

September 2019



Evaluation of Avaya CU360 Collaboration Unit

Hands-on testing of a compact, all-in-one, standards-based and cloud-ready video conferencing system.

RECON
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This evaluation sponsored by:

AVAYA

Background

Founded in 2000 and headquartered in Santa Clara, California, Avaya is a publicly-held (NYSE: AVYA) company that specializes in business and unified communications. The company employs ~ 8,000 people and has a customer base of more than 120,000 companies across more than 175 countries.

In June 2019, Avaya launched the Avaya IX Collaboration Unit (a.k.a. the CU360 video endpoint) – a compact, standards-based video conferencing system intended for use in small (huddle) meeting rooms.

In July 2019, Avaya commissioned the Recon Research (RR) team to perform a third-party assessment of the CU360 video endpoint.

This document contains the results of our hands-on testing.

Understanding the CU360 Video System

The Avaya IX Collaboration Unit (or CU360) is a standards-based (SIP, H.323) video conferencing endpoint offering 1080p video support, an integrated 4K camera and mic array, and support for standard and touch-capable 4K displays.



A complete CU360 kit sells for an MSRP of US \$899 and includes:

- The CU360 Base Unit including:
 - o A 1080p capable, standards-based video conferencing codec
 - o A 4K / 30 fps camera with a 102 degree field of view and 3x digital zoom
 - o A 4-element microphone array
- A wireless remote control with a full keyboard on the back
- An HDMI cable
- A wall mount bracket
- A power supply

The CU360 is a compact device (11 inches / 28 cm long, 2.2 inches / 5.5 cm wide, and 2.6 inches / 6.5 cm high) that can be mounted above or below the system display(s) or placed on the meeting room table.

Note – although the CU360 base unit does include a small speaker, the device is designed for use with the speakers on the connected meeting room display.

System Installation

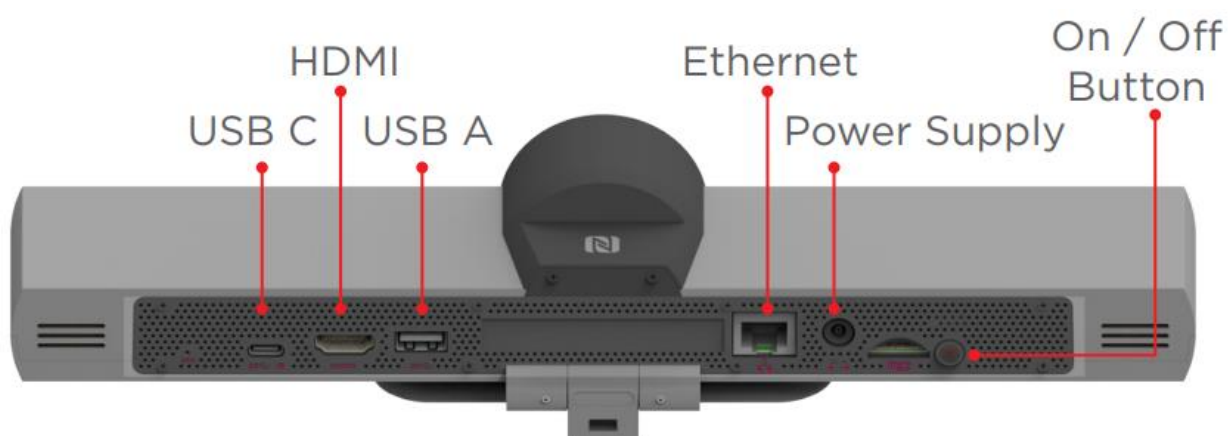
The installation of the Avaya CU360 within our test environment was quick and easy, requiring only:

- Placing the device on top of our meeting room display
- Connecting network (an Ethernet cable), an HDMI cable to our 4K display, and power

Side Note – the CU360 also supports PoE using an optional PoE splitter (eliminates the need for the external power supply) and Wi-Fi (eliminates the need for a wired Ethernet connection). These capabilities provide additional installation flexibility.

As we unboxed and installed the CU360, we inspected the design, build, and finish of the unit. The CU360 is a well-appointed device with clean lines, an attractive two-color design, and a ruggedized feel. The mounting hinge is more than strong enough to hold the unit in place atop a display.

The back of the unit offers various connections (2 x USB, 1 x HDMI, 1 x Ethernet, 1 x power) and an on / off button. Although the connection ports are not labeled, the connections are easy to identify.



The CU360's design language is well suited for small meeting spaces. We do, however, think support for a second display would be a strong value-add.

All in all, it took us less than five minutes to unbox, physically install, connect, and power-up the CU360.

System Configuration

The CU360 can operate in two different ways:

- As an endpoint registered to and automatically provisioned by an Avaya Equinox Management Server installed on the customer's premise (CPE).
- As a stand-alone video conferencing device registered to a third-party system or service.

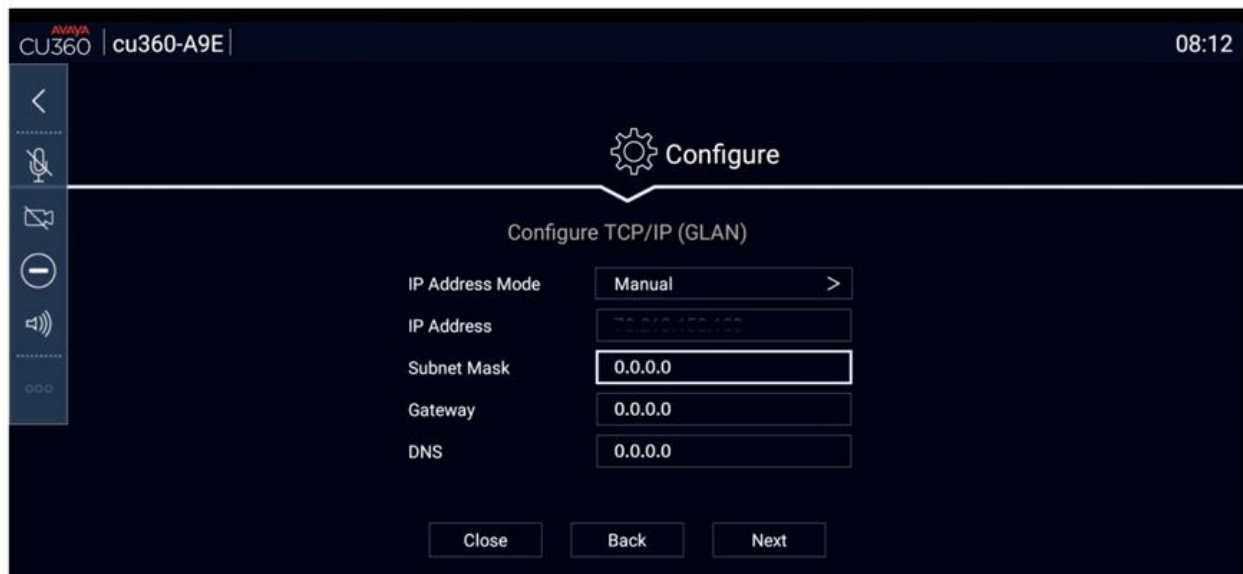
For this assessment, we used the CU360 as a stand-alone video conferencing device.

