

SMC2.0
V600R019C10

Product Overview (CloudVC20.1.0)

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1 Product Positioning and Highlights

This topic describes basic concepts, advantages, and benefits of the HUAWEI Service Management Center (SMC2.0).

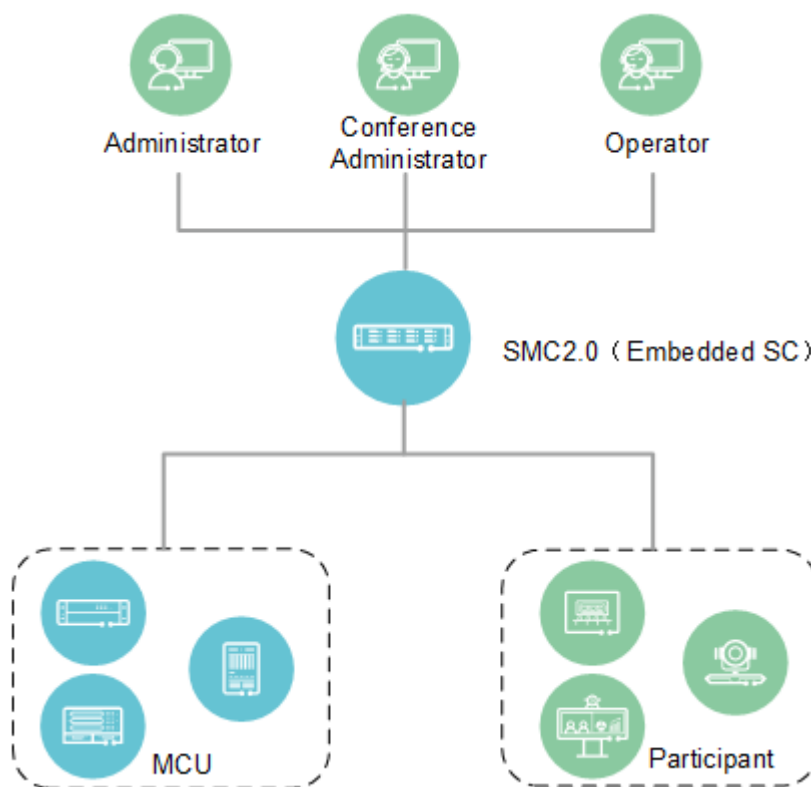
1.1 Positioning

This topic describes the position of SMC2.0.

The HUAWEI SMC2.0 service management system (SMC2.0 for short) is a new-generation video conferencing service management system that centralizes the management of video communications services for middle- and large-sized enterprises. The SMC2.0 is a mature management system for video communication, which enables enterprise IT decision makers, system administrators, and operators to smoothly communicate and collaborate with each other remotely, thereby greatly reducing enterprise operating costs.

Figure 1-1 shows the SMC2.0 in an overall network solution.

Figure 1-1 SMC2.0 in an overall network solution



Based on its superior architecture, the SMC2.0 provides:

- Intuitive web interface: It allows users to easily interact with the video conferencing system.
- Intelligent management: The unified management platform allows for real-time monitoring and remote diagnostics, maintenance, and upgrades for devices in the video conferencing system.
- Flexible resource allocation: In middle- and large-sized video conferencing networks, conference resources can be allocated by service area. Instant conferences can be easily hosted.
- Improved compatibility: The SMC2.0 preserves third-party interfaces for conferences initiation from third-party platforms. Meanwhile, it supports various types of devices, which helps maintain customers' investment profitability.

1.2 Highlights

The SMC2.0 is one of the most capable systems for conference and device management. It supports large networks and provides third-party interfaces for convergence.

Centralized Control

From the SMC2.0 web interface, users can manage multiple devices in the following ways:

- Administrators can manage a complete portfolio of video conferencing resources with one device, including MCUs, GK/SIP servers, and video endpoints.
- Powerful device management functions include auto detection, batch parameter configuration, visualized network topology and management, locked parameters for consistent operation, batch software version management and upgrade, querying and handling of alerts, and parameters configuration and alerts management for mainstream endpoints.
- The SMC2.0 can connect to eSight. Then unmanageable terminals on the SMC2.0 can be managed by eSight.
- Flexible and easy-to-create statistical reports deliver video resource usage updates in real time for more efficient resource management and fast decision making.
- Administrators can flexibly manage large-scale video conferencing networks by deploying MCUs and gatekeepers in geographically dispersed corporate branches as well as balance MCU cloud resource center loads with internal backup or between MCUs to improve resource utilization and conference reliability.
- Distributed video conferencing network by deploying SMC2.0s is designed for multi-level organization in government and enterprise industry. Device management by each organization and communication between different organizations including scheduling conference, conference control and so on are supported.
- The NLog end-to-end quality-monitoring function empowers operators to monitor conference quality and analyze fault history.

Hierarchical and Role-Based Authentication for Multiple Users

- Large enterprises can categorize users according to corporate organizational structures and define or assign user roles and access rights depending on organizational architecture.
- Graphics-based tree architecture displays show usage by individual users.
- Operators can establish large-scale video operating networks to provide hierarchical and role-based virtual operation services for multiple corporations.

Efficient Conference Scheduling

- SMC2.0 provides an easy-to-use User Interface (UI) that enables users to conveniently schedule conferences, view the status of conference rooms, choose appropriate conference times and sites, and send conference notices to participants via email.
- Conference templates and conference history functions allow users to define and schedule large cascaded conferences. The SMC2.0 system also allows automatic cascading of MCUs as needed with seamless management of multisite calls
- SMC2.0 can be integrated with Office Automation (OA) systems. For example, users can schedule conferences, cancel conferences, and view the availability of participants or conference rooms with the integrated Outlook application. Conference notifications are automatically added to participants Outlook calendars.

- SMC2.0 can be integrated with Office Automation (OA) systems. For example, users can schedule conferences, cancel conferences, and view the availability of participants or conference rooms with the integrated Outlook application. Conference notifications are automatically added to participants Outlook calendars.
- Users can join a conference by using the **One-Click-to-Join** button on the touchscreen or by initiating an ad-hoc conference with a unified access number.
- A Virtual Meeting Room (VMR) conference enables users to hold conferences anytime and anywhere by using a specified VMR number or conference URL without reservations.

Multiple Backups

The SMC2.0 adopts backup mechanisms for the server, SC, and MCU to achieve high reliability.

- SMC2.0 two-node cluster deployment: Active and standby servers can be deployed on the network to form a two-node cluster and implement failovers.
- SC hot backup: If network errors occur on the active SC, the standby SC can take over.
- Resource Pool: If an MCU fails, the SMC2.0 automatically switches services to an available MCU in the same or standby service area.

Embedded SC and Standalone SC

By default, the SMC2.0 is provided with an embedded SC. The SMC2.0 also supports standalone SCs.

- An embedded SC provides up to 1000 registration nodes.
- A standalone SC provides up to 10000 registration nodes, covering the needs of large-sized networks.
- SMC2.0 adds the ability to manage multiple standalone Switch Centers (GK/SIP Server), which allows for networking on a large scale and large-capacity firewall traversal.

Preserved Third-Party Interfaces

The SMC2.0 provides standard third-party interfaces for convergent conferences with third-party platforms.

