Project Workplace

Best Practices For Creating Effective Video-Enabled Rooms

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Topics covered include

- Lighting
- Whiteboard Placement
- Room Acoustics
- Standard Microphones
- Ceiling Microphones
- Presenter and Whiteboard Microphones
- Table
- Loudspeakers
- Cisco Proximity
- Display
- Desktop

This document discusses best practice for creating effective video-enabled rooms for conferences.

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Light Essentials

Be aware that video is sensitive to high contrast levels in the room. Most luminaries are made to avoid glare thus focusing the effect on the work area rather than people's faces.

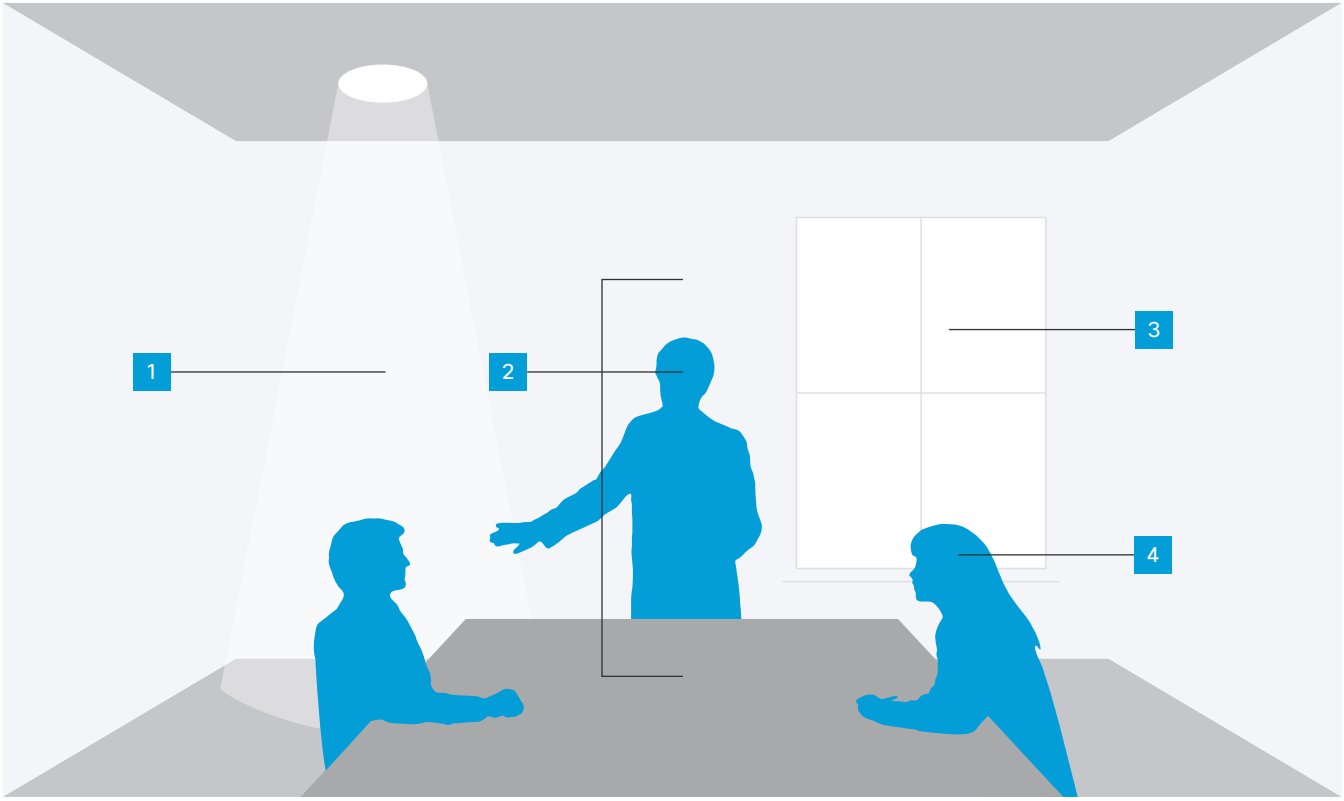
A common problem is insufficient light on people's faces. A glare-free luminary producing directive light at an angle of 45 degrees is optimal for video, but may be challenging to achieve.

Tips

Generally a good light color temperature is 4000 kelvin, but consider increasing this number if you depend mostly on daylight as your light source. A color-rendering index (CRI) of 80 or better is important. Avoid mixing technologies such as fluorescents and LED because their color profiles differ.

Neutral gray colors on walls and tables improve color appearance.

Avoid completely white walls or tables, a color with reflection value (LRV) of 50 percent is recommended.



Following are some tips on how to improve the lighting situation within a room:

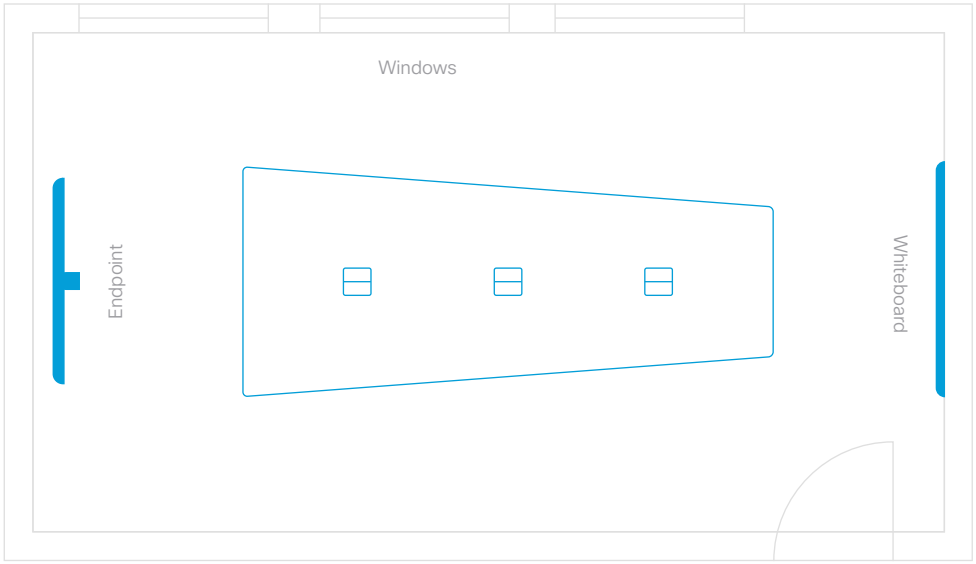
1. Avoid illuminating the surrounding walls too much. This only makes the faces appear darker.
2. Try to keep the contrast less than 1:1.5. For example, 500 lux on faces implicates maximum 750 lux on the table and surroundings.
3. Make sure you can reduce sunlight to a comfortable level.
4. Recommended light intensity is 400 to 500 lux on faces.

