HUAWEI RP100&RP200 Room Presence
V100R001C50

Product Overview

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1 Overview

Though high-definition (HD) videoconferencing products have a broad range of applications, and the video effect has been improved through introduction of the 720p and 1080p resolutions, the end-to-end meeting experience is still unsatisfactory to customers. Driven by customer demand for an improved end-to-end video conferencing experience, Huawei leveraged its years of expertise in audio-visual technologies to develop the HUAWEI RP series of videoconferencing products. These products display conference participants in true-to-life dimensions and provide sound localization, creating an in-person experience.

HUAWEI RP (RP for short) series products consist of:

- HUAWEI RP100-46S (RP100-46S for short)
- HUAWEI RP100-55S (RP100-55S for short)
- HUAWEI RP200-46S (RP200-46S for short)
- HUAWEI RP200-55S (RP200-55S for short)

Each model of the RP series offers a fully integrated unit incorporating a high-performance and cost-effective codec, 12x optical zoom 1080p HD precision camera, and omnidirectional microphone array. While the integrated unit reduces the footprint, the RP series also offers mobility. With a compact remote control and touch panel (optional), the RP series delivers an enriching and consistent videoconferencing experience on one or two HD displays anytime, anywhere.

2 Appearance and Components

2.1 Appearance

The HUAWEI RP series is a compact videoconferencing solution, able to meet the requirements for small- and medium-sized conferences.

The solution offers two display options: a single LCD (RP100) and dual LCD (RP200).

Figure 2-1 HUAWEI RP series

Figure 2-2 HUAWEI RP200

2.2 Components

Each model of the HUAWEI RP series is composed of:

- One HD precision camera
- One codec
- One or two HD displays
- Assembly component
- One microphone array
- One remote control
- One touch panel (optional)

Figure 2-3 Components of the RP100

Figure 2-4 Components of the RP200

2.2.1 All-in-One Videoconferencing Endpoint

Each model of the RP series products comes with Huawei's next-generation videoconferencing endpoint TE30, which provides a 1080p HD codec, HD precision camera, and stereo microphone.

Codec

Figure 2-5 Codec

The codec uses Huawei's proprietary Video Motion Enhancement (VME) 2.0 technology and an H.264 High Profile (HP) dual-core driver to:

- Provide sharper and clearer video than other leading systems in the industry.
- Deliver crisper, smoother, and more vivid video, with an increased video compression ratio without raising the bandwidth.

The codec provides users with clear full-duplex digital audio by integrating:

- Acoustic echo cancellation (AEC)
- Automatic gain control (AGC)
- Automatic noise suppression (ANS)

The codec also provides efficient algorithms for packet loss concealment and signaling and media stream encryption.

HD Precision Camera

Figure 2-6 HD precision camera

Extremely adaptable to its operating environment, the HD precision camera delivers optimal video quality through its support for:

- 12x optical zoom
- 1080p60 video resolution
- Automatic exposure (AE)
- Automatic white balance (AWB)
- Autofocus (AF)

The HD precision camera can be controlled remotely as well. This enables users to view videos from any angle and have a more in-person conference experience.

2.2.2 Microphone Array

Figure 2-7 Microphone array

HUAWEI VPM220 microphone arrays are used within the RP series products. The VPM220 provides high-quality audio and dramatically improves speech quality during conferences.

- High-quality audio

  The VPM220 supports a sampling rate up to 48 kHz and a full frequency range. It is able to sample sounds at rates lower than 22 kHz, which means that it can completely pick up sounds recognized by human ears. Based on the integration of digital signal processing and transmission technology and support for the AEC, AGC, and ANS functions, the VPM220 performs great in reduction of signal loss, while offering a hi-fi stereo experience.

- Surround sound experience

  An optimal pick-up range of six meters, 360-degree voice pickup, frequency compensation, and application of mono or dual audio channel all serve to deliver the best audio quality.

- Power saving

  Designed to be highly energy-efficient, the VPM220 requires at most 2.5 W of power when running.

2.2.3 Assembly Components

The major assembly components of the RP series products include the TV cabinet, equipment cabinet, and multi-functional socket. The assembly components have a simple and sleek appearance.

- Professional design

  The assembly components were designed with transparent technology, which means that cameras and microphones are integrated into the products and unseen by the participants, enabling participants' natural interaction without distractions. The length-width-height ratio, imaging principle, desktop shape, and image stitching were simplified to provide users with a smooth appearance, creating an in-person, face-to-face conference experience.

- User-centered design

  The assembly components were designed with the best practices of user-centered design (UCD) experts. The embedded cables and devices contribute to the sleek appearance, improving the conference environment.

