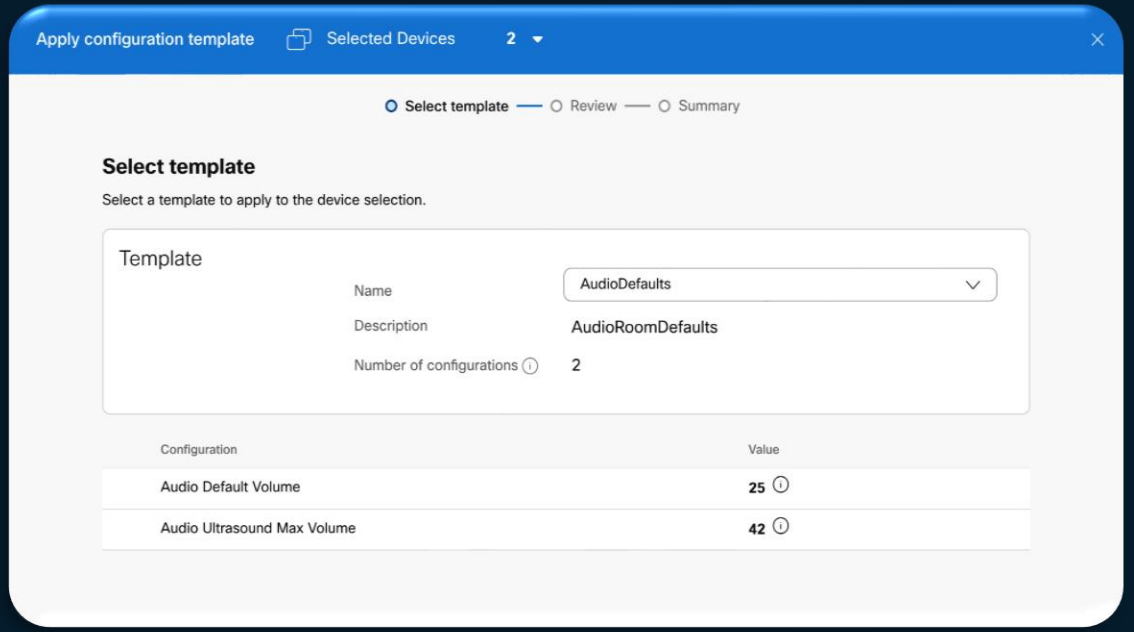
Control Hub



Control Hub Device Templates

- Applied across multiple devices
- Templates based on use case
  - General settings
  - Divisible room
  - Single configuration
- One template applied at a time
- Templates settings can be undone



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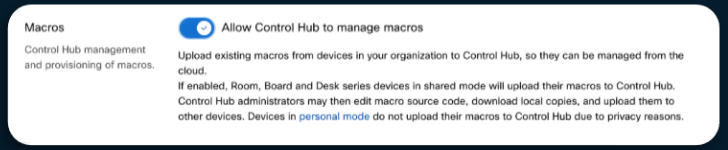
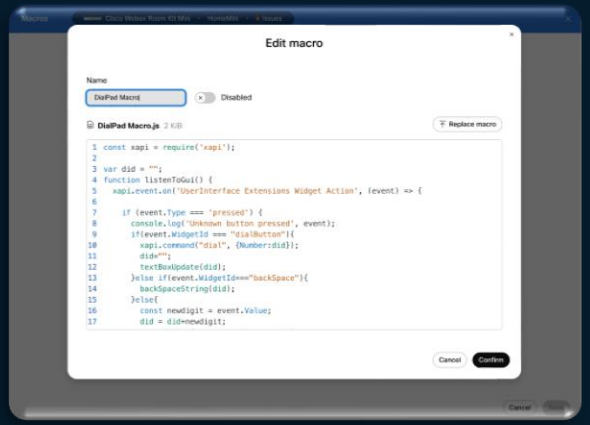
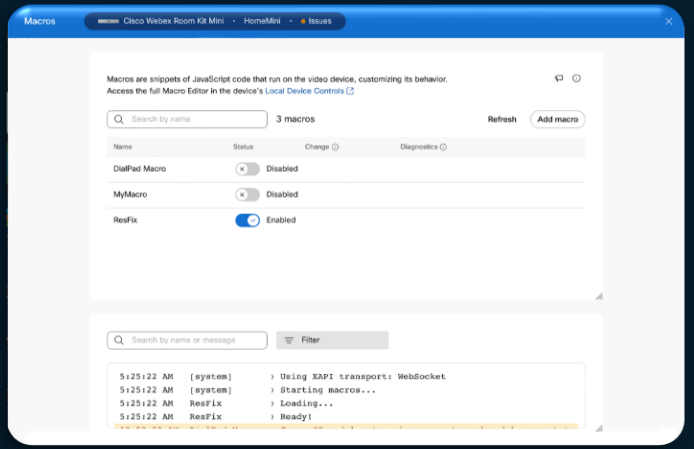
Control Hub Macros