First, we manually configured the CU360 to use one of our public IP addresses. Over the years, we've set IP addresses on countless devices. Typically, using the handheld remote to enter the IP address and other network information into the system is a time consuming and frustrating process.

To help simplify this process, the Avaya CU360 offers two features:

- An on-screen configuration wizard that prompts the user to enter the required information
- A full keyboard on the back of the CU360 remote

The configuration wizard is well designed, and each field is clearly labeled as shown below.



As we stepped through the fields and entered the information, we stumbled across a few minor nits.

- The system should default to SIP protocol instead of H.323.¹
- The sample data in a text field (e.g. the Subnet Mask field above with sample data 0.0.0.0 shown above) should be selected whenever a user enters that field.
- Some important keys (e.g. arrows, delete, back) on the remote control's keyboard are shared / support two functions. Ideally, these commonly used keys would have their own buttons.

Additional Data Entry Options:

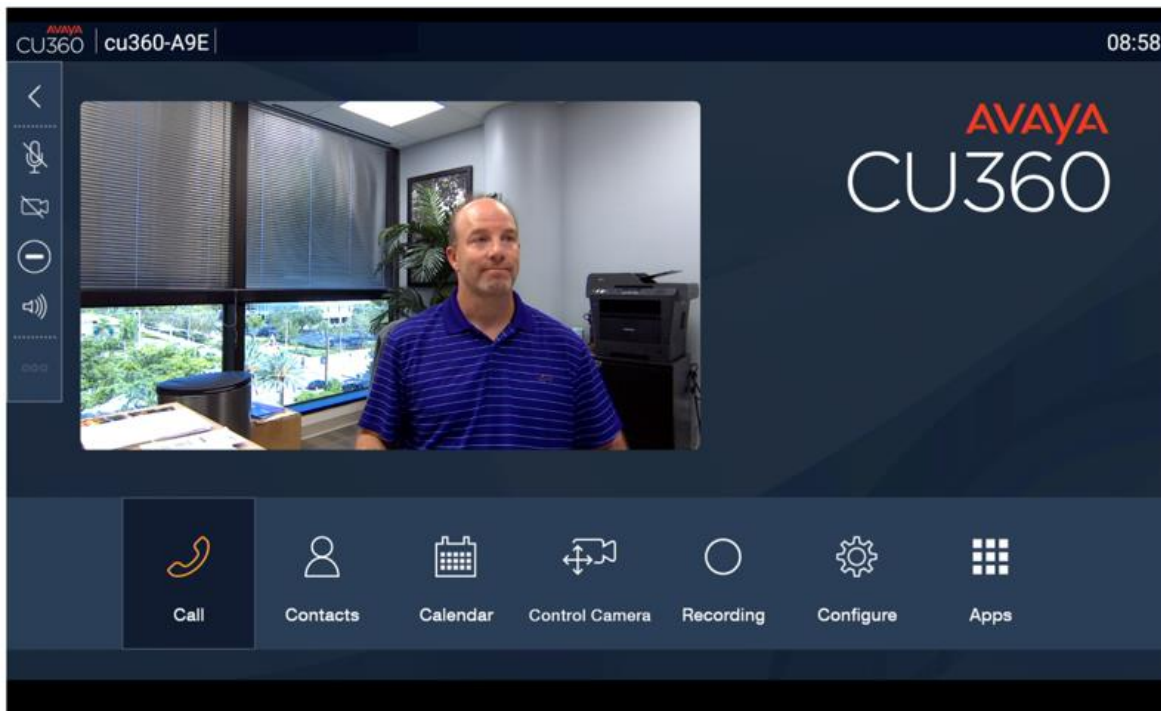
The CU360 supports various other data entry methods (e.g. any standard Android control device or remote, a USB keyboard / mouse, a touch display, etc.). After initially configuring the system with the remote control, we stepped through the same process first using a USB keyboard, and then with a 4K touch display. With these two methods, the configuration took only a few seconds.

We then accessed the system via the web UI and changed the admin password.

¹ According to Avaya, this will be implemented in the next software release.

Hands-On Testing – Video Calling & Interop

After configuring the system, we were presented with the CU360 main menu page shown below.



We then selected the Call icon on the screen and tested the CU360's ability to connect successfully to the following services and systems:

- Avaya Equinox Meetings Online service
- The BlueJeans Meetings service
- The Zoom Meetings service
- Several standards-based video systems from leading vendors