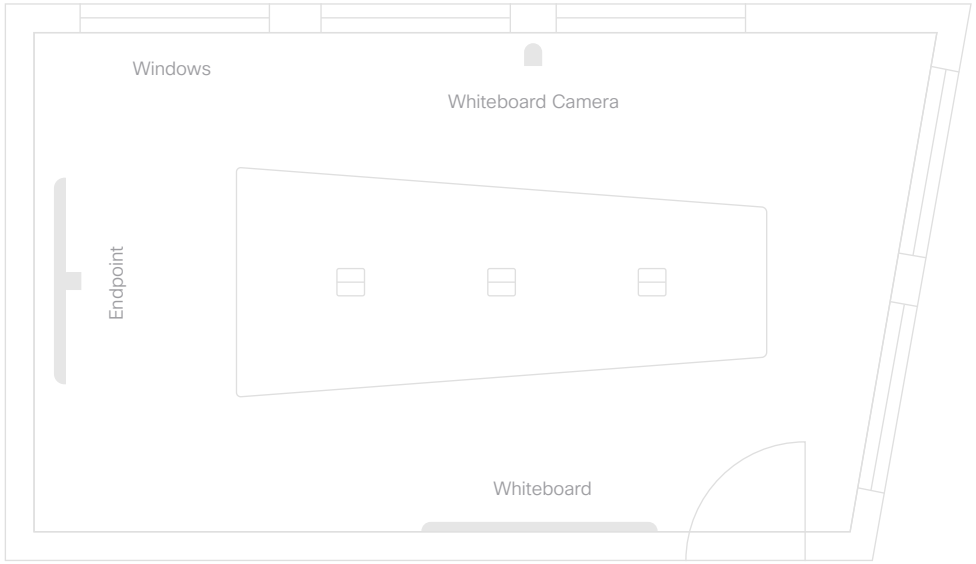
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Whiteboard Essentials

It is best to have the whiteboard visible in the camera overview. An additional camera allows for greater flexibility, such as focusing on the whiteboard.

- If the room allows for it, place the whiteboard on the wall opposite the endpoint.
- If the whiteboard is on a side wall, place it so that it is visible in the overview and use an additional camera to focus on the whiteboard.
- Point the additional camera directly at and centered on the whiteboard.
- Place the additional camera at least 5 ft (1.5 m) above the floor.