- SMC2.0 provides APIs for integration with other vendor products.
- Support for integration with existing user-authentication system in enterprises satisfies the need for unified account working in office.
- Integration with mainstream SMS platform is supported so that it can make it easy to use the system.

2 Application Scenarios

This topic describes use of the SMC2.0 in different application scenarios.

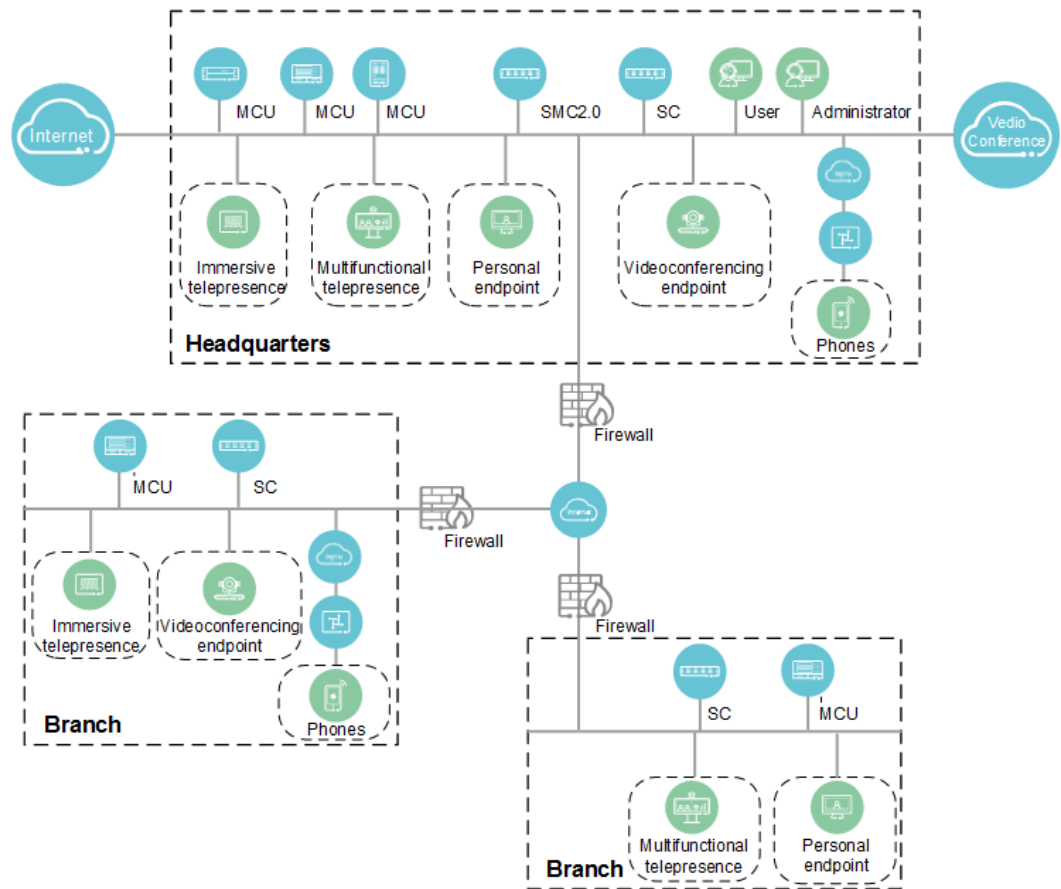
2.1 Deployment in a Large Enterprise and Its Branches Networking

The SMC2.0 can be deployed on a network for a large enterprise and its branches so all types of devices on the network can join HD video conferences.

The SMC2.0 serves as a service management platform in a large enterprise and its branches and integrates all components in the video conferencing system, enabling fast deployment for enterprise applications and eliminating the need for installing multiple components.

Figure 2-1 shows the deployment in a large enterprise and its branches.

Figure 2-1 Deployment in a large enterprise and its branches



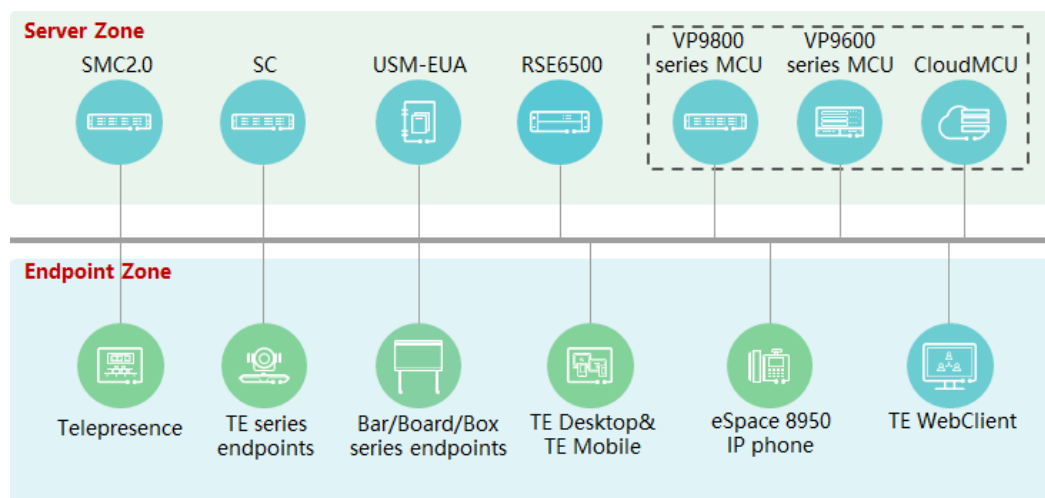
In the network for a large enterprise and its branches:

- The SMC2.0 serves as a service management platform that supports H.323 and SIP, manages conference resources and devices in the system, and provides functions, such as conference scheduling.
- The embedded SC manages the endpoints registered with it. Standalone SCs can be deployed to expand network capacity based on service requirements.
- An administrator logs in to the web interface of the SMC2.0 to control the permissions by specifying user types and their organizations. Users can schedule conferences from the web interface.

2.2 SMC2.0 and MCU Networking

The SMC2.0 and the MCU are connected to provide video conference services. The SMC2.0 centrally manages a diversity of NEs and endpoints, including RSE6500, MCU, telepresence, and videoconferencing endpoints.

Figure 2-2 SMC2.0 and MCU networking



Network description:

- The SMC2.0 supports MCU and RSE resource management, multi-MCU/RSE deployment, endpoint management, conference scheduling, and conference control.
- VP9800 series MCUs, VP9600 series MCUs and CloudMCU support hybrid networking.
- Endpoints allow users to hold a conference by SiteCall or IVR, and control the conference on web pages, the touchscreen, or remote control.
- Users can click the link in a conference notification email to start the web conference client, join VP9800 series MCU or CloudMCU-based voice, video, and data conferences, and use a web conference client to control the conferences.
- When an 9000 series MCU or CloudMCU with universal transcoding is used, multi-point conferences support continuous presence for each port.
- Users can watch video conference live streaming and VoD on a variety of devices, including computers, tablets, smartphones, and conferencing endpoints.

2.3 Firewall Traversal Networking

In a large-sized enterprise network, the traversal between private and public networks must be available because video conferencing endpoints and MCUs may be installed in different places and used in different ways. The SMC2.0 provides different networking solutions based on the networks where endpoints are deployed.