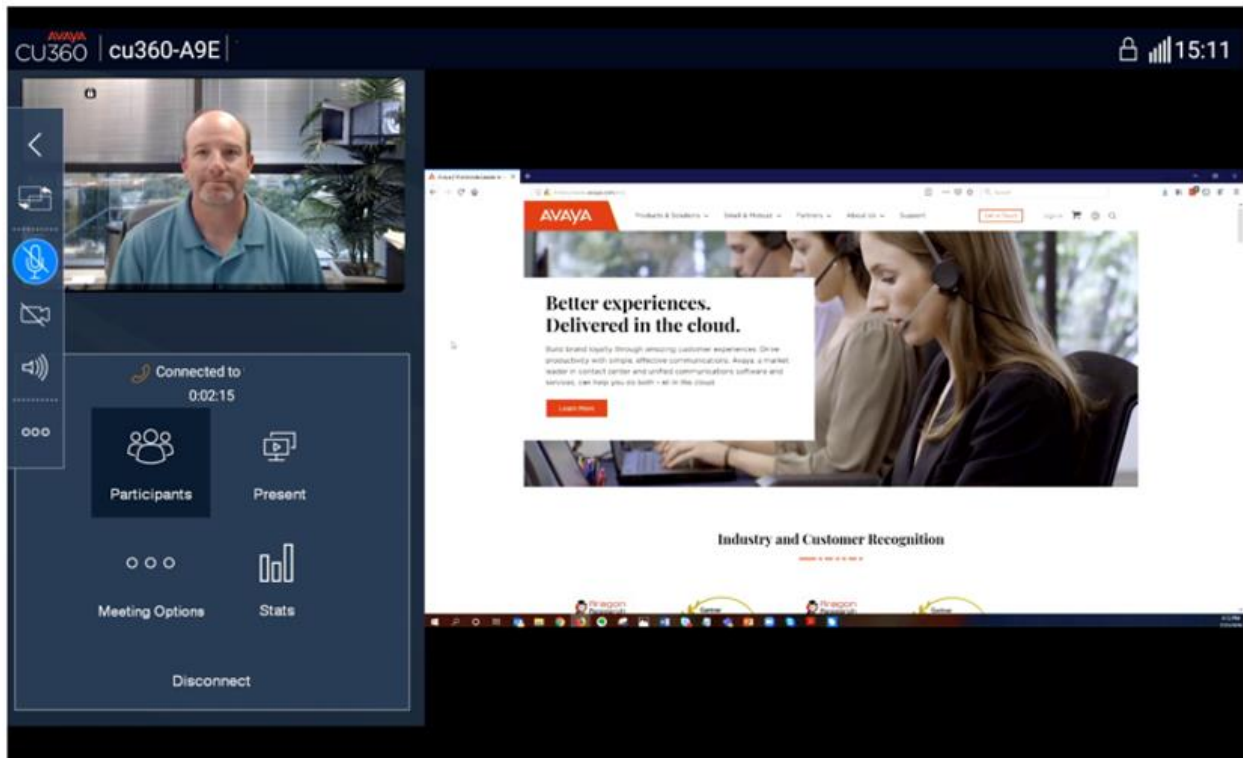
Participating in Avaya Equinox Meetings Online Sessions

First, we placed a video call to a virtual meeting room on the Avaya Equinox Meetings Online server by dialing the following SIP URI: [1234567@meetings.avaya.com](tel:1234567@meetings.avaya.com).

Address		@meetings.avaya.com		Protocols	SIP
Encryption		SRTP - AES128 HMAC_SHA1_80			
		Rx		Tx	
Rate	Call Rate (Kbps)	2095		2048	
Video	Coding	H.264 HiP SVC,1080p 1920x1080		H.264 HiP SVC,1080p 1920x1080	
	Actual Rate (Kbps)	2062		1992	
Audio	Coding	G.722.1 32K		G.722.1 32K	
	Actual Rate (Kbps)	32		32	

The CU360 connected to the Avaya service successfully at a call speed of ~ 2 Mbps. A review of the call statistics above revealed several noteworthy items:

- The CU360 negotiated a bi-directional 1080p video connection to the Avaya service. Most cloud video conferencing services support a maximum of 720p video resolution.
- The video connection utilized H.264 Hi-Profile (decreases required bandwidth at a given video resolution) and scalable video coding (reduces video infrastructure cost and latency and may offer improved network resiliency).



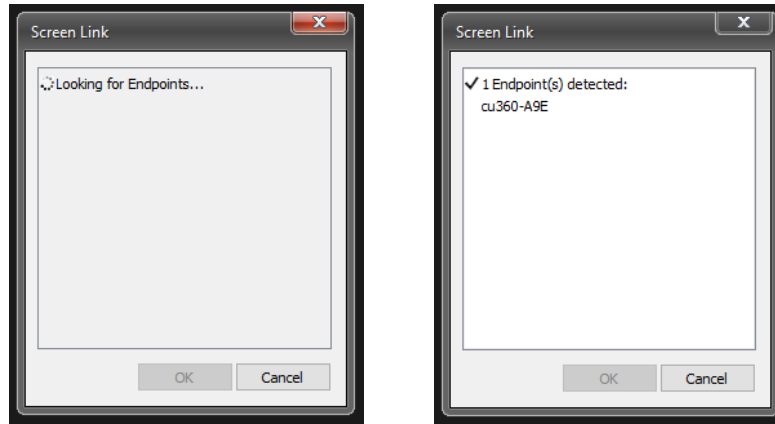
The screenshot above shows the CU360 participating in a meeting on the Avaya cloud and receiving dual-stream (BFCP) content from another participant in the meeting.

Note how the layout above displays the far-end site / participants, the incoming content, and a small window offering easy access to a handful of common functions.

Support for 1080p video resolution at 30 fps and scalable video coding (SVC) are clear benefits of using the CU360 with Avaya's cloud service.

The CU360 does not include a wired content input (e.g. HDMI). Instead, the CU360 supports wireless content sharing, both locally and to remote sites, using a function called Screen Link within the Avaya Scopia app (available for Windows and Mac PCs).

We installed the app, and when we opened the Screen Link menu the system started searching for Avaya endpoints on our network (see screenshot at left below). A few seconds later, the app found our CU360 (see screenshot at right below), and with a click we connected the app to our endpoint.