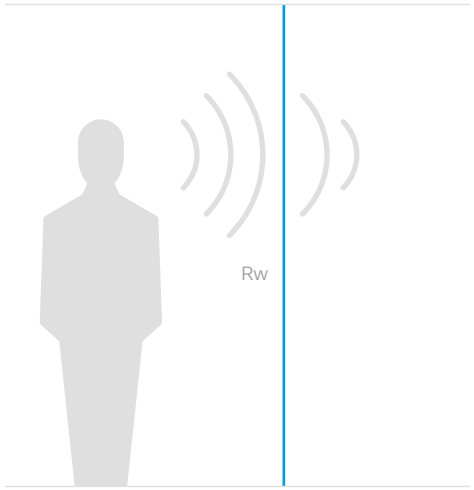


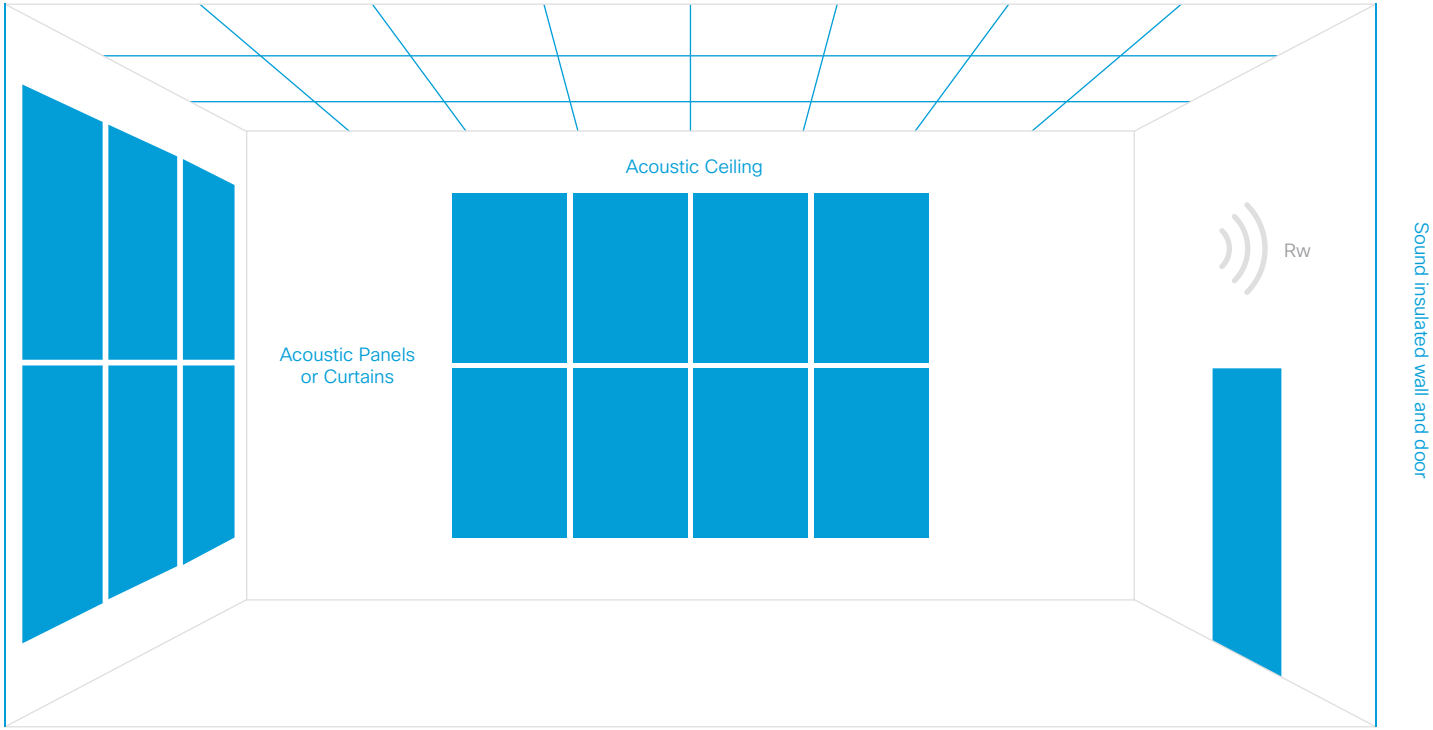


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Acoustic Essentials

Video systems usually work fairly well with most types of acoustics, but the experience can be a lot better with a little well-aimed treatment.





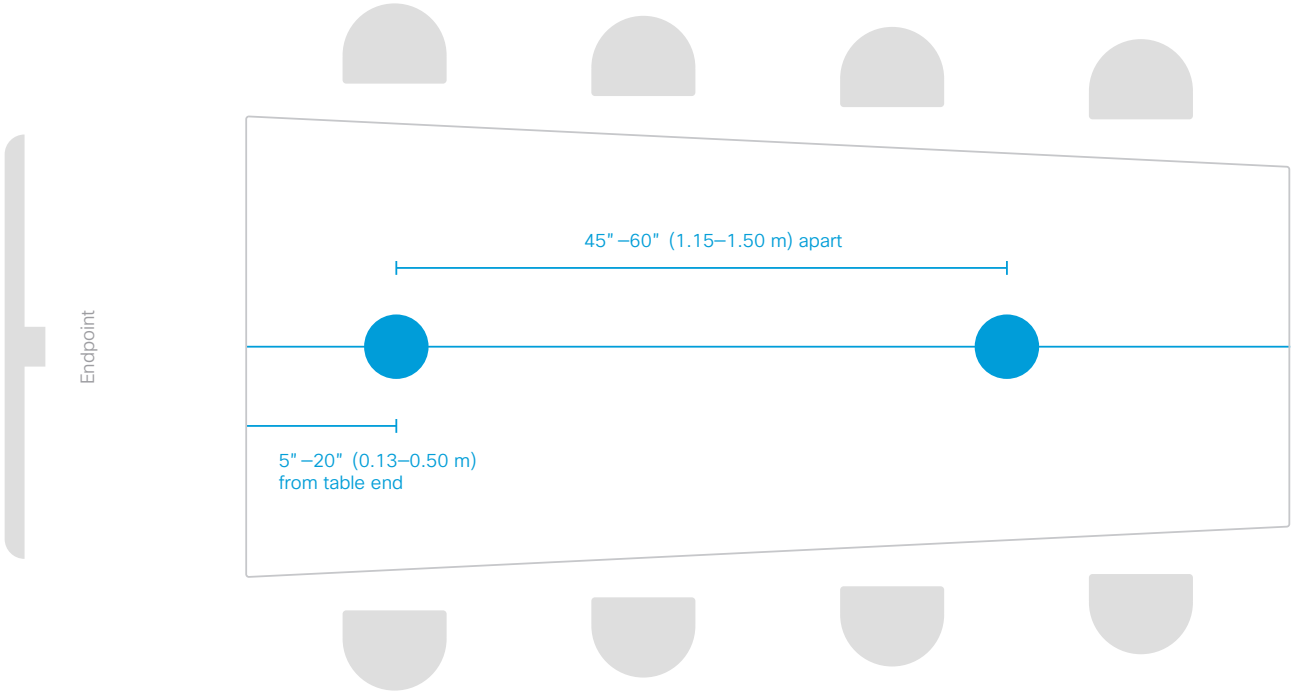
For the optimal experience aim for a reverberation time (RT60) of 0.3 to 0.4 seconds, and ensure that sound absorption is distributed evenly on the walls to avoid flutter echo from parallel walls. Follow these guidelines:

- Use an acoustic ceiling consisting of tiles with an absorption class A or NRC of 0.9 or greater.
- To avoid eavesdropping as well as disturbance of people located outside the room, we recommend that walls and doors have appropriate sound insulation. The walls should hold a Sound Reduction Index (Rw) of about 48 dB. Doors in the meeting room are recommended to hold an Rw of about 35 dB. For more information on how Rw is defined, see the international standard ISO 717-1.
- For quality microphone pick-up and comfort in the room, the ambient noise level should not exceed 30 dB (A-weighted sound pressure level).
- Put acoustic absorption on walls.
  - A good amount to use is approximately 0.5 times the ceiling area (Textile curtains also count as absorption).
  - Place absorption on at least two walls, preferably adjacent walls. Avoid placing it on opposing walls only.
  - In order to increase the low frequency absorption, acoustic wall panels should be mounted so that they protrude at least 2 in. (5 cm).

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Standard Microphones

- Use Cisco Telepresence omnidirectional microphones along the center line of the table.
- One microphone generally covers four people.
- The microphone closest to the system should be placed approximately 5–20 in (0.13–0.50 m) from the table end.
- Spacing between microphones should be about 45–60 in (1.15–1.50 m), and a maximum of 45 in (1.15 m) from participants.
- The maximum spacing should only be used in acoustically dampened rooms. In less-dampened rooms, the spacing should be decreased.