Enable**



Edit



View & Add

**Personal mode not supported

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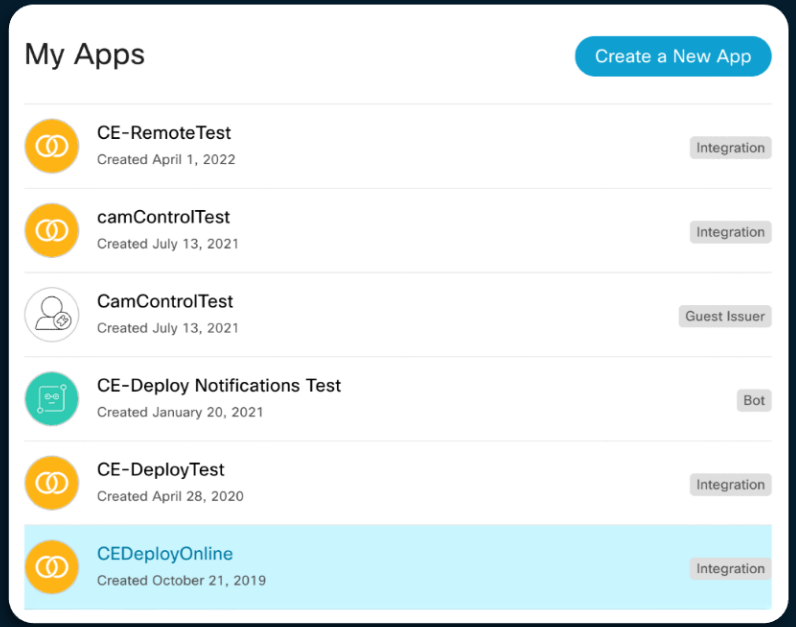
Control Hub Cloud xAPI

- Scoped Webex Integration
- Rate limit to 300 requests per minute
  - Conservative estimate
- Large body transactions can cause errors
  - Multiline commands
- Offline endpoints
  - Configurations stored by the cloud