The SMC2.0 can be deployed with an embedded SC or a standalone SC.

- When the embedded SC traverses between public and private networks, the SC can be embedded on private networks (with single network adapter).
- In a public-private network traversal network, the deployment of the SMC2.0 and standalone SC involves three scenarios: a single SC with dual network

adapters in the DMZ, a single SC with a single network adapter in the DMZ, and two SCs in the private network and DMZ respectively.

The following describes the networking for deploying the standalone SC to the DMZ (dual network adapters).

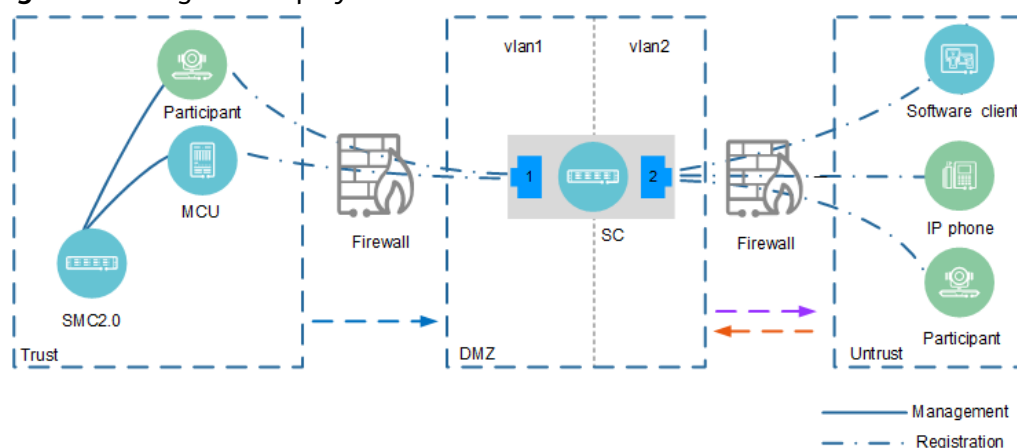
Standalone Single SC Deployed in the DMZ

Single SC is deployed on the DMZ zone and serves for the public and private endpoints and MCUs. Two network segments are divided, with one IP address provided to connect devices on the private network, and the other to connect devices on the public network by NAT mapping.

The Session Initiation Protocol (SIP) is used for controlling multimedia communication sessions such as voice and video calls.

Devices on the private network can communicate with those on the public network through SC which transfers signaling and media streams.

Figure 2-3 Single SC deployed on the DMZ



Network description:

- Video conferencing devices are deployed on the public network and private network, and most are deployed on the private network.
- MCU registers with SC using H.323 and SIP, and H.323 and SIP endpoints can join a multipoint conference concurrently.
- SC is deployed on the DMZ, and separated from public and private networks, to improve security of enterprise private network.
- Corresponding ports are opened on firewall to ensure data communication between SC and devices.
- Deployment of a single SC lowers the network-building cost.
- The SC can work with the firewall to open and close of dynamic UDP ports used for video and audio traffic.

2.4 DR Network

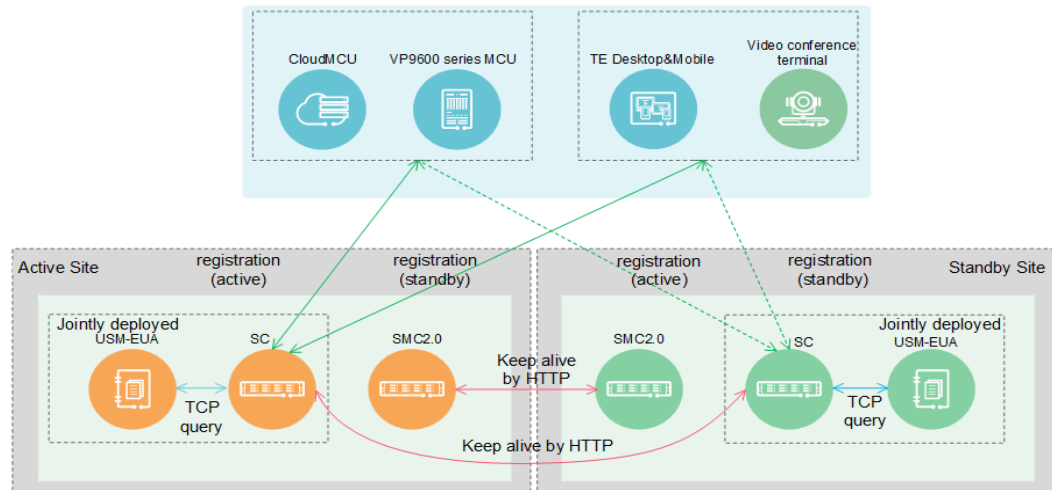
The video conferencing solution supports geographic redundancy. Each place involved has one system deployed. When the system in a place is abnormal due to

factors such as natural disasters, the system in another place takes over the services.

This solution supports NE-level switchover. On the DR network where two sites work in active/standby mode, both manual and automatic switchovers are supported, but only manual switchover is available.

Figure 2-4 shows the DR network.

Figure 2-4 DR network



- Each of the active and standby sites has an SMC2.0 deployed. The two SMC2.0s also work in active/standby mode and have heartbeat connections and data synchronizations between them. In normal cases, only the active SMC2.0 provides conference management and device management. When the active SMC2.0 is faulty, the standby SMC2.0 takes over services.
- Each of the active and standby sites has an SC deployed. The two SCs also work in active/standby mode and have heartbeat connections and data synchronizations between them. In normal cases, only the active SC provides number allocation, terminal registration, and routing/forwarding. When the active SC is faulty, the standby SC takes over services. The active and standby SCs have their own IP address. NEs connect to the active SC through its IP address. Terminals connect to the active and standby SCs through the domain name.
- Each of the active and standby sites has a USM-EUA deployed. The two USM-EUAs also work in active-standby mode. The USM-EUA must be deployed with the SC on the same server. Once an SC switchover happens, a USM-EUA switchover will certainly follow. In normal cases, only the active USM-EUA provides the corporate directory service. Only when the active USM-EUA is faulty, the standby USM-EUA will start providing this service. The active and standby USM-EUAs have their own IP address. NEs and terminals connect to the active USM-EUA through its IP address.
- Terminals or NEs preferentially access the active SMC2.0, SC, and USM-EUA. When the active SMC2.0, SC, or USM-EUA is faulty, the terminals or NEs automatically switch over to the standby one. If the standby SMC2.0, SC, or USM-EUA also becomes faulty during use, the terminals or NEs automatically switch over to the original active one again.