3 Product Features

3.1 True-to-Life Conference Experience

Traditional video conferences present simple voice and video communications. The RP series products, however, demonstrate a historic revolution from traditional video conferences to conferences that show participants in different locations face to face in true-to-life dimensions.

Figure 3-1 True-to-life conference experience

Communication between participants in different locations is not restricted to voice and video. The system enables users to communicate with remote participants using gestures, facial expressions, and the impression of eye contact; therefore enhancing the videoconferencing experience.

3.2 Easy Installation and Configuration

The RP series products come with embedded cables, which enables the products to be installed within 1 hour without assistance from IT personnel. With a built-in Wi-Fi module, each product of the RP series can work in conjunction with wireless microphones, wireless presentation sources, and wireless touch panels. Users need only to connect a power cable to the product to prepare it for conferencing, keeping the conference room tidy.

If a user purchases a touch panel for the product, the product allows its configuration file to be automatically imported from a USB device. The USB device is plug-and-play. After it is inserted into the product, system settings can be easily configured and securely backed up.

3.3 Voice Dialing

The RP series products support advanced speech recognition in Chinese and English. Users can call or join a conference simply by saying the name of the scheduled conference or the site name.

3.4 Wi-Fi Connectivity

Each product in the RP series has a built-in Wi-Fi module and is able to function as either a Wi-Fi client, or a Wi-Fi server, or both simultaneously. When functioning as a Wi-Fi client, the product can automatically scan for and connect to a wireless access point. The product's IP address can be dynamically obtained or set to a static value.

When a computer has an air content sharing client installed and is located on the same LAN as an RP series product, the computer can connect to the product through Wi-Fi to function as a presentation source. The need for cable connections is therefore eliminated. If a user also purchases a touch panel, the user can connect it to an RP series product through Wi-Fi to control the product.

3.5 Air Content Sharing

A user can download an air content sharing client from the codec web interface to a computer. Using this client, a user can connect the computer to the RP series product and share the computer desktop as a presentation. This eliminates the need for any physical ports and facilitates presentation sharing.

An air content sharing client supports encoding for resolutions of 720p and 1024 x 768 pixels and a frame rate up to 15 fps. When enabled, an air content sharing client automatically scans for RP series products on the same network. Once connected to the computer where the air content sharing client is installed, the RP series product can receive the desktop content from the computer and view and share the desktop content as a presentation.

3.6 Quick Initial Configuration

The RP series products can automatically load configuration files on a USB device to complete the initial configuration, significantly improving configuration efficiency. Users are able to easily prepare the product for immediate use.

3.7 Minimum Bandwidth

The RP series products utilize new VME 2.0 and H.264 HP dual-core technology to deliver superb HD experience over low bandwidth.

The RP series products support a maximum conference rate of 4 Mbit/s and provide industry-leading video quality. The 720p30 video can be maintained even when the bandwidth available is only 384 kbit/s, and the 1080p30 video can be delivered when the bandwidth is 512 kbit/s.

The RP series products use Huawei's new proprietary Video Motion Enhancement (VME) technology to enhance pre- and post-processing of video, noise reduction, contrast, edges, and illuminance. This enhancement enables the RP to provide sharper and clearer video when compared with similar systems in the same lighting and camera conditions.

Using latest hardware processing chip, and enhanced H.264 encoding and decoding technology, the RP's video compression ratio is increased, allowing crisper, smoother and more vivid video to be delivered using the same network bandwidth as competing systems.

3.8 Outstanding Network Adaptability

The RP series products have passed stringent tests for environment adaptability, security, electromagnetic compatibility (EMC), and reliability, to ensure that the system can adapt to different environments. The RP's intelligent heat protection function can automatically adjust its inner temperature so that it can function properly even when the ambient temperature is high.

- Intelligent rate control

  The RP series products provide the function to reduce the transmission rate on the bearer IP network. In other words, when the packet loss on the network reaches a critical level, the real-time transmission rate of data streams is reduced appropriately using certain technologies and policies, to adapt to actual network conditions. When network conditions improve, the transmission rate is increased automatically and the normal network bandwidth is recovered. Therefore, network resources are used to the maximum to achieve the best audio-visual quality.

- Packet loss concealment

  On an IP network, packet loss easily occurs during data transmission. This affects the conference quality. The RP uses the proprietary Super Error Concealment (SEC) technology, adjusting the quality of service (QoS) automatically and selecting a proper audio-visual processing policy based on the transmission performance of the bearer IP network. SEC technology improves the audio and video quality in a poor network environment, ensuring that a conference can be held smoothly even when the packet loss

rate reaches 20%. In terms of network jitter, delay, and packet error, the RP performs better than relevant international standards and other videoconferencing products that do not use SEC technology.