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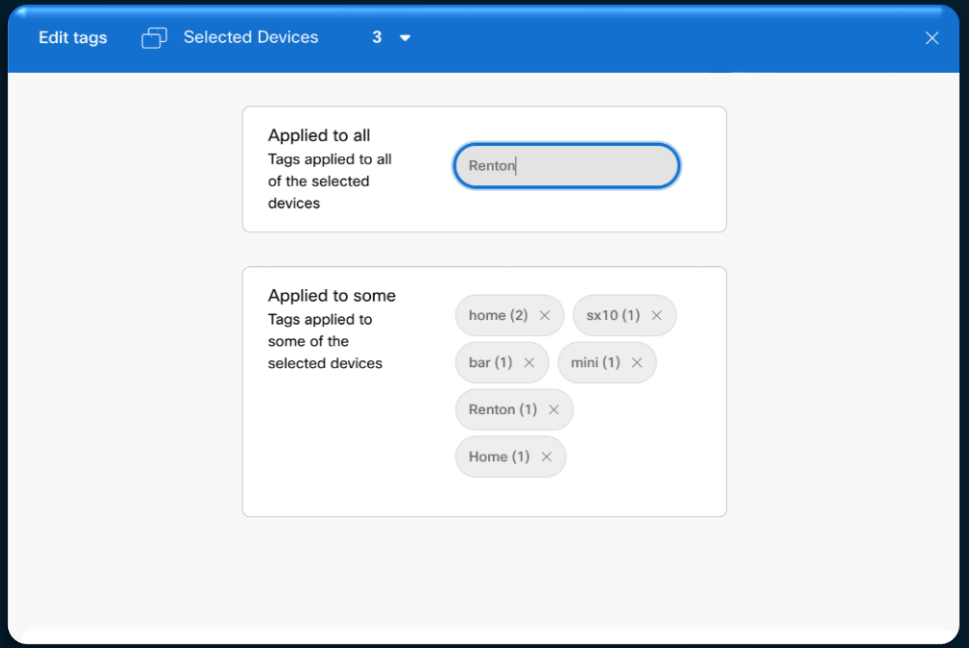
Control Hub Device Tags

- Have as many tags as you want!
- Avoid spaces in tags
  - camel Case or Pascal Case
- Examples of tags