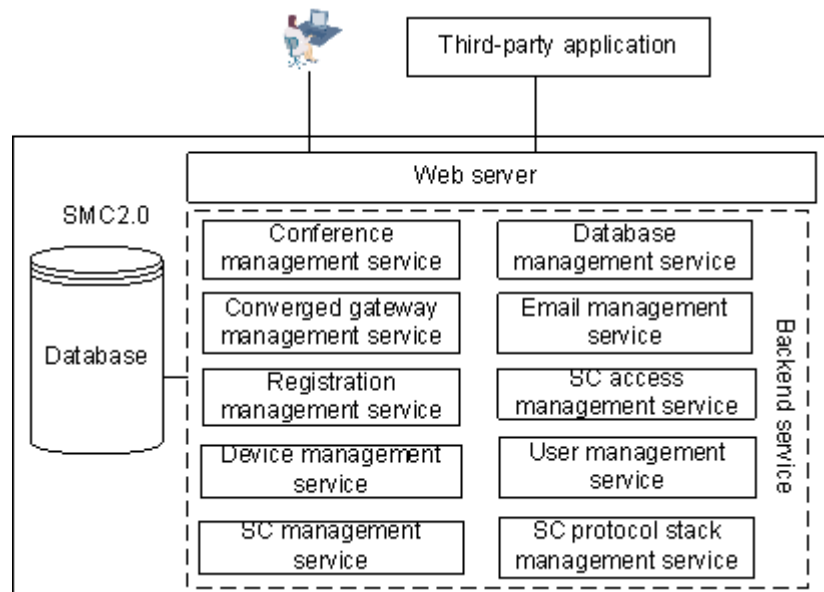
- Terminals are simultaneously registered with the active and standby SMC2.0s, SCs, and USM-EUAs.
- The MCU is simultaneously registered with the active and standby SMC2.0s and SCs. The MCU is a NE used to provide resources and does not require DR. It is used by the SMC2.0 and SC. The active SMC2.0 and SC share one MCU with the standby SMC2.0 and SC.

3 System Architecture

This topic describes the system architecture of SMC2.0.

The SMC2.0 is composed of three parts: web client, back-end service, and database, as shown in [Figure 3-1](#).

Figure 3-1 SMC2.0 system architecture



The functions of system components are as follows:

- **Web client**
The web client provides the human machine interface. Users can log in to the web interface and perform the following operations allowed for their user roles: Administrators can maintain system devices and configure resource usage policies; other users can only schedule and initiate conferences. All functions, including user rights management, are implemented from the web interface.
- **Back-end service**
The back-end service is the SMC2.0 engine, which provides E-mail management service, device management service, and others.

- Database
The database is the SMC2.0's data warehouse. It supports efficient and stable data access, contributing to a high performance SMC2.0.

Installation

The SMC2.0 and SC can be deployed on the servers or platforms listed in [Table 3-1](#) in single-node system, two-node cluster, or disaster recovery (DR) mode.

Table 3-1 SMC2.0/SC deployment schemes

| NE | Deployed On |
|--------|--|
| SMC2.0 | <ul style="list-style-type: none">• Bare mental server• FusionCompute virtualization platform• HUAWEI CLOUD Stack (HCS) platform |
| SC | <ul style="list-style-type: none">• Bare mental server (2288H V5/TaiShan)• FusionCompute virtualization platform• HCS platform |

4 Features and Benefits

This topic describes the main features and benefits of the SMC2.0.

4.1 Conference Hosting and Control

4.1.1 Multiple conference types

The SMC2.0 supports three video conference types. They are universal transcoding conference, full switching conference and SVC conference.

Table 4-1 Video conference types

| Video Conference Type | Application Scenario | Advantage | MCU Scheduling Sequence |
|----------------------------------|--|---|--|
| Universal transcoding conference | An enterprise deploys multiple MCUs most of which are VP9600 series MCUs and various types of terminals. | Endpoints can join the same conference at any protocol and bandwidth, and each participant can have the best possible experience available for their endpoint capability and bandwidth. | <ul style="list-style-type: none"> H.265 conference: VP9600 series MCU > CloudMCU/VP9800 series MCU H.264 conference: VP9600 series MCU > CloudMCU/VP9800 series MCU <p>In this case, video conferencing endpoints join conferences preferentially through the VP9600 series MCU with universal transcoding.</p> |

| Video Conference Type | Application Scenario | Advantage | MCU Scheduling Sequence |
|---|--|---|---|
| Full switching conference | An enterprise deploys multiple MCUs most of which are VP9600 series MCUs and basically the same models of terminals. | Compared with universal transcoding, universal transfer is not a full encoding and decoding mode. Instead, universal transfer allows endpoints to join conferences using different bandwidths and audio/video protocols based on the rate adaptation policy. Compared with a universal transcoding conference, a universal transfer conference saves MCU resources. | <ul style="list-style-type: none"> ● H.265 conference: VP9600 series MCU > CloudMCU/VP9800 series MCU ● H.264 conference: VP9600 series MCU > CloudMCU/VP9800 series MCU <p>In this case, video conferencing endpoints join conferences preferentially through the VP9600 series MCU with full switching.</p> |
| SVC conference (multi-stream forwarding conference) | An enterprise deploys multiple MCUs most of which are CloudMCUs and VP9800 series MCUs, and multiple conference terminals most of which are SVC terminals (including TE Desktop, TE WebClient, Bar&Board&Box series, and RoomPresence series). | Participants can choose to view video of any resolution. The video does not need to be encoded or decoded on the MCU. Video codec and continuous presence layout are directly performed on the SVC terminal. Service workload is relieved on the MCU, reducing the latency. | <p>CloudMCU/VP9800 series MCU > VP9600 series MCU</p> <p>In this case, SVC terminals join conferences preferentially through the CloudMCU/VP9800 series MCU. The VP9600 series MCU with universal transcoding is reserved for universal transcoding conferences. As a result, conference resources are used in the most appropriate way.</p> |

4.1.2 Multiple Conferencing Modes

The SMC2.0 supports multiple conferencing modes so users can initiate or join conferences flexibly.

The SMC2.0 allows for the following conferencing modes:

- Convene a conference on web pages of the SMC2.0, including template-based operations.
- Use an endpoint to call an ad hoc access number to activate a conference.
- Use an endpoint to call a unified access number to activate a conference.
- Use an endpoint to call a unified access number to create a conference.
- Use the SiteCall function of an endpoint to create a conference.
- Use a third-party interface to convene a conference.
- Turn a two-party call into a multi-party conference.
- Access a VMR meeting.

4.1.3 SVC Multi-Streaming and Hybrid Conference

SMC2.0 supports multi-streaming conferences based on the Scalable Video Coding (SVC) standard. A multi-streaming conference performs video forwarding only on the network side, without video codec conversion. Endpoints perform video codec and continuous presence layout (1 big and multiple small panes).

SVC is the extension of the H.264 Advanced Video Coding (AVC) video compression standard. It uses a variety of efficient algorithm tools of the AVC codec to generate decoded videos with different frame rates, resolutions, or quality levels.

Function Description

- Single and hybrid multi-streaming conferences are supported. Hybrid multi-streaming conferences support the access of SVC and AVC conferencing endpoints.

NOTE

Single multi-streaming conferences are an exception of hybrid multi-streaming conferences, and collectively referred to as hybrid multi-streaming conferences.

- The cascading between hybrid multi-streaming conferences and between hybrid multi-streaming conferences and universal transcoding conferences is supported.
- SVC conferencing endpoints can be TE Desktop, TE WebClient, RoomPresence series and Bar/Board/Box series.

4.1.4 Data Conference

The SMC2.0 supports data conference which TE Desktop&Mobile can be involved in, and expand collaboration capabilities.

WebClient Access

In mobile scenarios - such as branches, hotels, airports, and SOHO, users can use the TE WebClient to join voice, video, and data conferences through the Internet or Wi-Fi, facilitating communications and collaboration.