3.9 Multiple Traversal Solutions and Proven Conference Security

The RP series products provide the static network address translation (NAT) function. If the number of terminals within the firewall is small, the terminals can traverse the firewall or a NAT device by configuring one-to-one mappings for public and private networks on the firewall. For one-to-one mapping, each terminal needs to be allocated with an IP address on the public network.

By also supporting H.460 (a protocol for firewall and NAT traversal between private and public networks) and the function to receive and send audio-visual data using the same port, the RP provides a complete firewall and NAT traversal solution.

The RP series products support H.235 signaling and media stream encryption. Working with Huawei Multipoint Control Units (MCUs) and management platforms, the RP series products support end-to-end signaling and media stream encryption and decryption for all services across the entire network. This ensures security during conferences.

3.10 Open and Standards-Based System

The RP series products are new-generation products based on the standard videoconferencing system. This design ensures the seamless integration of the RP series products, management software at the service layer, and MCUs in Huawei videoconferencing solutions.

The RP series products can access and register with an IMS network using SIP, and join or initiate an HD video conference on the IMS network.

The RP series products can interwork with Microsoft Lync2010^{TM} and OCS2007R2 systems and terminals, and with Cisco TelePresence systems. This design also allows the RP series products to work with telepresence products, HD video terminals, SD video terminals, desktop video terminals, and telephone conference products that support H.323 or Session Initiation Protocol (SIP), protecting investment, and improving audio-visual quality.

3.11 HD Video and Data

With support for the standard H.239 protocol, the RP series products can transmit two independent video streams simultaneously. When a computer is connected to the VGA port on the codec, both the conference video and the content displayed on the computer (including slides, Word documents, flash files, and HD images and movies) can be transmitted to a remote site simultaneously. This ability to transmit two independent video streams simultaneously enables the RP series products to meet the requirements for different conference scenarios, such as training sessions or medical consultations.

- HD dual stream

  The powerful hardware platform used on RP series products can encode and decode two channels of 720p30 video. Users can view presentations, such as HD films, shared by remote sites in real time. Requirements for dynamic dual stream can be met since both video and presentations can be dynamically displayed at a frame rate of 30 fps.

- Various continuous presence layouts

  Taking the application scenarios of HD data sharing into full consideration, the RP series products support the concurrent display of video and presentation in continuous presence mode. The RP200 can also independently display presentations on its secondary display screen.

3.12 Ease of Use

Based on the results of a UCD survey, the user-friendly user interface and the new remote control make operations simple and easy.

The remote control is smart and easy to use. The division of function buttons is consistent with the style of the user interface. Users can control the RP easily with the remote control.

The RP series products also provide optional Android-based, 10-inch touch panels. With an intuitive user interface, the touch panel provides quick access to all conference functions.

In addition, the status of the network established using the data card can be monitored, including the signal strength, packet loss rate, and connection status.
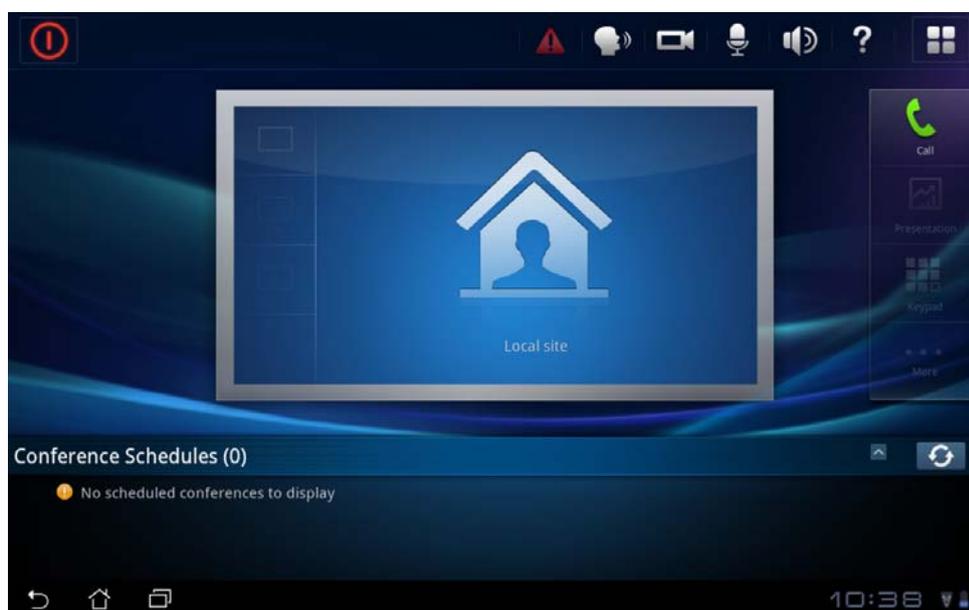
Figure 3-2 Touch panel UI

3.13 Powerful Built-in MCU

The built-in MCU function, which requires the purchase of an MCU license, allows users to hold multipoint conferences that can be simultaneously attended by up to four HD video sites and three audio-only sites. This makes the RP series product suitable for holding small conferences.