  - Location based
  - Personal or shared device
  - Product type



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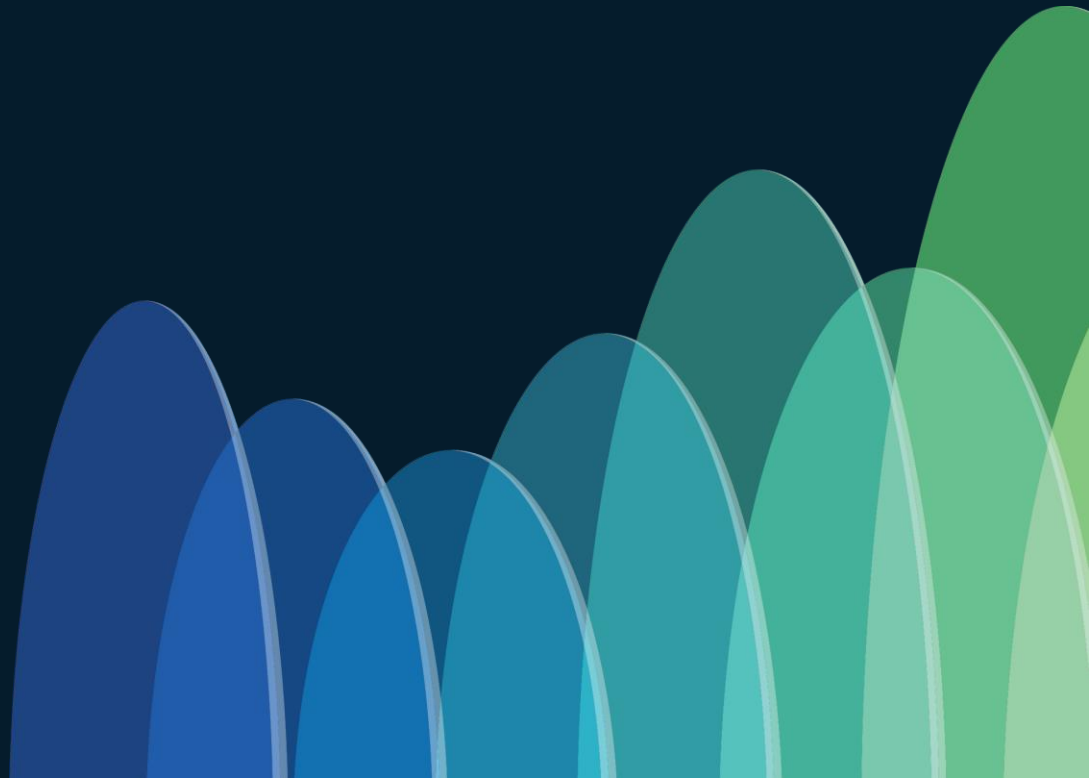
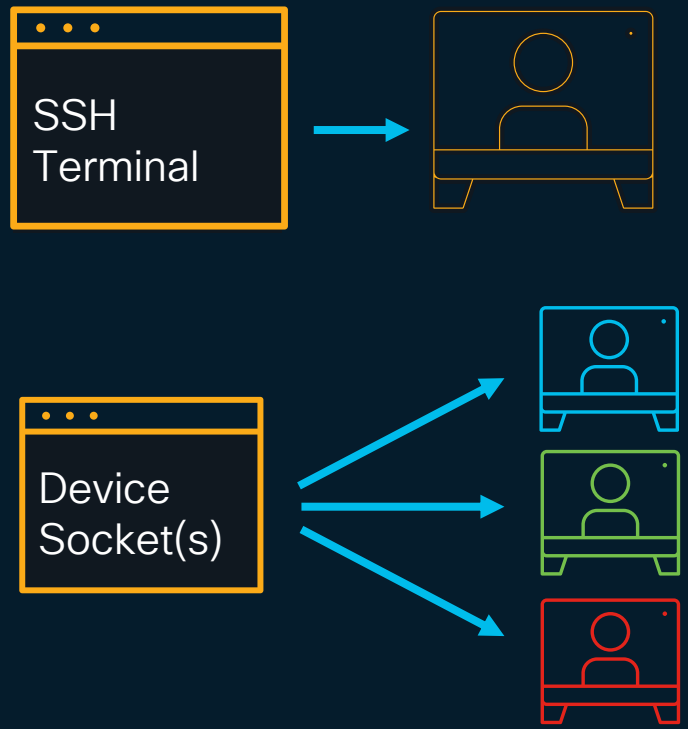
Endpoint API’s