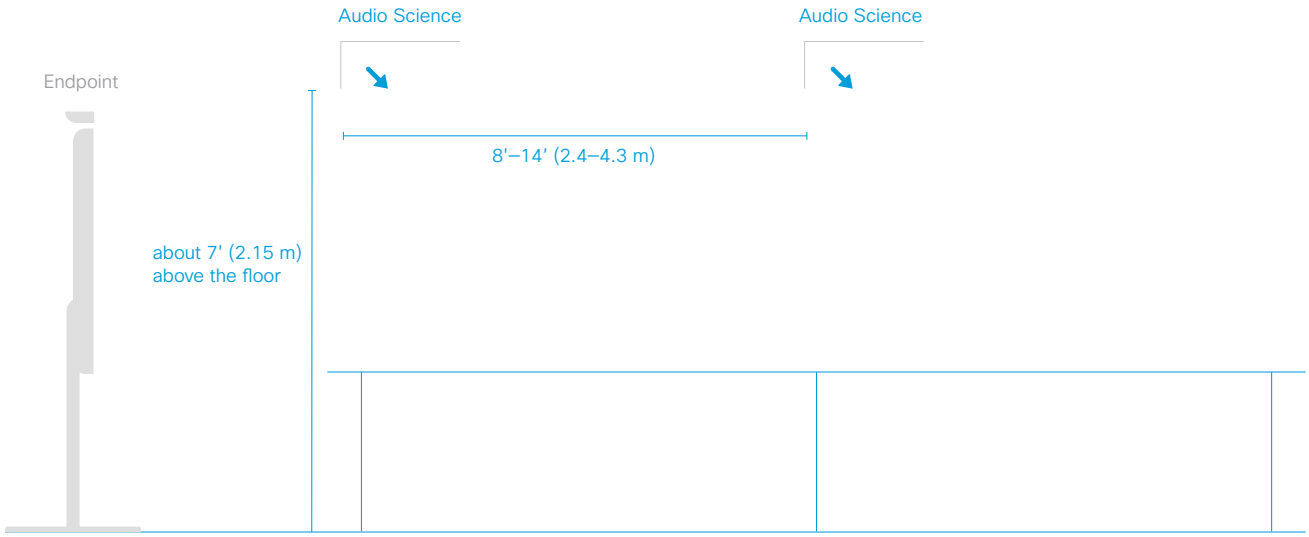


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Ceiling Microphones

In some situations you might want to keep the table free of microphones. Cisco provides the ceiling microphone, Audio Science, which can be used in these scenarios. Following are some guidelines on positioning the microphone correctly:

- It can be used with tables seating 8–14 people.
- Align the Audio Science microphone with the table edge closest to the system. Mount it about 7 ft (2.15 m). above the floor.
- The microphone must face away from the endpoint.
- For longer tables, mount the Audio Science microphones with a spacing of 8–14 ft (2.4–4.3 m).
- The maximum spacing should only be used in acoustically dampened rooms. In less-dampened rooms, the spacing should be decreased.



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Addtitional Microphones

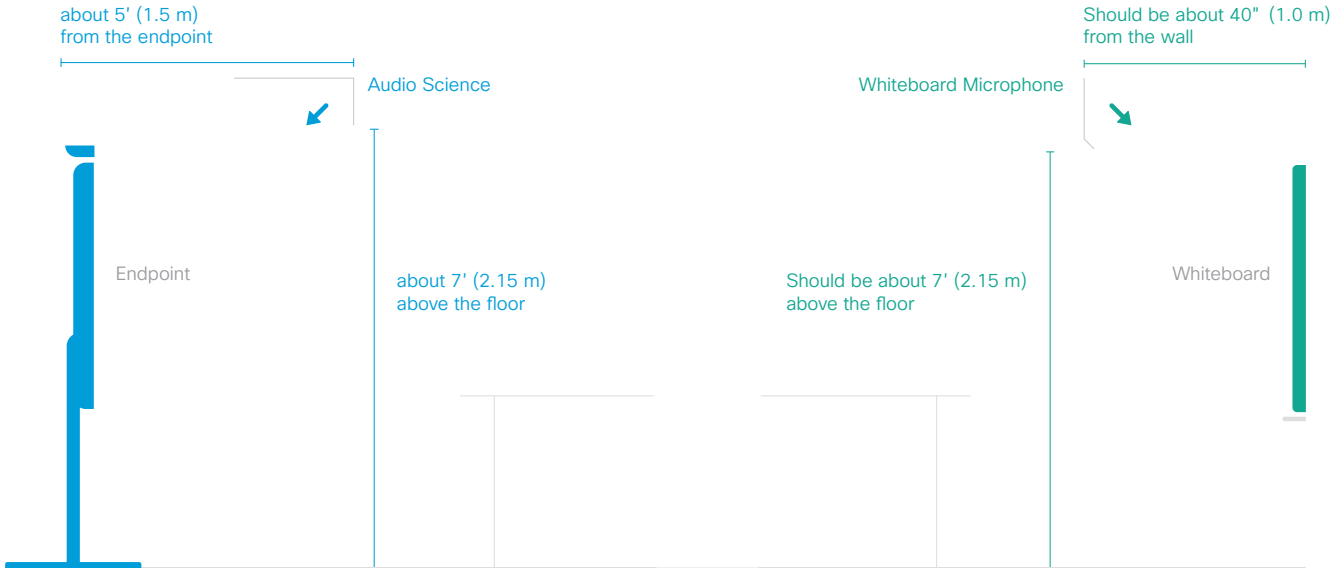
In scenarios with an active presenter who could be moving around, an additional ceiling micro-phone can be used to capture the speaker's voice.

Presenter Microphones

- To capture the voice of the presenter, it is recommended to use an Audio Science microphone.
- The microphone must face where the presenter will be.
- It should be mounted well above the floor, about 7 ft (2.15 m) Distance to the endpoint should be about 5 ft (1.5 m).

Whiteboard Microphones

- As an alternative to Audio Science, a directional microphone suspended from the ceiling could be used.
- It should be mounted about 7 ft (2.15 m) above the floor and 40 in (1.0 m) from the wall.