The built-in MCU has powerful universal transcoding, which enables it to:

- Automatically negotiate the audiovisual capability with all participating sites so each site can join the conference with the best conference experience available.

- Allow HD, SD, H.323, and SIP sites to attend the same conference.

- Automatically adjust the continuous presence layout (dependent upon the number of participating sites) so the video of each site can be displayed in continuous presence.

- Support continuous presence per port. This function means that each participant site can independently choose their continuous presence views (excluding the local site), improving the conference experience.

The built-in MCU enables users to invite multiple sites to join a conference using the web interface, remote control, or touch panel. Sites can also call into a conference held on the built-in MCU. With the need to set parameters (such as conference protocols and site capability) eliminated, the RP series product makes a perfect choice for videoconferencing for small- and medium-sized enterprises.

4 Typical Applications
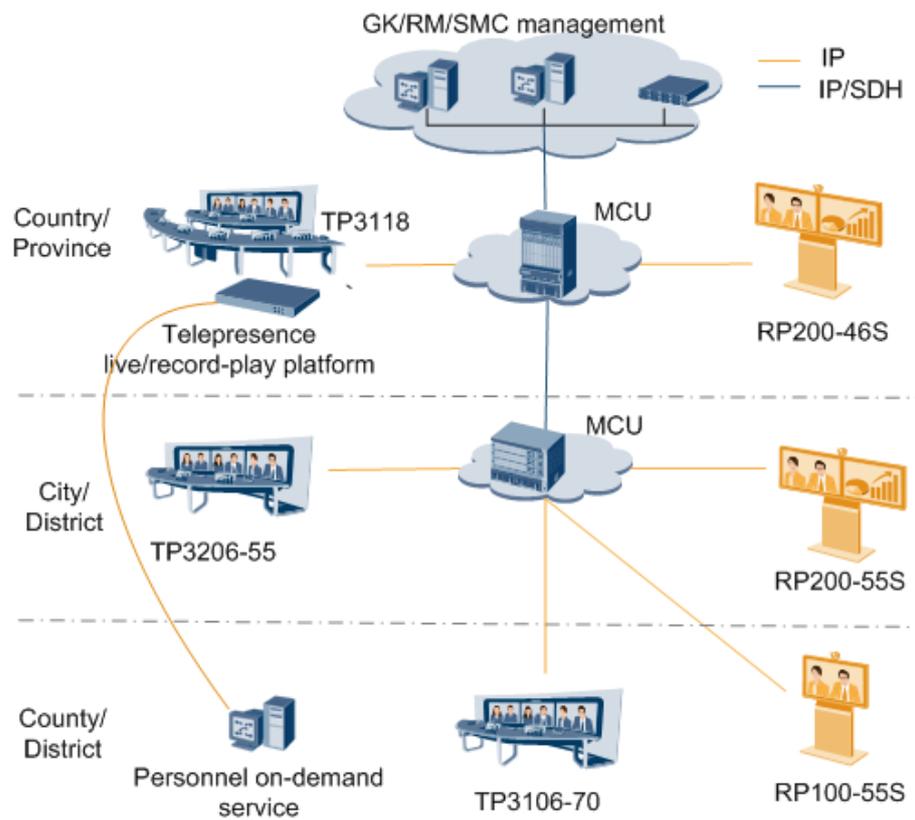
4.1 Complete Solution

Figure 4-1 Complete telepresence solution

The following describes the system network:

- The telepresence series products are deployed at all sites of the network. MCUs are deployed based on the actual network condition and capacity.

- Depending on the site size and environment, the dual-row TP3118 units (with two rows of conference tables) are deployed at large sites, the TP3106 units (with a single row conference table) are deployed at small- to medium-sized sites, and the RP series products are deployed at small sites and in executive offices.

- Recording devices can be deployed at important sites based on customers' requirements.

  This system has the following benefits and features:

- Features, such as ultra-HD video, sound localization, and face-to-face communication, are available for all conference sites.

- IP data connections can be used to access a network and high line reliability is ensured.

- The ViewPoint 8660 and ViewPoint 8650 MCUs, which feature the highest security and reliability in the industry, or the VP9000 series MCUs, which support universal transcoding, are used to host conferences. Hierarchical and role-based management of MCUs is supported in a distributed manner.

- Uni-screen systems can access the network, bringing the telepresence experience to small conference rooms and executive offices.