Endpoint API's for Deployment

- 3 Delivery Options
  - HTTP/HTTPS
  - SSH
  - WebSockets
- Websockets is the best option
  - jsxapi library support
  - JSON support
  - Easier to manage large scale projects



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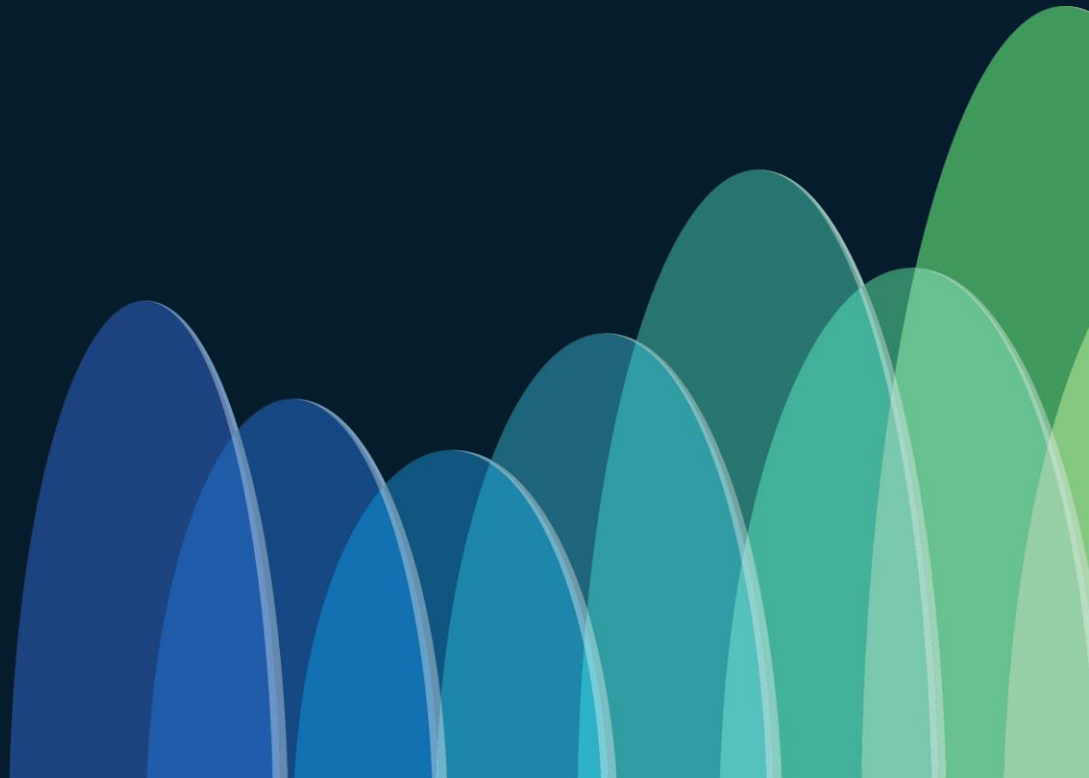
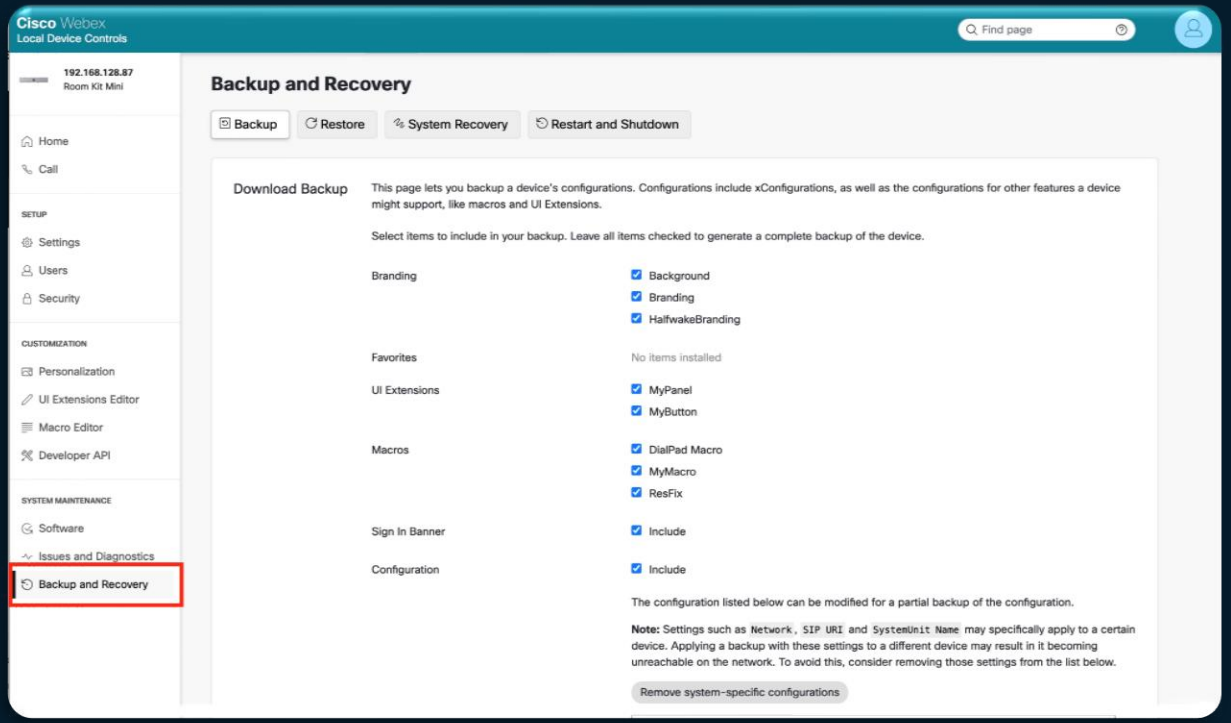
Device Backups