The CloudMCU/VP9800 series MCU is deployed to provide voice, video, and data conference capabilities, and the endpoint extranet access networking scheme is used to ensure access security of TE WebClient users from the extranet. During a data conference, TE WebClient can be installed as a plug-in to the browser on users' computers.

Data Collaboration

[Table 4-2](#) lists data collaboration functions for different roles in a conference.

Table 4-2 Data collaboration functions

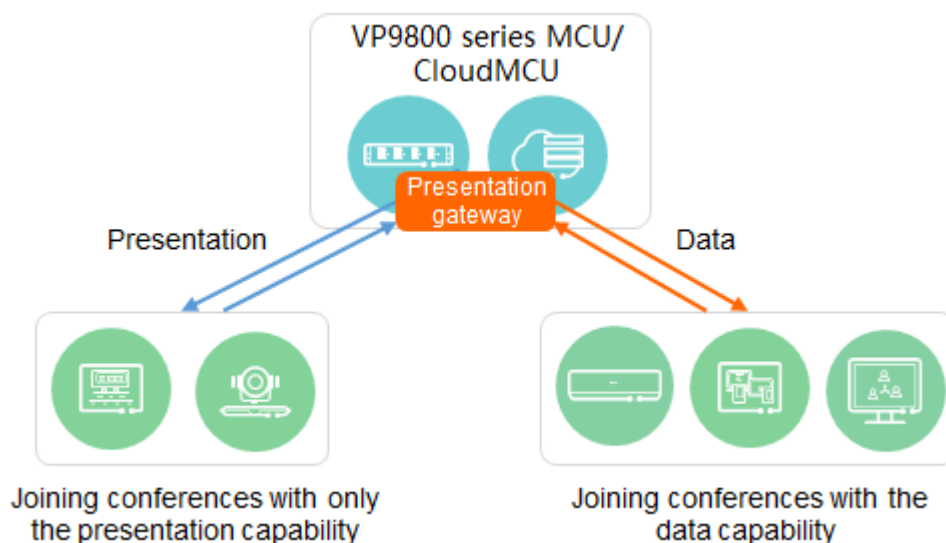
| Role | Function |
|-------------|--|
| Chair | <ul style="list-style-type: none"> ● Viewing participant video ● Broadcasting participant video ● Transferring to another number ● Sending a conference IM ● Sharing a document ● Taking notes, recording a conference, releasing a bulletin, and transferring a file |
| Presenter | <ul style="list-style-type: none"> ● Viewing participant video ● Transferring to another number ● Sending a conference IM ● Performing data collaboration operations, such as document sharing, whiteboard, desktop, program, and media ● Inviting a participant to share the desktop ● Taking notes, recording a conference, releasing a bulletin, and transferring a file ● Initiating a poll |
| Participant | <ul style="list-style-type: none"> ● Viewing participant video ● Transferring to another number ● Sending a conference IM ● Taking notes |

Interoperability Between Presentations and Data

The presentation gateway of the VP9800 series MCU/CloudMCU enables interoperability between presentations and data.

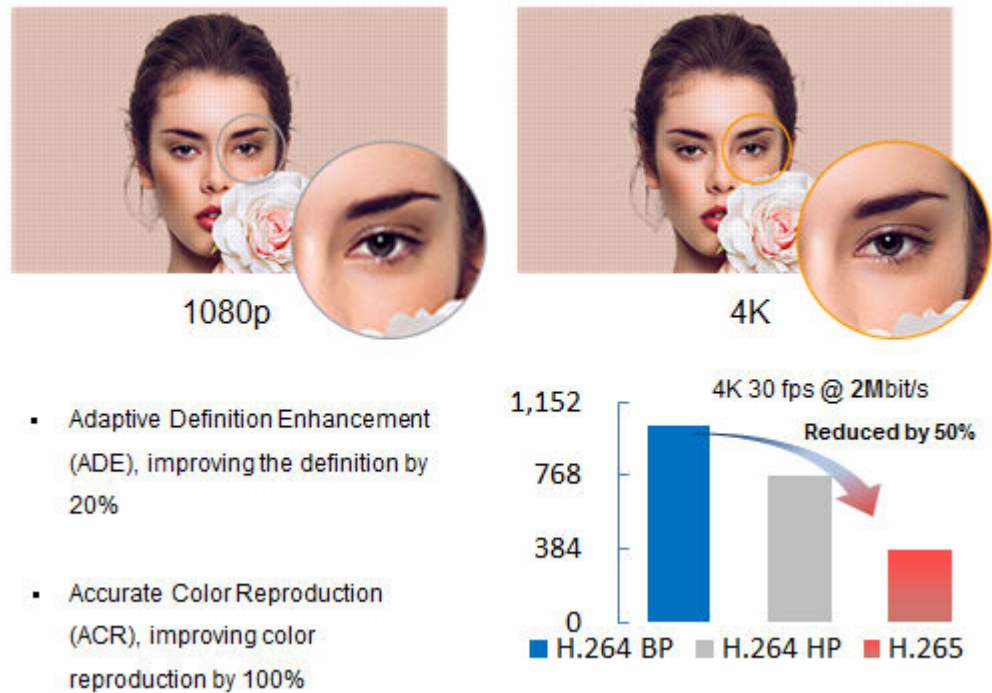
- Users can access data conferences using the Web Client, TE Desktop/TE Mobile, RoomPresence series and Bar/Board/Box series. The VP9800 series MCU/CloudMCU and the preceding terminals support data sharing encoding and decoding to implement data conference functions.
- Traditional video conferencing endpoints, such as the RP100, RP200, TP series, and TE series endpoints, do not support data sharing encoding and decoding. These endpoints can use interoperability between presentations and data to join data conferences that support various types of endpoints.

Figure 4-1 Interoperability between presentations and data



4.1.5 H.265 4K Conference

The resolution and data volume transmitted in 4K is fourfold of those in 1080p. Using 4K, images can be displayed on a larger screen with higher resolution. This makes remote precision design and telemedicine possible through 4K conferencing-based remote collaboration. The combination of H.265 and Huawei-patented Video Motion Enhancement (VME) technologies enables users to enjoy 4K video effects and experience under the same bandwidth required for 1080p.



The video conferencing solution provides the SMC2.0, VP9600 series MCUs, TX50, and Box 300/600/700/900 to implement H.265 4K conferences. Functions are listed as follows:

- H.265 conference reservation and scheduling on the SMC2.0.
- H.265 4K point-to-point calls between endpoints and conversion of a point-to-point call to a multipoint conference.
- H.265 conferences that are initiated by making calls from endpoints. When making a call on an endpoint to initiate a conference, an endpoint user can set the conference parameter to H.265 to initiate an H.265 conference.
- H.265 conferences that are initiated from endpoints using IVR.
- Encrypted H.265 conferences.

4.1.6 Convenient Multi-Level Conferencing

On the SMC2.0, common conferences can be cascaded to form a multi-level conference in specified structure.

Typical Scenario 1

A province-level seminar that contains city conference center A and city conference center B needs to be held. Conference template A and conference template B are usually used to initiate conferences for city conference center A and city conference center B, respectively. In this case, conference template A and conference template B can be merged to form a multi-level conference template. This multi-level conference template can be used to initiate the desired seminar. Conference template A and conference template B do not need to be modified.