- The telepresence recording and on-demand functions are provided.
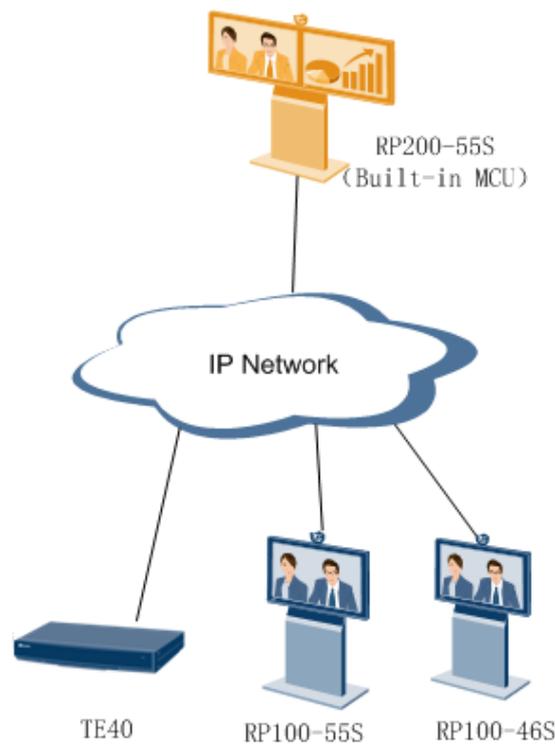
4.2 Built-in MCU Based Network

Figure 4-2 Built-in MCU based network

The network description is as follows:

- The RP200-55S built-in MCU supports a total access bandwidth of up to 6 Mbit/s. A multipoint conference hosted by the built-in MCU can be simultaneously joined by up to four HD video sites (including the local site) and three audio-only sites, meeting the requirements for small video conferences.

- H.323, SIP, and audio-only sites can join the same conference at a bandwidth of up to 2 Mbit/s. Sites can also join the same conference using different rates and protocols, as the built-in MCU can automatically negotiate the optimal bandwidth and video resolutions with those sites.

- To hold conferences, users can call sites one at a time, or use a predefined conference template to call all sites simultaneously. After a conference starts, sites can call the built-in MCU to join in.

- When a site joins a conference, the built-in MCU automatically adjusts the continuous presence layout to display the video of that site. Each participant site can also independently choose their continuous presence views.

4.3 Videoconferencing Solution Converging RP Series Products, Telepresence, HD, and SD Sites
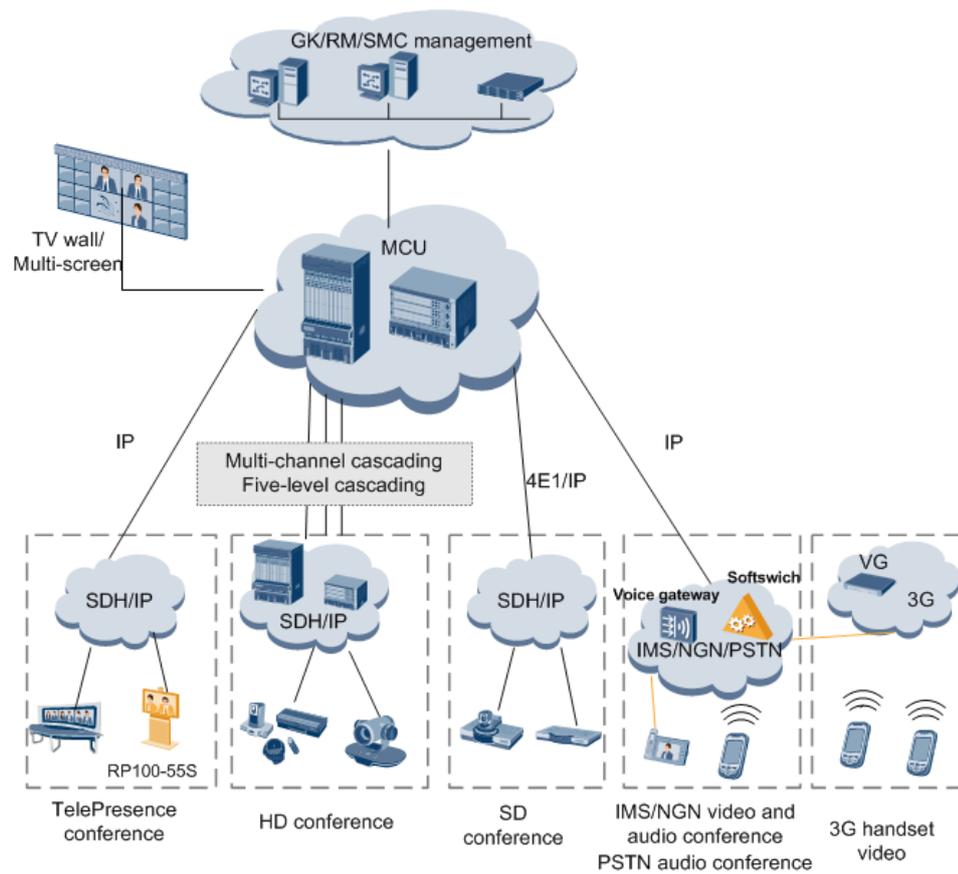
Figure 4-3 Videoconferencing solution converging RP series products, telepresence, HD, and SD sites