Device Web Admin Page Backup Templates



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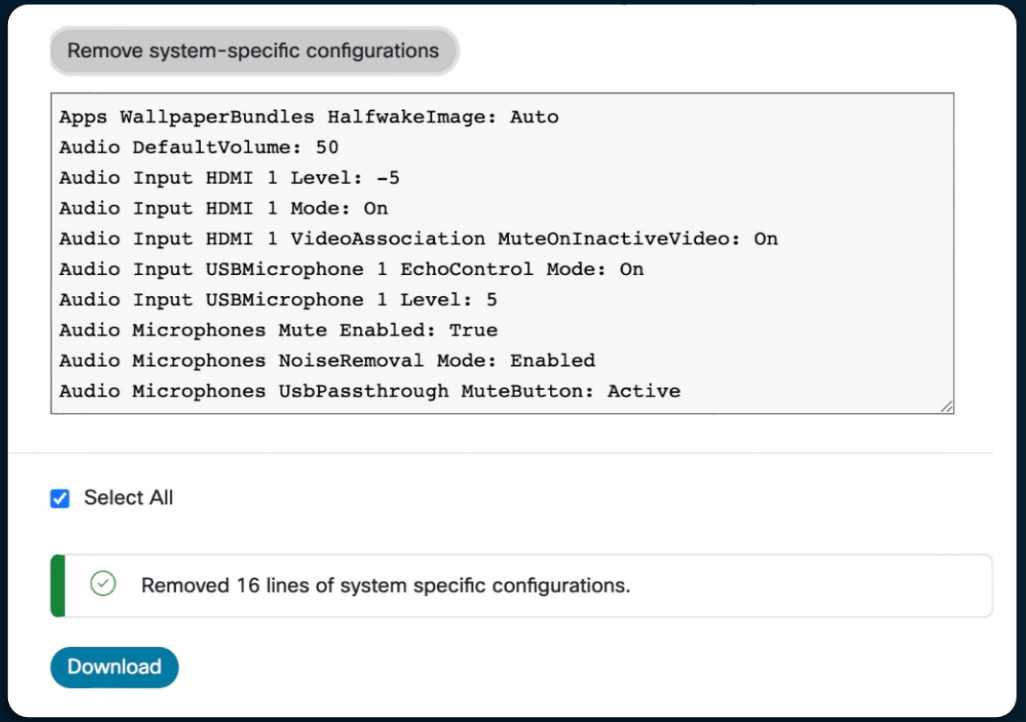
Backup Template Creation

Remove system specific Configuration and download template



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Restoring Backup Template

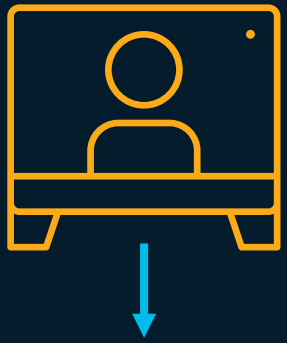
```
You are now connected via CE-Deploy $
Welcome to
Cisco Codec Release RoomOS 11.3.1.5 7762617dc56
SW Release Date: 2023-03-09
*r Login successful
OK

xCommand Provisioning Service Fetch Checksum: {value} ChecksumType: SHA512 Mode:
 Replace Origin: Other URL: http://fileserver.com/file
```