Typical Scenario 2

Conference center A is holding a food seminar, while conference center B is holding a healthy life seminar. If a manager wants to merge these two seminars, multi-level conferencing can be used.

4.1.7 VMR Conferencing

In a Virtual Meeting Room (VMR) conference, some users or meeting rooms are allocated with fixed VMR numbers. Each access number is similar to a virtual meeting room. A user can dial the VMR number or click the link corresponding to the VMR number to join the conference without scheduling a conference.

The VMR conferencing service is provided in the personal VMR mode. The VMR conference resource is allocated to a user or conference device. That is, a VMR number is bound to an account. In this case, the VMR conference belongs only to this account. Only this account can activate the VMR. After the VMR is activated, other participants can dial up to join the conference. If the VMR is not activated for the account, other participants cannot join the conference. A VMR can hold only one conference at a time.

The VMR can ensure that the conference resources of individual users are not occupied, and the conference can be successfully held at any time.

Figure 4-2 Example of creating a VMR conference by one click (Board)

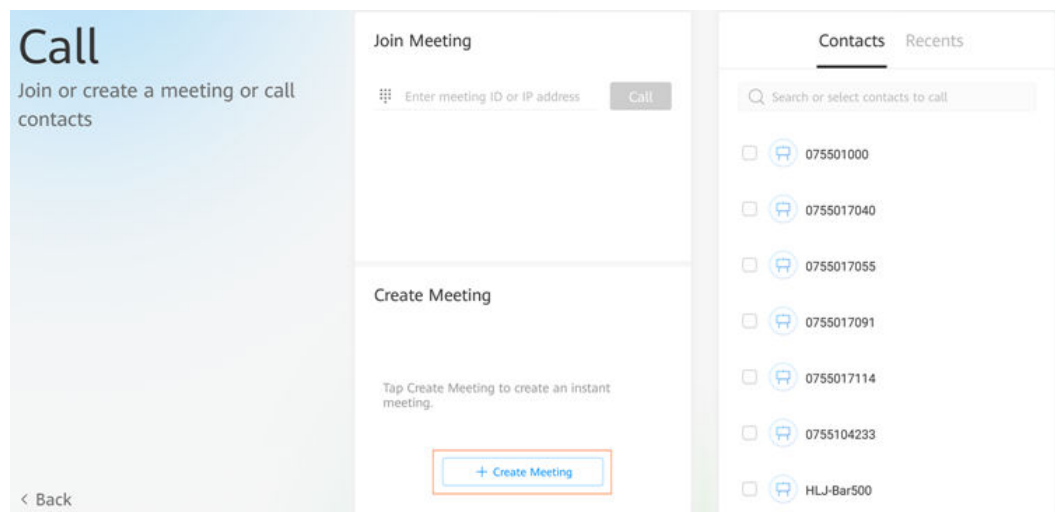


Table 4-3 Terminals to which the personal VMR conference feature is applicable

| Terminal Type | Feature Support |
|-------------------|---|
| eSpace 8950 Phone | Supports the feature of joining a conference by dialing a number. |
| RP100/RP200 | Supports the feature of joining a conference by dialing a number. |
| TP3106/TP3206 | Supports the feature of joining a conference by dialing a number. |

| Terminal Type | Feature Support |
|--|--|
| TE10/TE20/TE30/TE40/TE50/TE60/TX50/DP300 | Supports the feature of joining a conference by dialing a number. |
| TE Desktop | Supports the feature of joining a conference by one click on the screen and the feature of joining a conference by dialing a number. |
| TE Desktop for MAC/TE Mobile | Supports the feature of joining a conference by dialing a number. |
| WebClient | Supports the feature of joining a conference by clicking a link. |
| Bar/Board/Box series | Supports the feature of joining a conference by one click on the screen and the feature of joining a conference by dialing a number. |
| RoomPresence series | Supports the feature of joining a conference by one click on the screen and the feature of joining a conference by dialing a number. |

4.1.8 Unidirectional Live Broadcast Conference

A unidirectional live broadcast conference can be held on the SMC2.0. The conference is a special video conference, which allows endpoints to join the conference as audience participants.

Background

When scheduling a unidirectional live broadcast conference on the SMC2.0, the administrator can define endpoints as audience participants or common participants. Then, endpoints join the conference based on the participant types defined by the administrator.

- A common participant can receive and send audio and video.
- Audience participants are divided into unidirectional and bidirectional audience participants.
 - Unidirectional audience participant: A unidirectional audience participant can only receive audio and video. Audience participants join a conference as unidirectional audience participants by default.
 - Bidirectional audience participant: A bidirectional audience participant can receive and send audio and video.
 - During a unidirectional live broadcast conference, the administrator can switch unidirectional audience participants to bidirectional audience participants on the SMC2.0. Alternatively, a unidirectional audience participant can switch its state to bidirectional audience participant on the endpoint.

Application Scenario

In a unidirectional live broadcast conference, most audience participants only need to receive audio and video, and do not need to send audio and video. Therefore, a unidirectional live broadcast conference can reduce the resources occupied by a large-capacity conference.

If most participants only need to receive audio and video, and only a few participants need to send and receive audio and video in a large-sized conference, you are advised to set the conference type to unidirectional live broadcast conference.

4.1.9 Conference Template Predefinition

A conference template is a collection of conference settings that are stored in the SMC2.0, including the conference participants. It can be used for conference scheduling, improving conference scheduling efficiency.

The SMC2.0 supports the following types of conference templates:

- Common conference: No conference ID is specified, and participants can join the conference only after the conference administrator initiates it from the SMC2.0.
- Ad hoc conference: A conference ID is specified. The conference administrator or any participants can activate the conference by dialing the conference ID and entering the activation password.
- Multi-level conference: Multiple common conferences can be cascaded into one conference in the specified structure.

4.1.10 Conference Multi-Channel Cascading

When bandwidth or line resources are sufficient, multiple cascading channels can be set up between cascaded MCUs so that multiple media streams can be transmitted simultaneously between the MCUs, implementing conference continuous presence.

Two MCUs can be cascaded through a single H.323 channel, multiple H.323 channels, a single SIP channel, or multiple flexible SIP channels. The actually used channel type is determined by the cascading type and conference settings.

Table 4-4 Support for cascading channels

| MCU Type | Single H.323 Channel | Multiple H.323 Channels | Single SIP Channel | Multiple Flexible SIP Channels |
|--|----------------------|-------------------------|--------------------|--------------------------------|
| VP9600 series MCU (V500R002C10) | Supported | Supported | Unsupported | Unsupported |
| VP9600 series MCU (V600R019C10) with intermixed media boards | Supported | Supported | Unsupported | Unsupported |