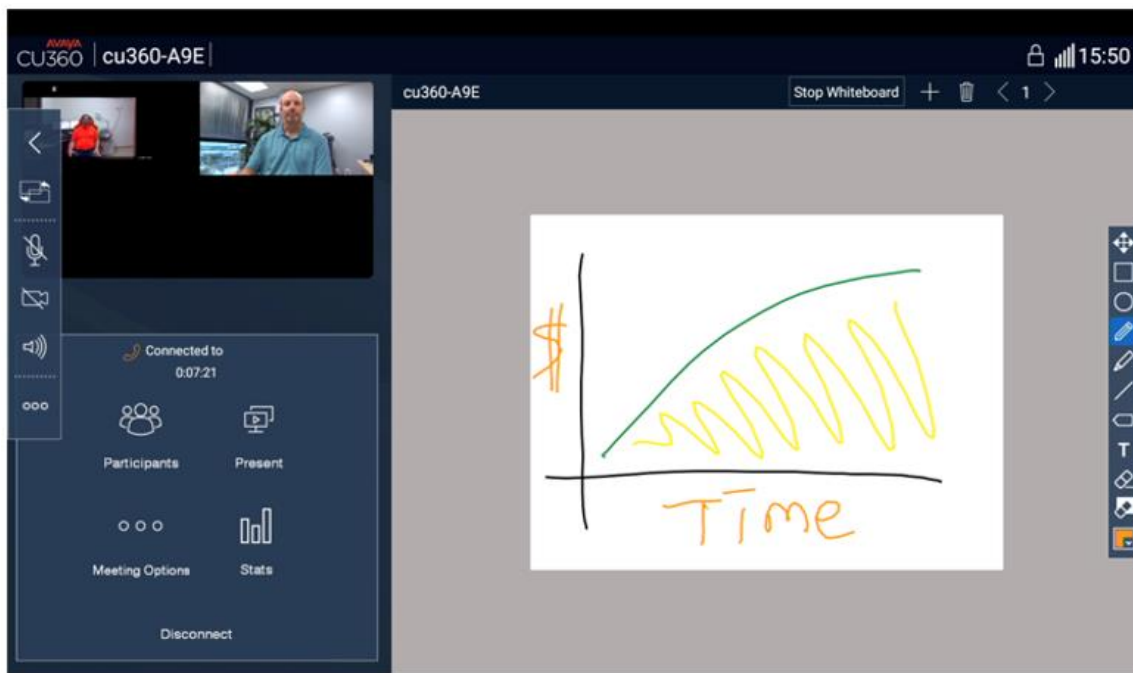


With Screen Link active, sending our PC content wirelessly through the CU360 required only a single press on the “Content” button on the remote. Sending content to the Avaya cloud worked very well, offering the remote participants a 1080p content stream at up to 15 fps.

We then repeated all of the above tests using H.323 instead of SIP.

Relevant Notes

- 1) Currently, Screen Link requires the user to be on the same network as the video system, which makes it difficult for guests to share content.²
- 2) While sending content from the CU360, the frame rate and resolution of the outgoing video stream dropped. The CU360 does, however, offer admins granular control of the bandwidth allocation and sharpness / motion settings while using dual stream mode.



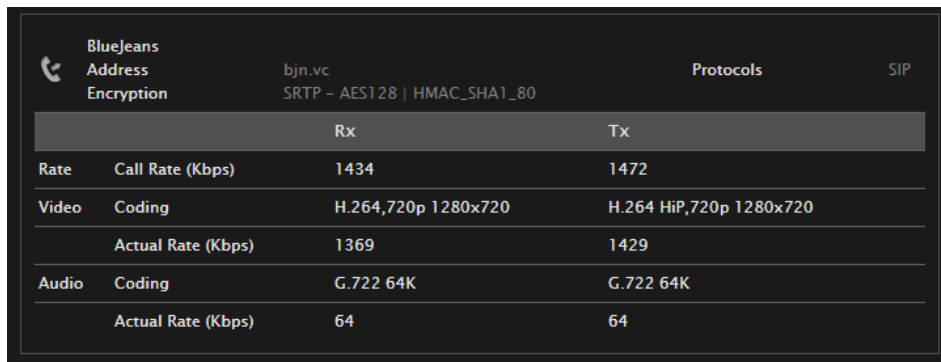
² According to Avaya, this will be addressed in a pending software update that will add wireless access point (WAP) functionality to the CU360, allowing guests to connect directly to the CU360 over Wi-Fi to share content. In addition, the optional Avaya AV Grabber (slated for release in Q4 2019) will add a wired (HDMI) input to the CU360. RR did not test either of these capabilities.

While connected to the Avaya cloud, the CU360 can share its integrated digital whiteboard (see screenshot above) with other meeting participants.

The CU360 also includes a handful of pre-loaded Android apps (e.g. calculator, calendar, clock, gallery, etc.) that can be shared during any video call.

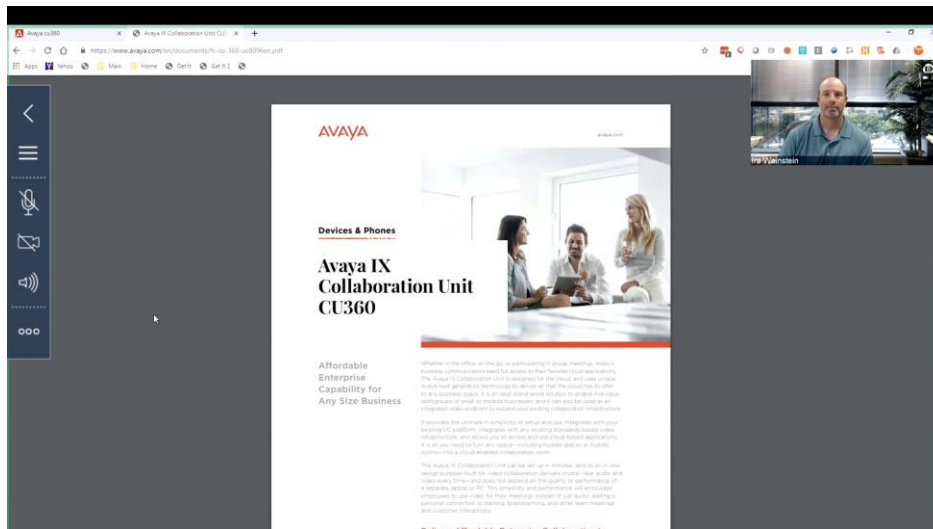
Participating in BlueJeans Meetings

To connect to the BlueJeans Meetings service, we dialed the SIP URI “bjn.vc” and entered the meeting ID of our test meeting using the keyboard on the CU360 remote.



BlueJeans		bjn.vc	Protocols	SIP
Address				
Encryption		SRTP - AES128 HMAC_SHA1_80		
		Rx		Tx
Rate	Call Rate (Kbps)	1434		1472
Video	Coding	H.264, 720p 1280x720		H.264 HiP, 720p 1280x720
	Actual Rate (Kbps)	1369		1429
Audio	Coding	G.722 64K		G.722 64K
	Actual Rate (Kbps)	64		64

The CU360 connected to the BlueJeans service successfully at a call speed of ~ 1.4 Mbps and negotiated a bi-directional HD720p video connection with wideband audio as shown above.



The screenshot above shows the CU360 participating in a BlueJeans meeting and receiving dual-stream (BFCP) content from another participant in the BlueJeans meeting.

We then tested the ability to send content from the CU360 into a BlueJeans meeting using Screen Link. Once again, content send worked perfectly.