Send xAPI command

Hosted file

Endpoint fetches file



Calculates Checksum and performs restore

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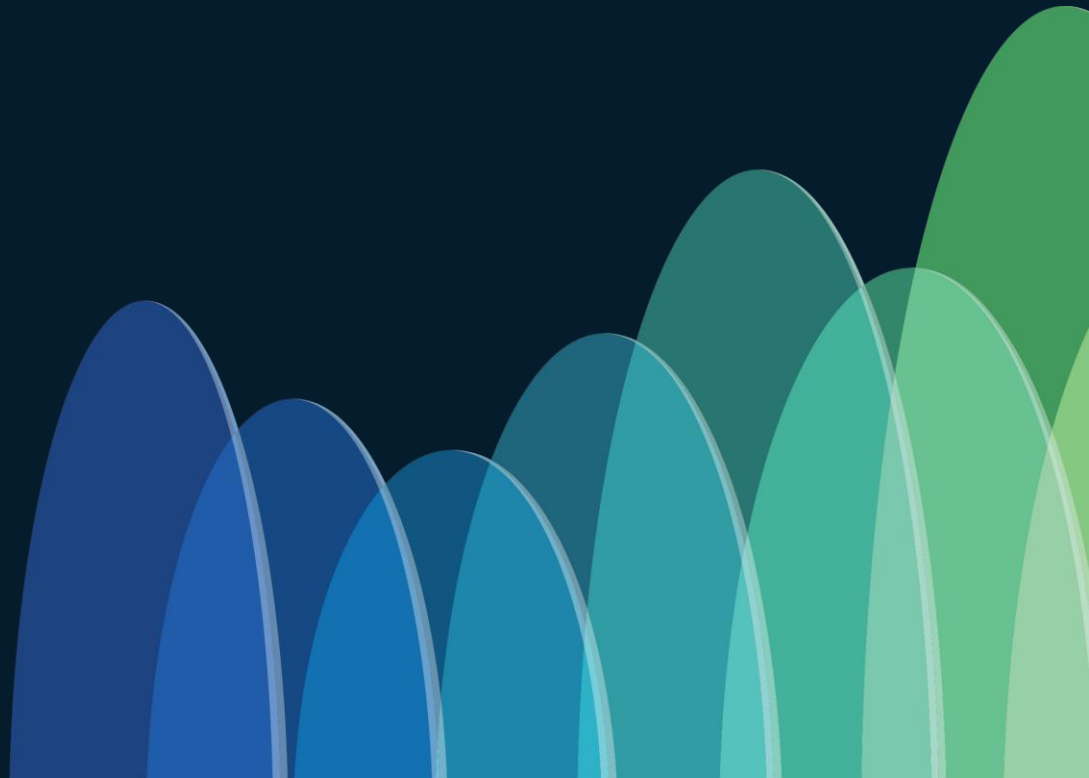
CE-Deploy



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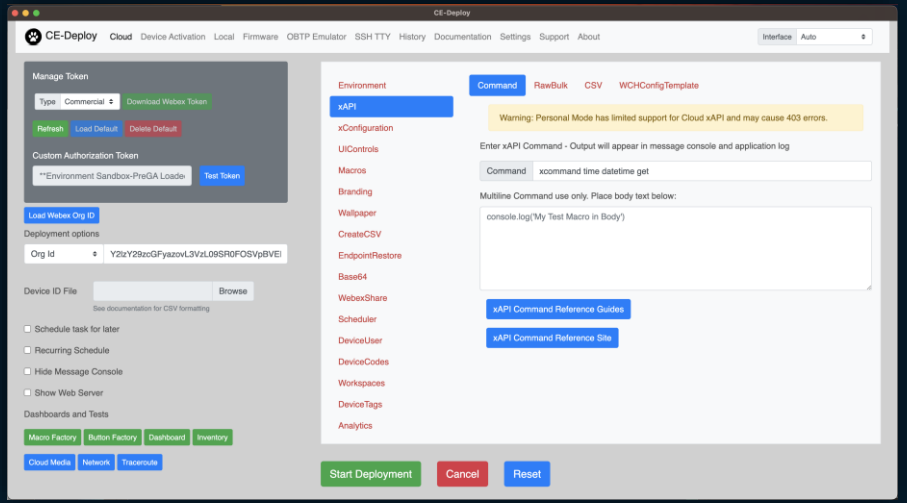
CE-Deploy

- Built based on customer feedback
- Not an automation tool
- Developed using common frameworks and libraries
  - Electron – App UI
  - JSxAPI – Accessing Endpoint API
  - Bottleneck – Job queueing
- Public API's
  - Cloud and endpoint xAPI's, putxml