The network description is as follows:

A hierarchical structure will be adopted. At upper-level sites, telepresence products are deployed depending on the site size to ensure the true-to-life effect. At lower-level sites, a hybrid of HD and SD videoconferencing products can be deployed based on actual conditions to reduce costs.

This system has the following benefits and features:

- Features, such as ultra-HD video, sound localization, and face-to-face communication, are available for all telepresence sites.

- Interconnection between the telepresence systems and the HD and SD systems of the existing network as well as conference control is supported.

- IP data connections can be used to access a network and high line reliability is ensured.

- The ViewPoint 8660 and ViewPoint 8650 MCUs, which feature the highest security and reliability in the industry, or the VP9000 series MCUs, which support universal transcoding, are used to host conferences.

- The deployment is easy. Reconstruction is performed based on the existing network. Only upper-level offices require reconstruction. In lower-level offices, most original devices can be retained to protect investment.

- For sites that support 1080p, and 720p, investment on HD displays, cameras, and other devices can be reduced.
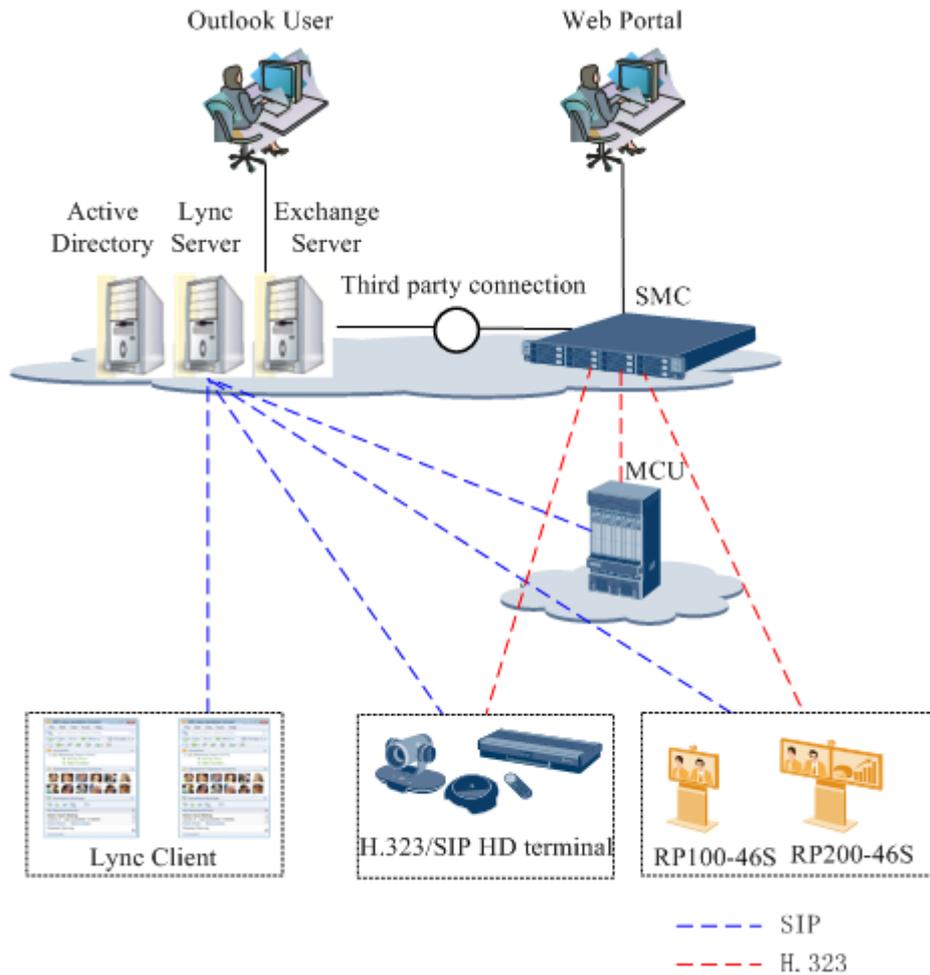
4.4 MSUC Convergence Network

Figure 4-4 MSUC convergence network

The network description is as follows:

- Using SIP, the RP registers with the Lync server and implements audio and video interworking with the Lync client. In other words, the RP and the Lync client can see and hear each other.