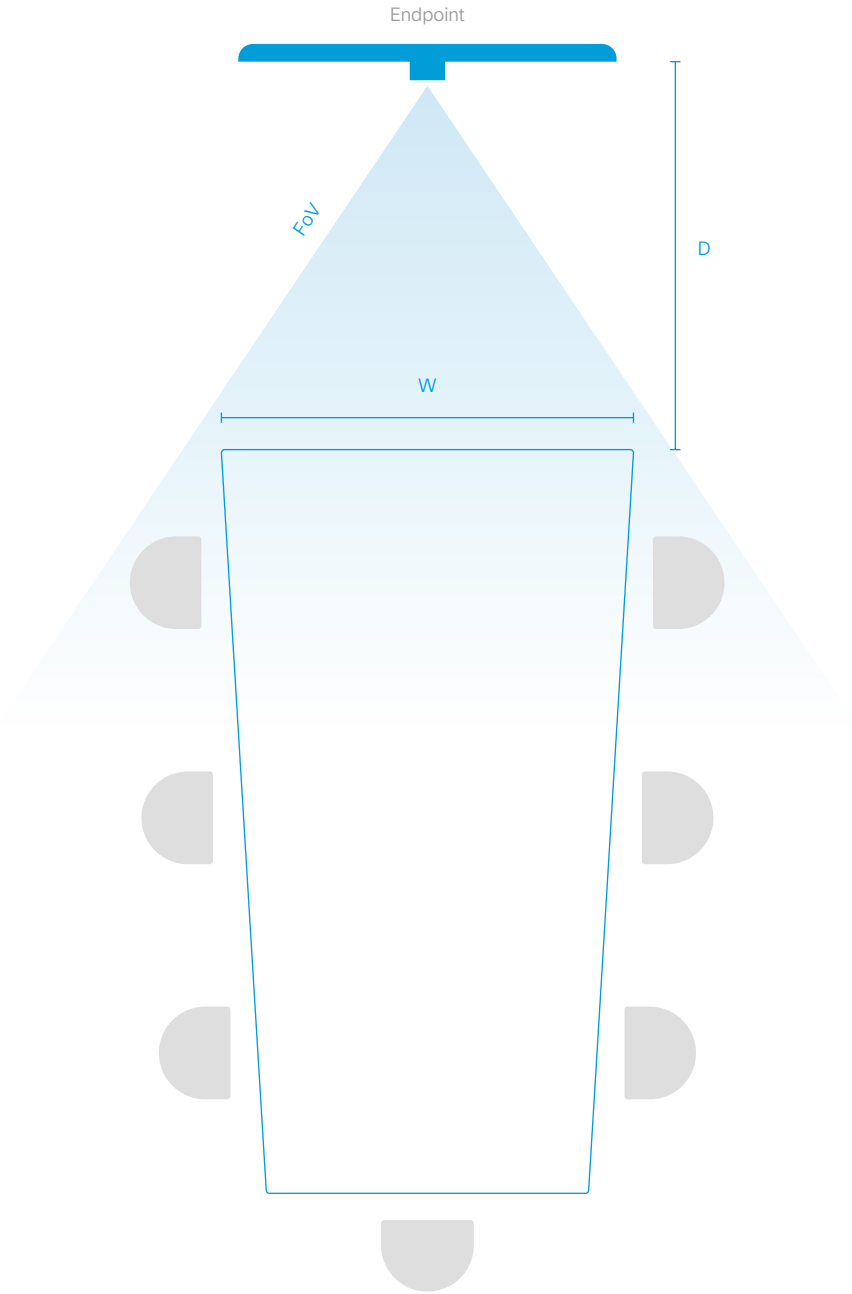
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Table

- To enable everyone at the table to see the screen, the table width should be slightly wider than the system/screen(s).

- The Field of View (FoV) of the cameras dictates that the distance (D) between table and system should not be less than 0.7 times the width (W) of the table front.

- We recommend using a slightly slanted table when there are three or more participants seated on the long side of a table. It should be wider on the end closest to the system so that everyone can see the screen and be seen on camera.



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Loudspeakers

The choice of loudspeaker does not only affect the sound quality in the local room, but a poorly performing loudspeaker can cause echo and audio artifacts for remote participants.

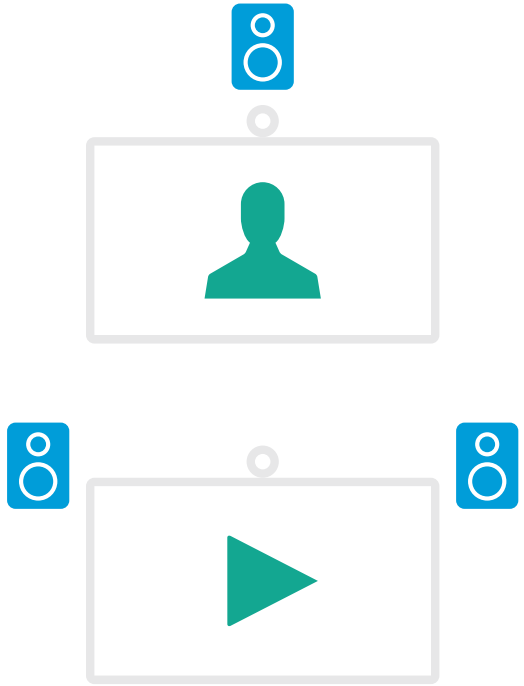
Loudspeaker Performance Recommendations

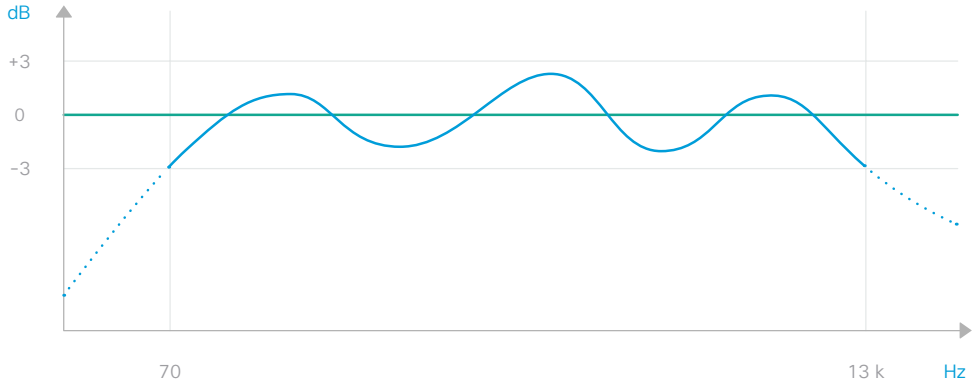
To reproduce voice accurately, to avoid echo, and to increase speech intelligibility, follow these guidelines in selecting your loudspeakers:

- Sound pressure level (SPL): At least 80 dB at all listening positions.
- Frequency response: Within ±3 dB in the 70 Hz to 13 kHz range (see figure).
- Total harmonic distortion plus noise (THD+N): Lower than 1 percent.