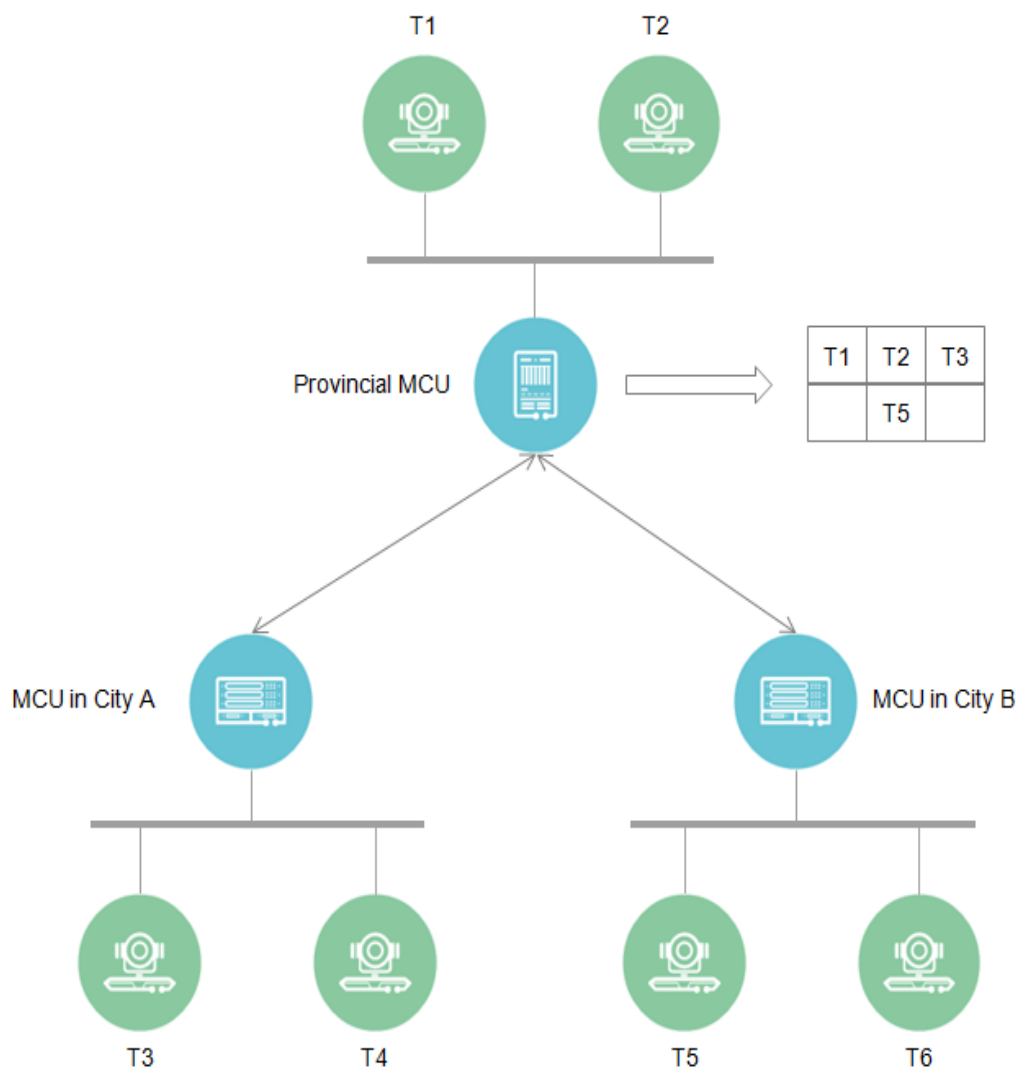
| MCU Type | Single H.323 Channel | Multiple H.323 Channels | Single SIP Channel | Multiple Flexible SIP Channels |
|---|----------------------|-------------------------|--------------------|--------------------------------|
| VP9600 series MCU (V600R019C10) with no media boards intermixed | Supported | Supported | Supported | Supported |
| VP9800 series MCU | Supported | Supported | Supported | Supported |
| CloudMCU | Supported | Supported | Supported | Supported |

H.323 Multi-Channel Cascading

Bank M sets up the video conferencing system shown in [Figure 4-3](#). A VP9000 series MCU is deployed as the provincial MCU. Cities A and B each have a VP9000 series MCU deployed. Because only one cascading channel can be set up between the provincial MCU and MCU in city A, the latter can only transmit one channel of video to the former. The following problems therefore arise:

- The provincial MCU cannot add videos of T3 and T4 (or T5 and T6) simultaneously into continuous presence.
- The two participants on the provincial MCU cannot view multiple participants on a city-level MCU simultaneously. For example, T2 cannot view T4 while T1 is viewing T3.
- The two participants on a city-level MCU cannot view multiple participants on the provincial MCU simultaneously. For example, T6 cannot view T2 while T5 is viewing T1.

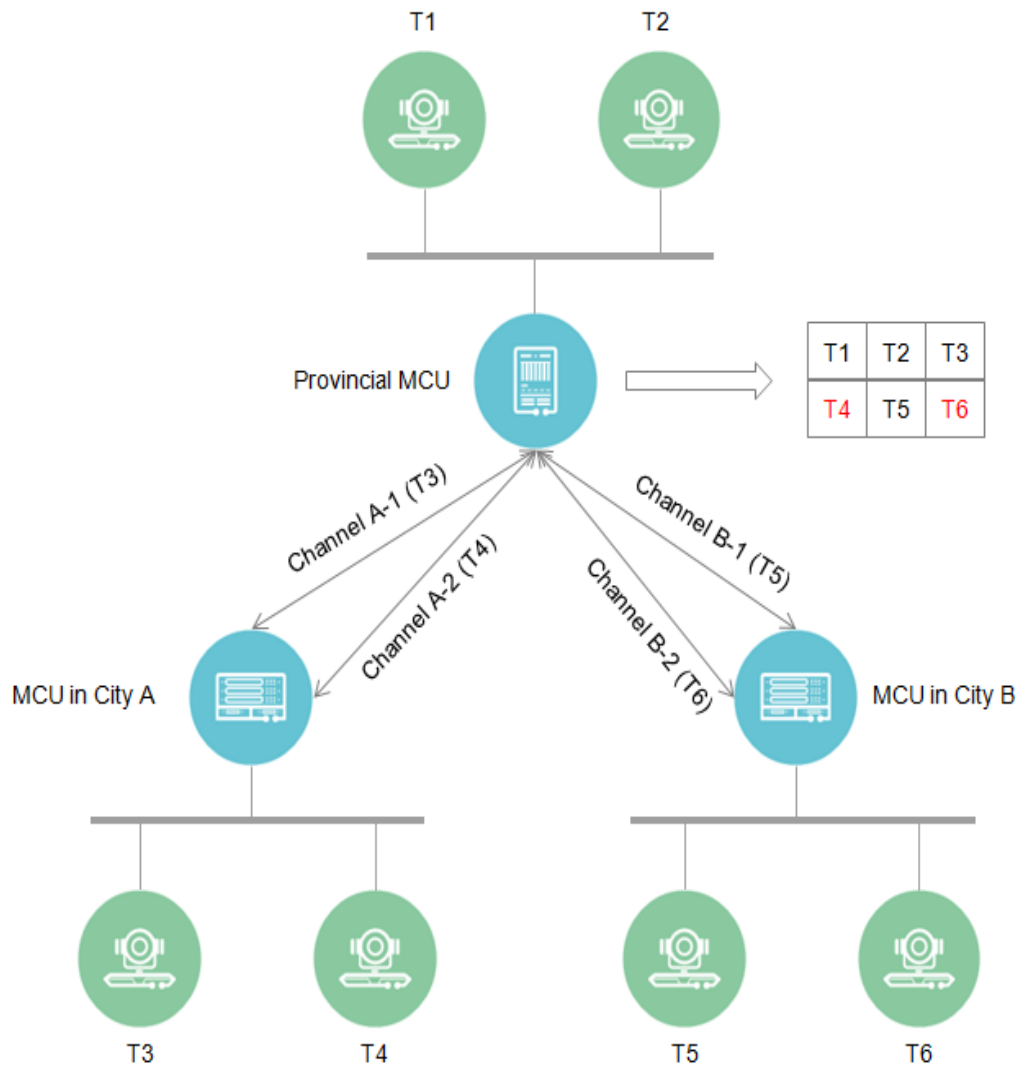
Figure 4-3 H.323 single-channel cascading between VP9000 series MCUs



To address the preceding problems, Huawei introduces the H.323 multi-channel cascading technology.