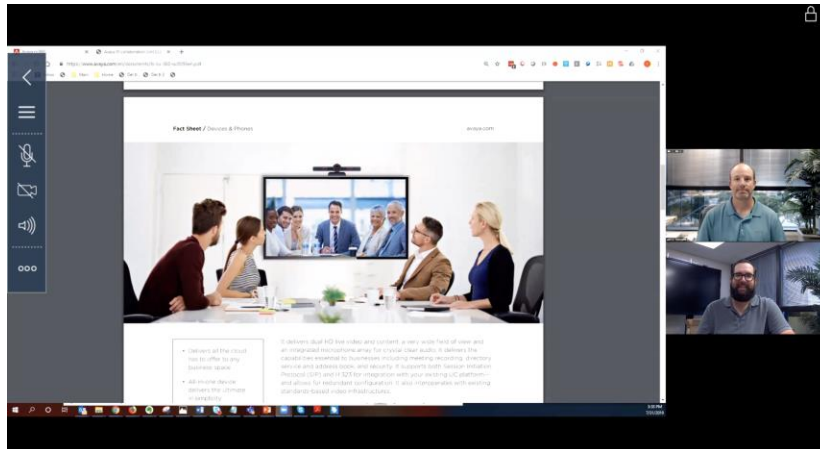
Finally, we repeated all of the above tests using H.323 instead of SIP, and the results were the same.

Participating in Zoom Meetings

To connect to the Zoom Meetings service, we dialed the IP address of the Zoom’s US East SIP / H.323 gateway and entered the meeting ID of our test meeting using the keyboard on the CU360 remote.

ZoomRC		Address		Protocols	
Encryption		SRTP - AES128 HMAC_SHA1_80		SIP	
		Rx		Tx	
Rate	Call Rate (Kbps)	1572		1920	
Video	Coding	H.264, 720p 1280x720		H.264 HiP, 720p 1280x720	
	Actual Rate (Kbps)	1507		1827	
Audio	Coding	G.722 64K		G.722 64K	
	Actual Rate (Kbps)	64		64	

The CU360 connected to the Zoom service successfully at a call speed of ~ 1.5 Mbps and negotiated a bi-directional HD720p video connection with wideband audio as shown above.



The screenshot above shows the CU360 participating in a Zoom meeting and receiving dual-stream (BFCP) content from another participant in the meeting.

In this case, we changed the layout on the CU360 to display content in a large window and the video participants in smaller windows on the side. The CU360 supports a range of different on-screen layouts.

We then tested the ability to send content from the CU360 into a Zoom meeting using Screen Link. Once again, content send worked perfectly.

Finally, we repeated all of the above tests using H.323 instead of SIP, and the results were the same.

Connecting with Other Standards-Based Video Systems

We then tested the CU360's interoperability with three current generation video conferencing endpoints from well-known vendors.

For this effort, we placed multiple SIP and H.323 video calls between the CU360 and each standards-based system. We also tested content sharing both to and from the CU360.

During all of our interop testing, the CU360 connected successfully and provided a solid video, audio, and content sharing experience.

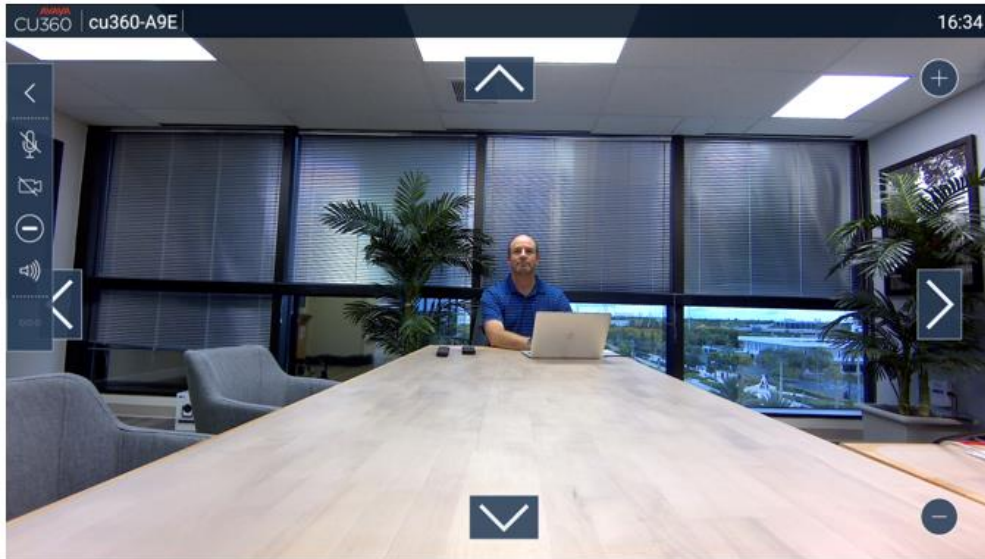
In all cases, the CU360 successfully negotiated 1080p video, 1080p content, and wideband audio connections with the other standards-based video systems.

Video Performance

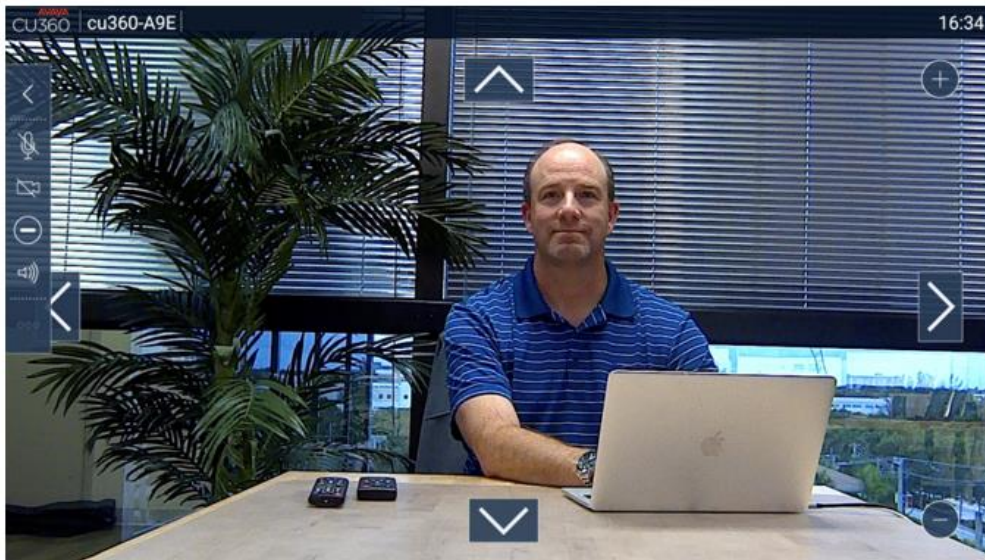
After completing dozens of test calls to multiple cloud services and other standards-based video endpoints, we would categorize the CU360's video performance as good.