General Recommendations

- For the most natural presence, place a mono loudspeaker directly above the screen (see figure).
- For better content reproduction, stereo speakers on the sides of the screen are advisable (see figure).
- If using a speaker tracking system, loud speakers should be as far away from the tracking module as practically possible.
- An additional subwoofer can be used for improved low-frequency content reproduction.
- Loudspeakers must supply adequate coverage at all participant locations. In larger spaces like auditoriums, this can mean distributed systems with delay zones.
- To avoid attenuation, loudspeakers must be placed at a height such that all participants have a clear line of sight to the high-frequency drivers. The directionality of loudspeakers in different frequency ranges must also be taken into account to cover all participant areas.
- Built-in loudspeakers in TVs do not usually fulfill the performance criteria; therefore, using external loudspeakers is highly recommended. Professional studio monitors are often a good option as they are well-performing, durable, and come in a variety of sizes.





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Cisco Proximity

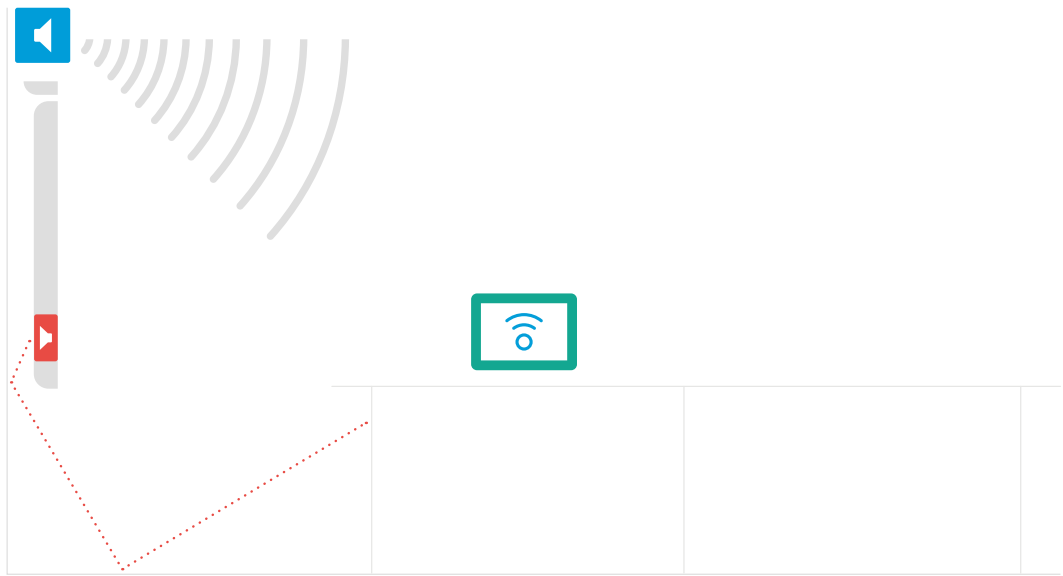
- Cisco Proximity relies on ultrasound for pairing, so loud speakers used with this feature should have some response up to 22 kHz for it to function.

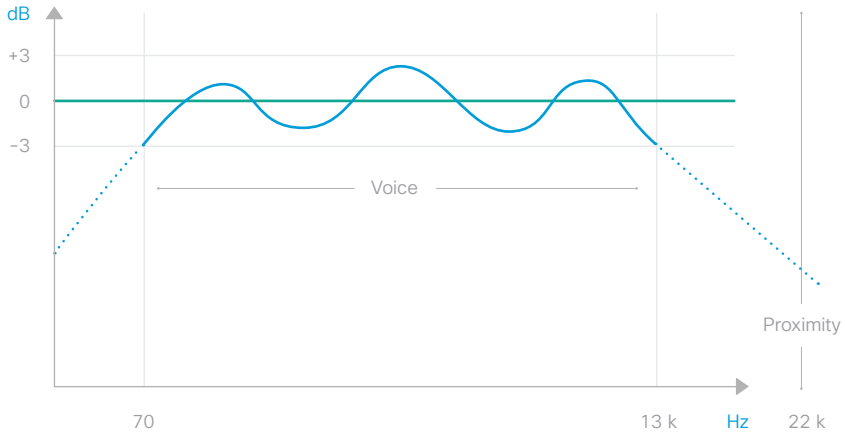
- Note that most loudspeakers produce sufficient ultrasound levels for pairing purposes. The reason they are not specified to this frequency range is that frequencies above 20 kHz are typically attenuated more than 10 dB and are not relevant to human hearing. Loudspeakers with dedicated tweeters are more likely to produce sufficient ultrasound levels than full-range speakers larger than 4 inches.

- Because ultrasound is highly directional, obstacles that cause shadowing of the speakers may cause pairing issues. Examples of such obstacles are displays with integrated speakers in the back.

- If Proximity is used in open and shared spaces, some acoustic shielding should be used to prevent pairing with devices that are not participating in the meeting.

- Components in the audio chain may filter out the ultrasound needed for pairing. It is recommended that a sample setup be tested before you order a large number of loudspeakers or displays.