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Wednesday
10:30am –11:30am

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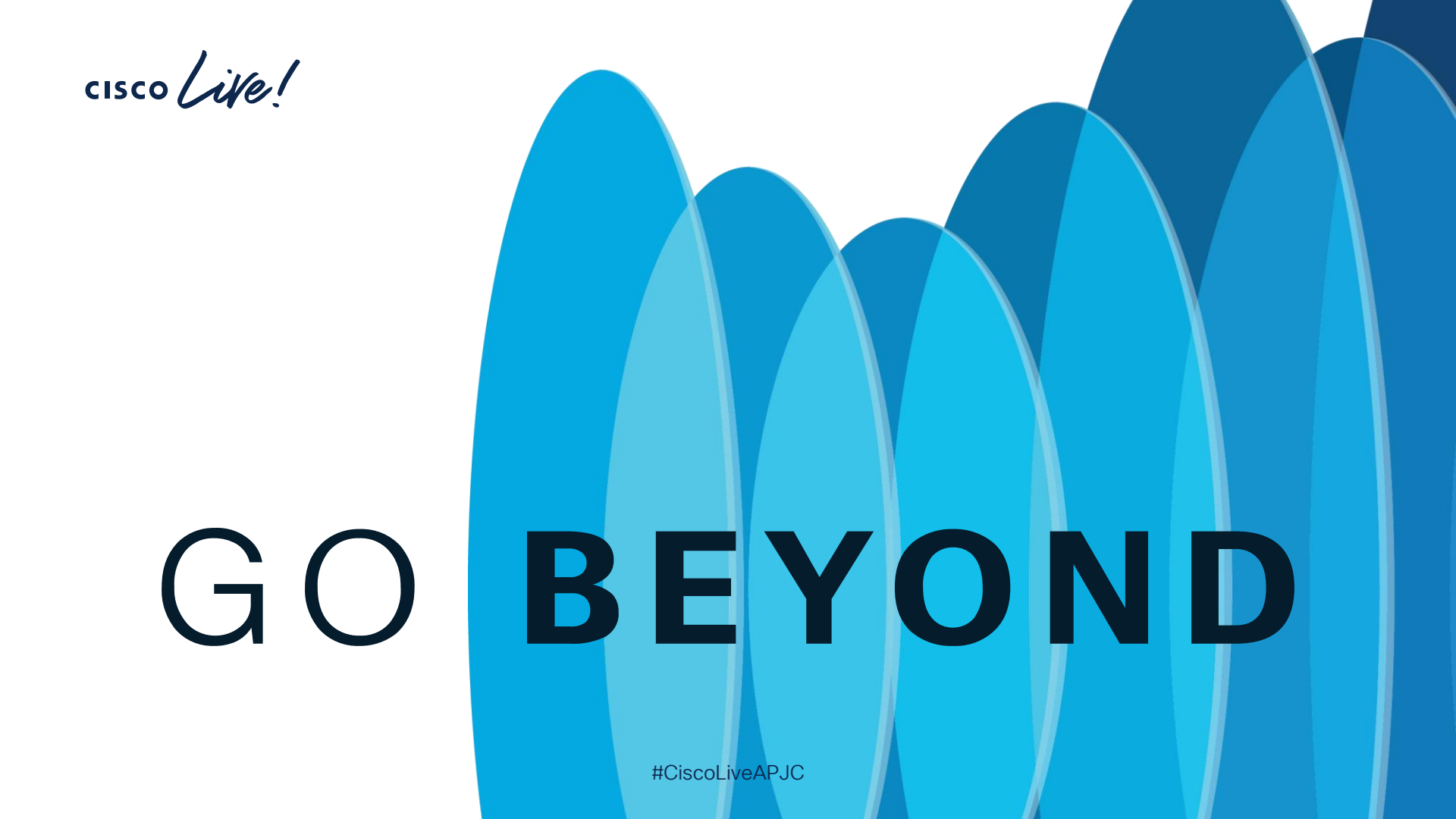
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