- The RP can call the Lync client:
  - The RP supports the Lightweight Directory Access Protocol (LDAP) address book. Users can search Lync client users on the network and add the users found to the local address book of the RP.
  - Users can place a video call to contacts in the local address book.
  - Users can enter the SIP URI or number of the called party and initiate a call.
  - The status (online, busy, or offline) of each other (the calling party and called party) is displayed in the address book.

- The Lync client can call the RP:

  – Users can search for the desired contact from the contact list and place a video call to the contact.

  – Users can enter the SIP URI or number of the called party and initiate a call.

  – If a call is initiated from the contact list or by entering the SIP URI, the status (online, busy, or offline) of each other (the calling party and called party) is displayed.

4.5 Huawei IMS Convergence Network
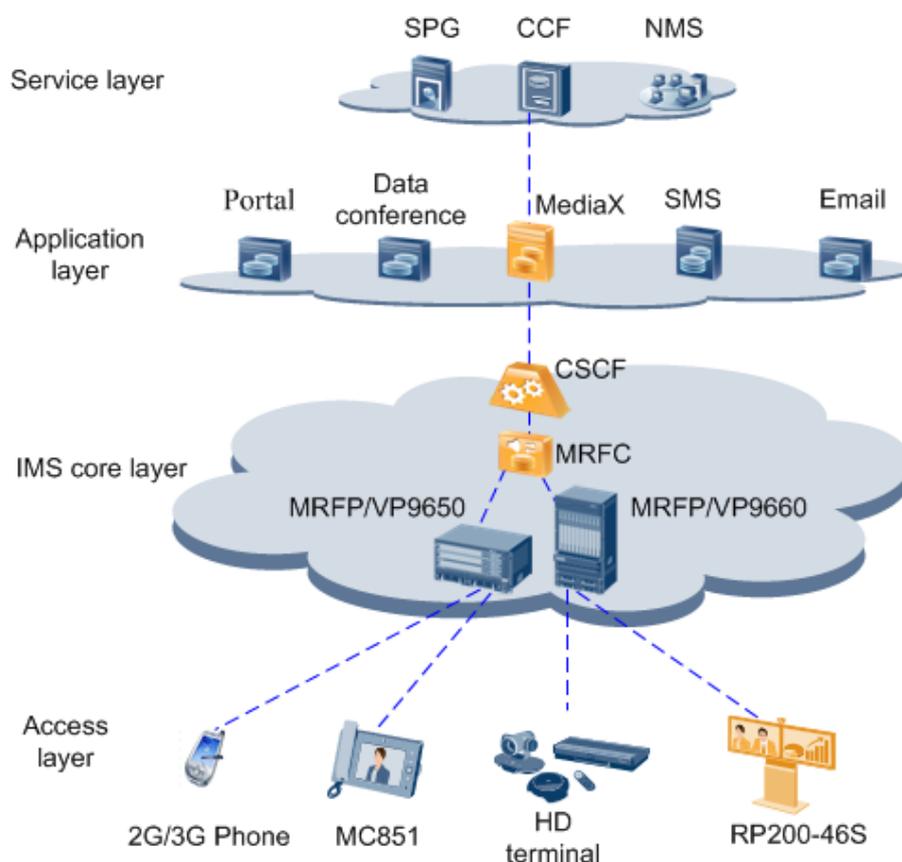
Figure 4-5 IMS convergence network

Born of the standard IP protocol, IMS uses voice over IP (VoIP) applications based on the 3rd Generation Partnership Project (3GPP) standard SIP applications to provide fixed and mobile multimedia services for operators. MCUs are integrated to enhance the functionality of the Huawei IMS videoconferencing solution.

The network description is as follows:

- The RP series products can access and register with an IMS network using SIP, and join or initiate an HD video conference on the IMS network.

- The RP series products support two video inputs and displays the video and presentation at the same time. The RP series products combine still images of presentation materials with moving pictures of people to provide an in-meeting experience.

- After joining the IMS convergence conference, the RP series products interwork with different client devices to provide users with more convenient and diversified video and audio communications services.