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Display

Recommendations

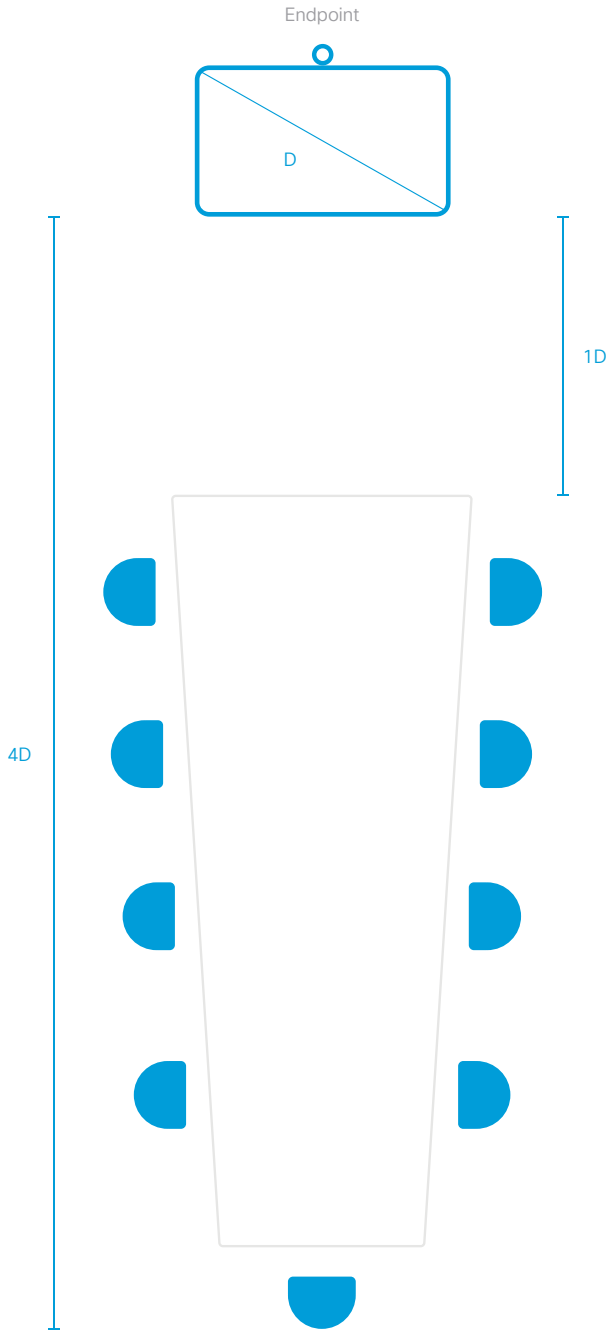
- Typically, the optimal viewing distance for video and normal content is one to four times the diagonal of the screen. For example, the optimal viewing distance for a 55-inch screen is between 4 ft 7 in 18 ft 4 in (1.4–5.6 m). Additionally, the following can influence the maximum viewing distance:

  - To optimally view more detailed content, such as graphics or spreadsheets, reduce the maximum viewing distance.

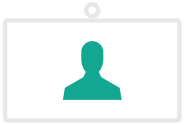
  - If the screen displays only one person, you can increase the maximum viewing distance.

- Displays should have High-Definition Multimedia Interface Consumer Electronics Control (HDMI-CEC) support so the codec is able to turn on the display when resuming from standby.

- Use displays with lower delay to increase the naturalness of communication. Delay through most displays is often very high (>100 ms) and is therefore detrimental to real-time communication quality. In some cases, activation of “Game” or “PC” mode, deactivation of motion smoothing and/or changing to a different HDMI input can reduce the delay. Test a sample before ordering a large number of displays.



Common display configurations include:



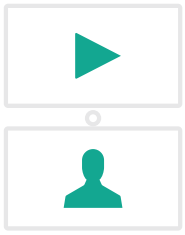
Single screen:

Focus on either video or content.



Dual screens (horizontal):

Simultaneous video and content.



Dual screens (vertical):

Video on bottom and content on top for narrow rooms/tables.