During all calls, the CU360 provided very strong incoming video and an HD quality (1080p or 720p) outgoing video stream. However, the clarity of the CU360's camera image was slightly lower than we've seen with competing systems with 4K sensors.

In addition, the CU360 offers four white balance settings – automatic, indoor, outdoor, and fluorescent light. We tested each of these settings within our fluorescent-lit office and found that automatic worked the best. One minor nit – the camera's color / white balance settings could be improved.



When zoomed out, the CU360 camera's 102-degree field of view allowed it to capture participants seated within 18 inches of the front display; a seating arrangement quite common within huddle rooms.



When zoomed in, the system was able to capture a relatively tight shot of a person seated at the end of the table in our meeting room (roughly 8 feet from the camera lens).

Audio Performance

The CU360's 4-element microphone array provided good outgoing quality at distances of 12 feet and more from the device. The system passed both our full-duplex testing and our echo cancellation testing with flying colors.

In other words, the system is more than ready to support small and even some medium meeting rooms from an audio perspective.

We also tested the CU360's ability to attenuate / eliminate unwanted noises like HVAC noise and noises outside the meeting room. For now, at least, noise reduction is not an area of strength for this device.

USB and Bluetooth Audio Devices

The CU360 also supports both USB and Bluetooth external mic / speaker systems. We tested this capability with add-on devices from four leading vendors.³ In all cases, the system worked as expected.

Side note – the CU360 is clearly intended for use in huddle / small meeting rooms. However, the support for external mic / speaker devices enables it to support medium and even some large spaces, although in a large room the camera's 3x digital zoom may be a limiting factor.

Update – based on our feedback, Avaya has decided to add 5x digital zoom in the next software release.

Hands-On Testing - UI / Menu System

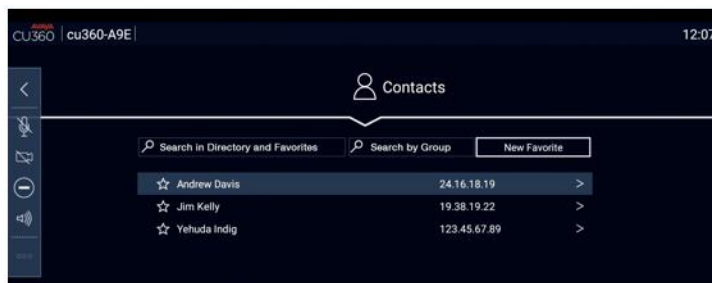
On-Screen User Interface

To assess the ease of use and workflow of the CU360, we spent some time navigating around the on-screen user interface using the handheld remote. Overall, we found the on-screen menu to be well organized and intuitive.

Call Menu - allows the user to place a call to a SIP URI and IP address, and provides quick access to a list of recent calls that can be redialed with a single click.

This menu also allows the user to set a handful of advanced call options including the call protocol (H.323, SIP, ISDN), call type (audio-video or audio-only), and call rate before placing a call.

Contacts Menu – allows the user to create and search through a directory of contacts (Favorites). We used our USB keyboard to create the three contacts below. Strangely enough, the UI does not include a "Save" button. To save a new contact, the user must press the back button.



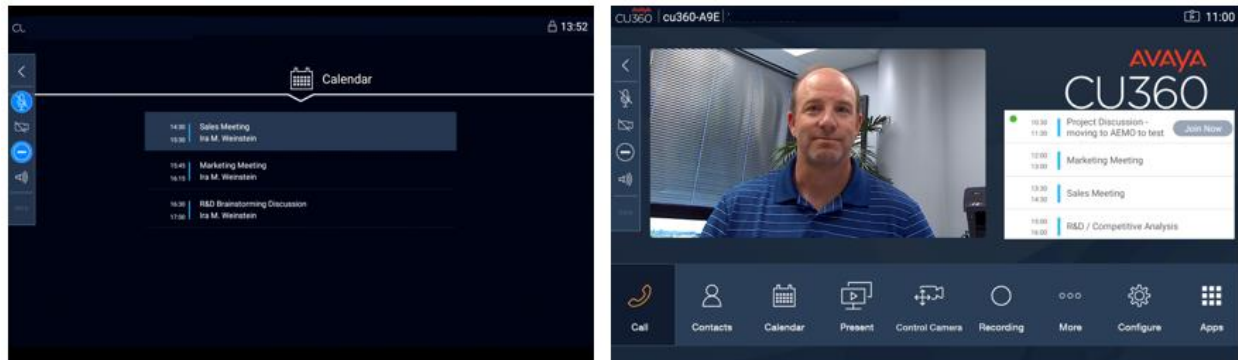
The system also allows users to add contacts from the Recent Calls section to the Favorites list.

³ Avaya offers a USB / Bluetooth speakerphone called the B109, but we did not test this device as a part of this evaluation.

Calendar Menu – provides a list of today’s upcoming meetings for the meeting room / video system. The CU360’s calendar syncs with the Avaya Equinox Management system and Office 365 / Exchange.

We tested this functionality using one of our Office 365 accounts, and it worked quite well (see image at left below), although a few newly calendared meetings took a few minutes to show up on the page.

For meetings on Avaya Equinox Meetings Online, the system provides a click to join button.



In addition, the list of upcoming meetings is also displayed on the main page of the UI (see above right). Note the Join Now button available for the first meeting.

Control Camera Menu – allows the user to pan, tilt, and zoom the CU360’s fixed camera. The CU360’s camera control functions worked as expected, although the pan / tilt / zoom motion was a bit jumpy.