5 Product Specifications

Item	Sub-Item	Specifications
Protocol compliance	Multimedia frame protocol	ITU-T H.323 and IETF SIP
	Video encoding and decoding protocol	H.263, H.263+, H.263++, H.264 BP, H.264 HP, H.264 SVC
	Audio encoding and decoding protocol	G.711, G.722, G.728, G.722.1*, G.722.1C*, AAC-LD, HWA-LD *: G.722.1/G.722.1C, licensed from Polycom®
	Dual-stream standard	ITU-T H.239, BFCP
	IP protocol	IPv4/IPv6 dual stack
	Encryption protocols	• H.235 • Advanced Encryption Standard (AES) • TLS • SRTP • SSH/HTTPS
	Network transmission protocol	TCP/IP, FTP, FTPS, DHCP, SNMP, Telnet, SSH, HTTP, HTTPS, PPPoE, RTP, RTCP, SNTP
	Other communications protocol	H.221, H.225, H.230, H.231, H.233, H.234, H.235, H.241, H.242, H.243, H.245, H.281, H.283, H.350, H.460, and T.140
	Conference bandwidth	1080p30 or 720p60: minimum bandwidth 512 kbit/s 720p30: minimum bandwidth 384 kbit/s

Item	Sub-Item	Specifications
	Presentation resolution	• Input: 1920 x 1200, 1080p (1920 x 1080), 1600 x 1200, 1680 x 1050,1600 x 900, XGA+ (1400 x 1050), 1440 x 900, WXGA (1366 x 768), 1360 x 768, SXGA (1280 x 1024), 1280 x 960, WXGA (1280 x 800), WXGA (1280 x 768), 1280 x600, 720p (1280 x 720), 1152 x 864, XGA (1024 x 768), SVGA (800 x 600), VGA (640 x 480) • Output: 1920 x 1080, 1280 x 1024, 1280 x 720, 1024 x 768, 800 x 600 • Coding/Decoding resolution: 1920 x 1080, 1280 x 1024, 1280 x 720, 1024 x 768, 800 x 600
	Other video features	• Face recognition • PiP, Picture out Picture (PoP), and other display layouts • Video Motion Enhancement (VME) • VideoIntensifier • ViewProcessing
HD camera	Image sensor	2-megapixel 1/3-inch CMOS
	Resolution	1080p60 /50(1920 x 1080 pixels)
	Lens	• Zoom: 12x optical • Focal length: f = 3.9-46.8 • Aperture: F1.8 to F2.8 • Maximum horizontal angle of view: 72° • Panning angle: ±100°, Tilting angle: ±30° • Up to 30 local camera presets and 16 remote camera presets • AWB, AE, and AF • Three flexible image modes: standard, vivid, and natural
	Exposure mode	Auto and manual
	White balance	Auto and manual

Item	Sub-Item	Specifications
Screen	HD display	Size: RP200-55S: 55 inches RP200-46S: 46 inches RP100-55S: 55 inches RP100-46S: 46 inches Resolution: 1920 x 1080 pixels
Environmental requirements	Operating state	
	Ambient temperature	0°C to 40°C (32°F to 104°F)
	Relative humidity	10% to 80%
	Ambient noise	< 46 dBA SPL
	Minimum illuminance	150 lux
	Recommended illuminance	> 300 lux
	Non-operating state	
	Ambient temperature	–40°C to +70°C
	Relative humidity	0% to 95%
Power and power supply	Input voltage	100–240 V AC, 50 Hz or 60 Hz
	Power (without illumination and air conditioners)	• RP200-55S: 307 W • RP200-46S: 247 W • RP100-55S: 177 W • RP100-46S: 147 W
Physical specifications	Dimensions (H x W x D)	• RP200-55S: 1782 mm x 2550 mm x 500 mm (70.16 in. x 100.39 in. x 19.69 in.) • RP200-46S: 1692 mm x 2170 mm x 500 mm (66.61 in. x 85.43 in. x 19.69 in.) • RP100-55S: 1782 mm x 1270 mm x 500 mm (70.16 in. x 50 in. x 19.69 in.) • RP100-46S: 1692 mm x 1080 mm x 500 mm (66.61 in. x 42.52 in. x 19.69 in.)
	Weight	• RP200-55S: 90 kg • RP200-46S: 80 kg • RP100-55S: 65 kg • RP100-46S: 60 kg

Table 5-1 Technical specifications of the RP series products

A Acronyms and Abbreviations

A

AEC	Acoustic Echo Cancellation
AGC	Automatic Gain Control
ANS	Automatic Noise Suppression
AWB	Automatic White Balance
AE	Automatic Exposure
AF	Automatic Focus

C

CIF	Common Intermediate Format

EMC	Electromagnetic Compatibility

I

IP	Internet Protocol
IMS	IP Multimedia Subsystem

M

MCU	Multipoint Control Unit

N

NAT	Network Address Translation

Q

QoS   Quality Of Service

S

SEC   Supper Error Concealment

SIP   Session Initiation Protocol

U

UCD   User Centered Design

V

VGA   Video Graphics Array

VME   Video Motion Enhancement