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Desktop recommendations

1. Shared Office

Personalized endpoint

- Intelligent Audio microphone array
- Internal loudspeakers or headphones

2. Home desk

Personalized endpoint

- Intelligent Audio microphone array
- Internal loudspeakers or headphones

3. Open plan hot desk

Endpoint in Shared Mode

- Privacy screen
- Headset

4. Quiet Room

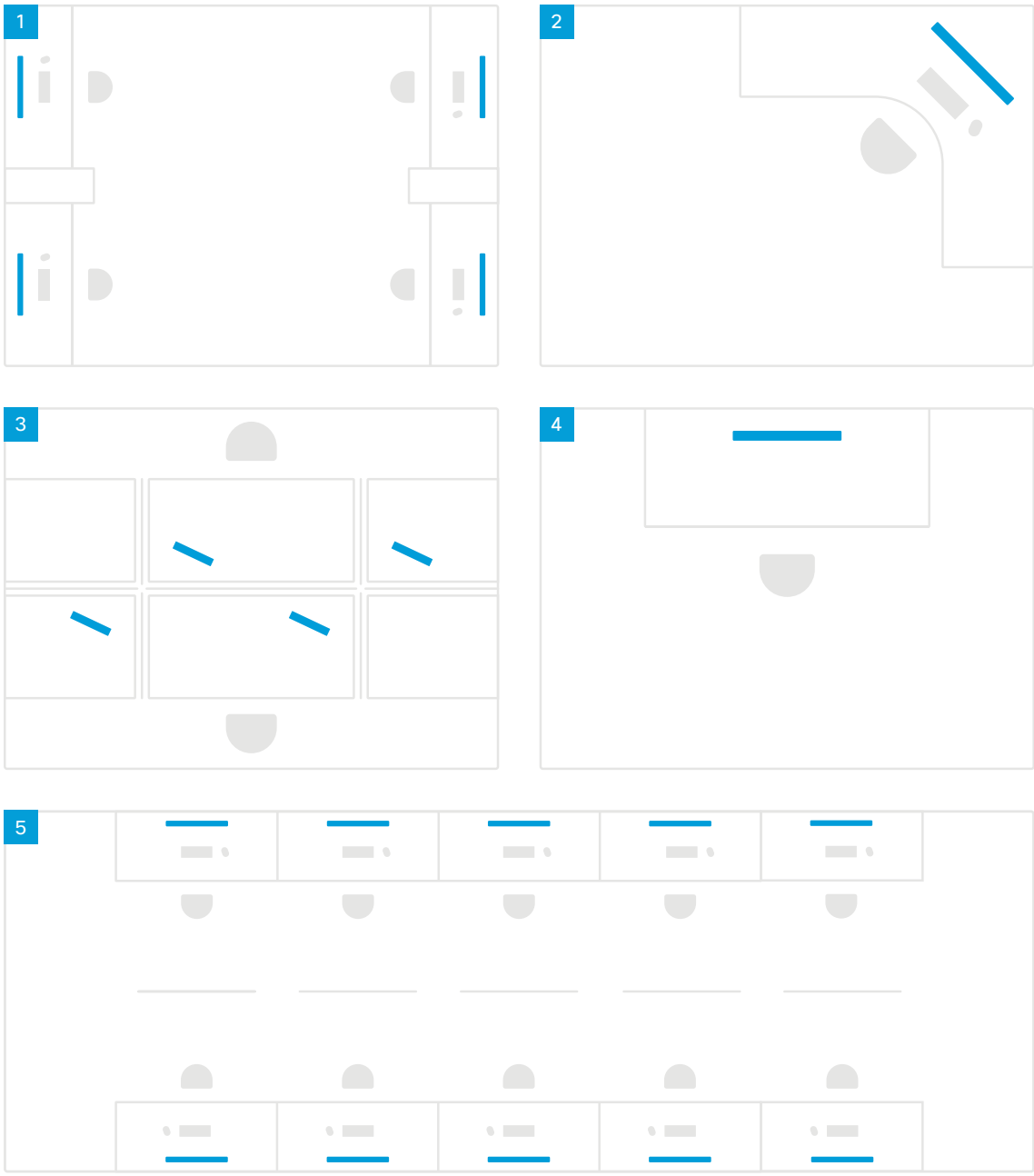
Endpoint in Shared Mode

- Intelligent Audio microphone array
- Internal loudspeakers
- Privacy screen if the opposing wall is transparent

5. Open plan personal desk

Personalized endpoint

- Headset or Intelligent Audio microphone array together with headphones
- Privacy screen



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Desktop tips

Audio

Headsets (microphone included) and headphones (without microphone) are personal items and should not be shared. USB headsets are recommended. Minijack headsets can be used with a USB adapter. Check what audio connection your relevant endpoint has. Recommended USB units can be found at our partner websites: jabra.com/cisco, plantronics.com/cisco, sennheiser.com/cisco

With a set of microphone arrays the DX80 is capable of greatly attenuating sound disturbances in your environment and ensures the best sound quality to the other person on the call.

Background and privacy

A busy background can be disturbing when using video and makes it harder to focus. Back to back seating may allow video participants to see the screens of colleagues and this might introduce som privacy issues. A thin privacy screen may be placed or hanged between rows to maintain a calmer background.

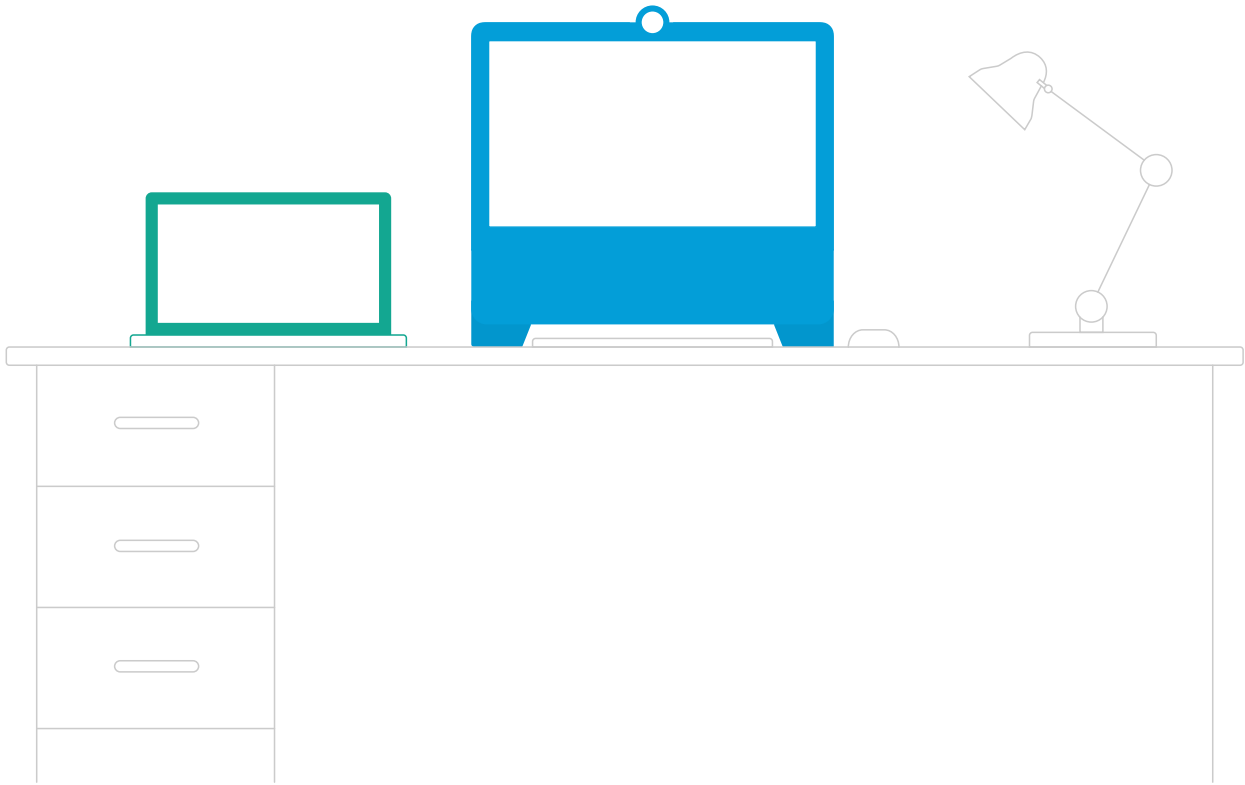
Be considerate towards your colleagues

- Choose an appropriate ringtone and adjust the system levels appropriately.

- Short syncs are fine in open plan workspaces, but longer meetings should be taken in quiet rooms.

Glare

To address any screen glare we recommend that you set the brightness to around 95% and that you position your device so that it does nto have windows or lights directly behind the users.



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For more information about scenarios and setup, please visit:

www.cisco.com/web/telepresence/projectworkplace.html

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