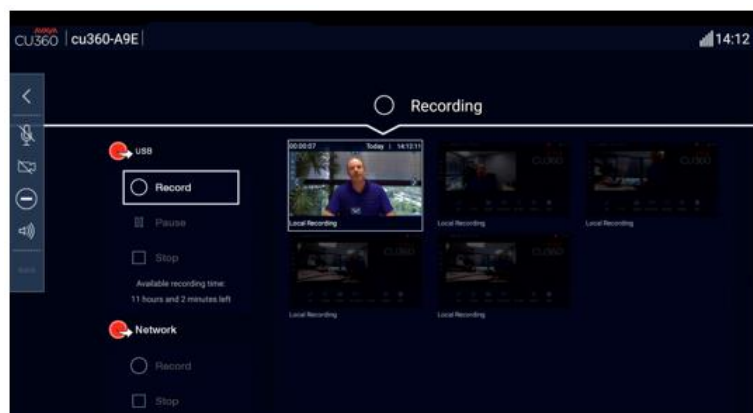
Recording Menu – allows the user to create a local-only recording (while in a local meeting – not a video meeting) or a recording of a video meeting in progress, and playback existing recordings.

We tested the local and meeting recording capabilities by:

- Inserting a USB flash drive into the USB port on the back of the unit
- Pressing the Record button on the remote, at which point the system announced, “please note – the meeting is being recorded,” and a red “recording” dot appeared on the screen.
- Conducting a normal discussion for roughly one minute.
- Pressing the Record button again to stop the recording, at which point the system announced, “please note – the meeting is no longer being recorded,” and the red dot disappeared.
- Repeating the process during a live video call.

Finally, we selected and played-back one of our recordings on the CU360 directly, and then on our PC after removing the USB flash drive.

The quality of the recordings was quite good, and we were pleased to see that the files were stored on the USB drive in standard .MP4 format.



Although we did not test this capability, the CU360 can also be configured to automatically upload (via FTP) recordings to an external server.

The recording function worked very well during our testing, but we would have liked to see a USB port on the front or side of the unit so users don't have to reach behind the device to insert the flash drive.

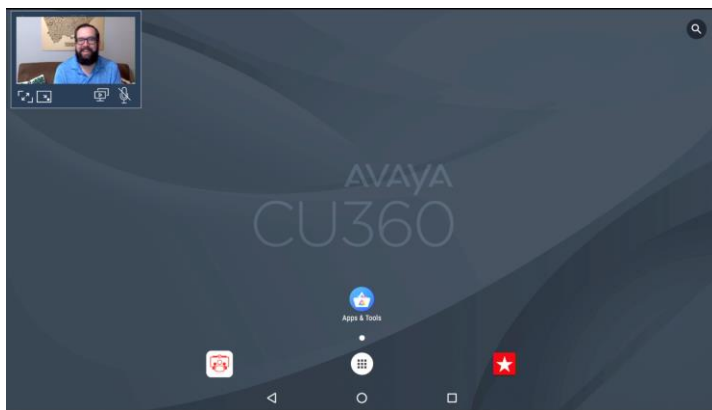
Configure Menu – provides access to a plethora of system information and configuration including:

- Basic system information - e.g. system name, E.164 address, SIP server settings, etc.
- System settings – date, time, time zone, NTP server, etc.
- Network options - e.g. enable IPv6, enable Wi-Fi, H.323 settings, etc.
- Calling settings – mute on connect, default volume, auto answer, do not disturb, etc.

The password-protected “Advanced” menu provides access to many more settings ranging from calendar configuration to camera settings, protocol settings, and remote access. We tested many (but certainly not all) of these settings, and they worked as expected.

On the positive side, the CU360 offers a wide range of configuration and customization options. On the negative side, too many settings will confuse users. Most current-generation video systems limit the number of settings they expose to standard users.

Android Home Page – at startup, the system automatically launches the Avaya CU360 app and offers the on-screen UI described above. However, we discovered that the actual home page of the CU360's on-screen menu is a slightly customized Android home screen (see screen shot below).



Pressing the home button (or back button) on the CU360 remote takes the user to this page.

It is no secret that the CU360 is an Android-based device. In fact, one of the CU360's power features is its ability to run third-party Android apps. We were, however, surprised that Avaya exposed a raw Android menu to the users in this way.

To return to the CU360 app from the Android menu, users can either, i) click on the Call or Disconnect buttons on the remote, or ii) enable pointer-mode on the remote and click the CU360 icon (bottom left icon in the screen shot above). While these methods to return to the CU360 app worked properly, we suggest that Avaya change the system to keep users from landing in the Android menu accidentally.

Web User Interface

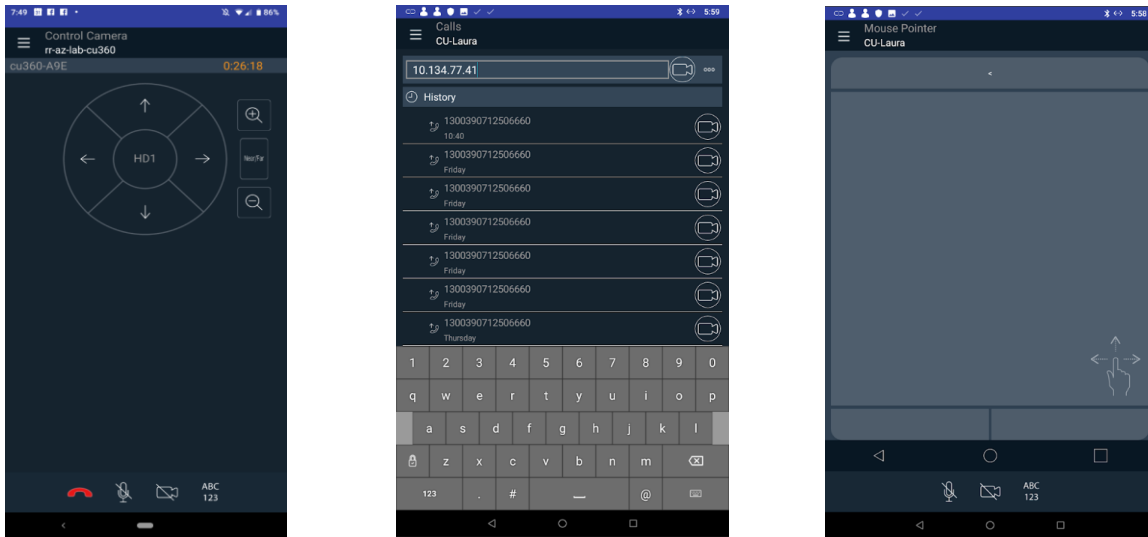
During our testing, we also used the CU360's web UI to configure the system, place calls, add / edit favorites, and access call statistics.

The CU360's web UI is well thought out and easy to understand. We expect that most admins will use the web UI to configure and manage the system.

Avaya Collaboration Control App

Available on the Google Play Store but still listed as an “early access” app, the Avaya Collaboration Control app allows users to:

- Control the CU360’s camera (screenshot below at left)
- Start / stop recording
- Dial a call (screenshot below at middle)
- Control an on-screen pointer using a touch pad (screenshot below at right)



The app also has an option to present content from the mobile device, but that capability didn’t work during our testing.

System Status Information

The CU360 uses a combination of the LEDs around the camera lens and the LED strips on the front of the device to provide real-time system status information. The table below shows the various LED combinations and their meanings.

Status	Circular LED crown	Lateral LED strips
Alarms	Red	Red
Idle	Yellow	—
Idle, muted, or sleep mode	Blue	Blue
In a conference	Green	—
In a conference with audio muted	Blue	Blue
In a conference with video privacy mode	Green Blue, if audio is muted	Red
Calls being established	Red, rotating	Red
Upgrade in progress	Red, rotating	Red

For example, the image at right shows a CU360 in idle, muted, or sleep mode.

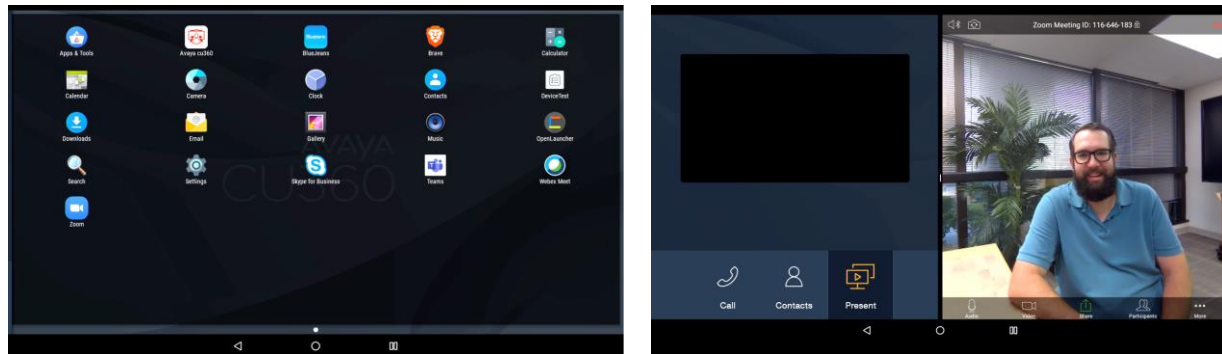


Support for Android Apps

The CU360 is an open-Android device that allows users to install and use any Android application (currently an alpha feature).

To simplify the process of installing Android apps, Avaya is creating its own Android Play Store. Unfortunately, this was not available during our testing, so we installed a few Android apps on the device by copying the APK files to the CU360 and installing each app manually.

We loaded the APKs for BlueJeans, Cisco Webex, Microsoft Skype for Business and Teams, and Zoom onto the CU360 (see screenshot at left below) and launched each app on the system.



Each of the Android apps worked on the CU360, and we were able to conduct video / audio meetings (the screenshot at left above shows a Zoom meeting using the Zoom for Android app on the CU360).

Once a few bugs are ironed out, the ability to use third-party Android apps will be a power feature for the CU360.

However, we stumbled across a few glitches as we used the apps. For example, camera control (pan, tilt, zoom) is not available while using these apps. Apparently, this capability will be available soon.

The CU360 “main app” also crashed a few times while we were using the other collaboration apps.

Once Avaya tightens up the workflow and fixes a few bugs, the ability to install and launch Android apps will be a very interesting power feature for the CU360.

Analysis and Opinion

The Avaya CU360 is a compact, standard-based video conferencing system well suited for use in small and even medium-sized meeting spaces.

The CU360 is really two devices in one:

- A SIP / H.323 group video conferencing system offering strong interop with other systems, and wide range of features including a 4K camera, an integrated 4-element mic array, 1080p video and 1080p wireless content sharing, calendar integration, local and meeting recording, electronic whiteboarding, touch-display support, and more.
- An Android device allowing users to install and use third-party Android apps ranging from collaboration apps (e.g. BlueJeans, Cisco Webex, Microsoft SfB and Teams, Zoom, etc.) to Google Drive, Salesforce, Slack, Dropbox, WhatsApp, Angry Birds and more.

Our team spent quite a bit of time testing the various features and capabilities of the CU360. Overall, we were impressed by the ease of use, feature-set, and performance of this small, sub-\$900 device.

The CU360 packs quite a punch for a small footprint device with a sub-\$900 list price.

The system's core features, such as SIP / H.323 video calling and interoperability with 3rd party video systems and cloud services, worked perfectly. In addition, the CU360 boasts a handful of additional capabilities rarely (if ever) found in competing systems – even at higher price points.

Also, while still in alpha at this point, the support for third-party Android apps means the CU360 can address the needs of organizations using many different collaboration tools – without requiring them to install or bring a PC into the meeting room.

Finally, although the device's integrated mic array is more than adequate for small meeting rooms, the ability to use USB and Bluetooth mic / speaker devices allows the CU360 to support medium-sized meeting spaces. Not too shabby!

But alas, no device is perfect. As we played with the CU360, we noticed a few small UI issues that should be addressed, and we think the outgoing video quality needs a bit of improvement. But these are software-items that should be relatively easy to address.

All in all, the CU360 packs quite a punch for a small footprint device with a sub-\$900 list price.

Based on our hands-on testing, we believe the CU360 should be on the short-list of any organization needing to video-enable its small (and maybe even medium-sized) meeting spaces.

About Avaya



(Information below provided by Avaya)

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For over one hundred years, we've enabled organizations around the globe to win — by creating intelligent communications experiences for customers and employees.

Avaya builds open, converged and innovative solutions to enhance and simplify communications and collaboration—in the cloud, on premise, or a hybrid of both.

To grow your business, we're committed to innovation, partnership, and a relentless focus on what's next. We're the technology company you trust to help you deliver Experiences that Matter.

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RR provides enterprise customers, vendors, channel partners, and investment professionals with the information and insight needed to make fact-based decisions.

What makes RR different is the depth of our knowledge and experience that comes from 15+ years of company briefings, market analysis, and hands-on testing of products and services in the space.

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