After a conference is scheduled successfully, MCUs set up multiple cascading channels based on the multi-channel information delivered by the service management system. These cascading channels are used for transmitting multiple streams between upper-level and lower-level MCUs. In the scenario shown in [Figure 4-3](#), videos of T3, T4, T5, and T6 can be added to continuous presence, as shown in [Figure 4-4](#).

Figure 4-4 H.323 multi-channel cascading between VP9000 series MCUs

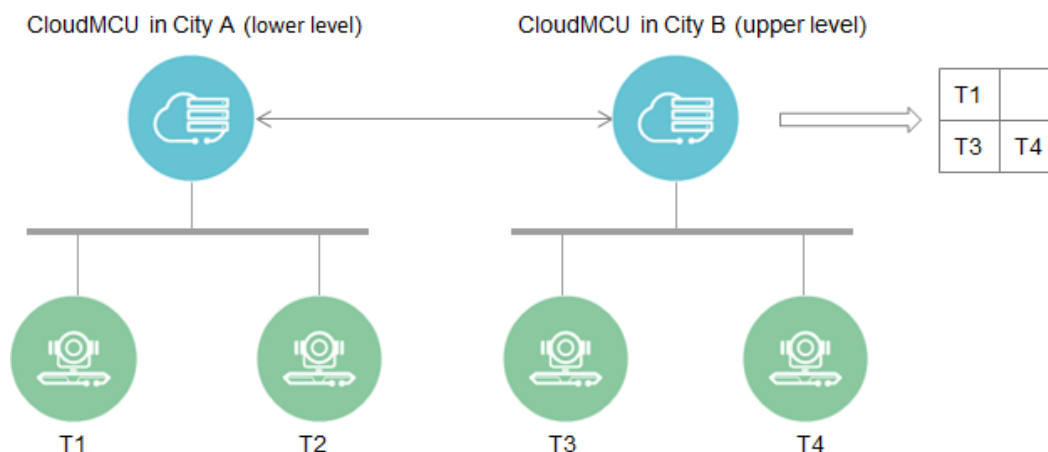


SIP Flexible Multi-Channel Cascading

Bank C sets up the video conferencing system shown in [Figure 4-5](#). Cities A and B each have a CloudMCU deployed. The CloudMCU in city A is of the lower level, and the CloudMCU in city B is of the upper level. Because only one cascading channel can be set up between the CloudMCUs in cities A and B, the latter can only transmit one channel of video to the former. The following problems therefore arise:

- The CloudMCU in city B cannot add videos of T1 and T2 simultaneously into continuous presence.
- The two participants on CloudMCU B cannot view multiple participants on the lower-level CloudMCU in city A simultaneously. For example, T4 cannot view T2 while T3 is viewing T1.
- The two participants on the CloudMCU in city A cannot view multiple participants on the upper-level CloudMCU in city B simultaneously. For example, T2 cannot view T4 while T1 is viewing T3.

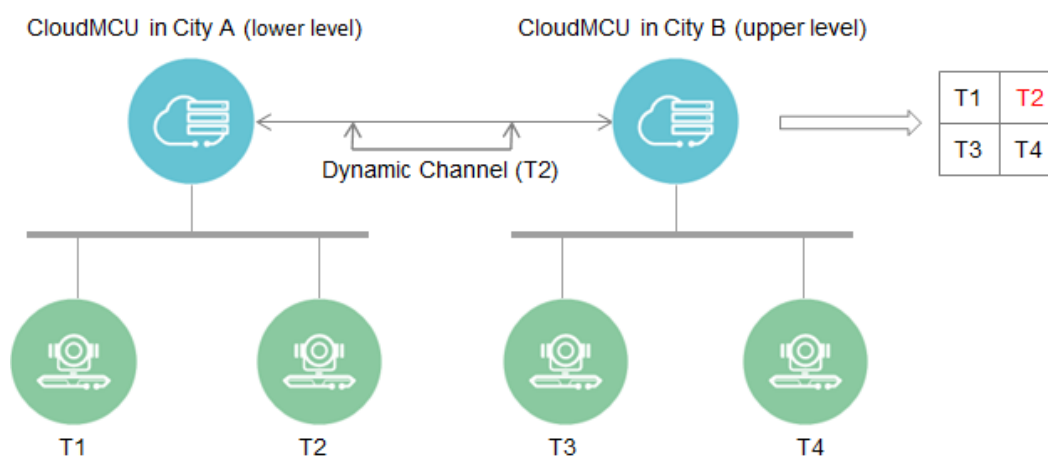
Figure 4-5 SIP single-channel cascading between CloudMCUs



To address the preceding problems, Huawei introduces the SIP flexible multi-channel cascading technology.

In fact, flexible multi-channel cascading uses only one channel. The MCU dynamically applies for channel resources as required, and the resources are borne in the existing channel. In the scenario shown in [Figure 4-5](#), videos of T1 and T2 can be added to continuous presence, as shown in [Figure 4-6](#).

Figure 4-6 SIP flexible multi-channel cascading between CloudMCUs



4.1.11 VDC-based Visualized Dispatching

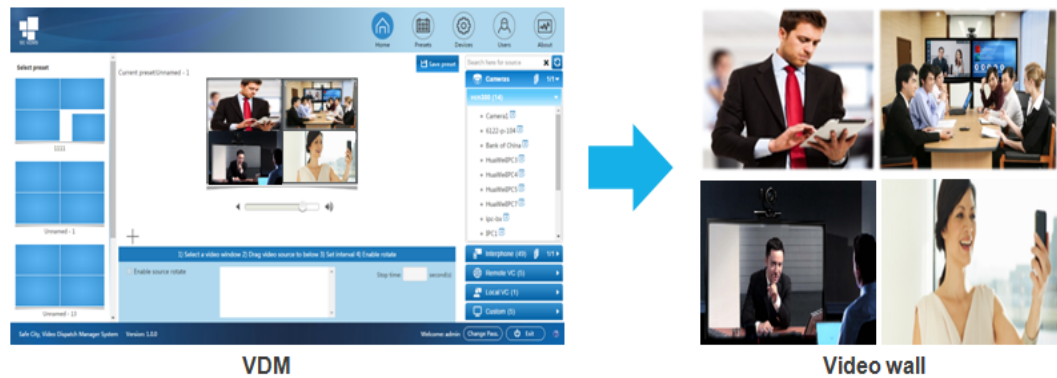
The video conferencing solution adopts the Visual Dispatch Console (VDC) to implement unified video push to the video wall, multi-level cascading, as well as video conferencing and surveillance convergence, enabling rich industry applications.

Unified Video Push to the Video Wall

A video wall, an image and text display system, is an ultra-large screen consisting of multiple display units. It well meets customers' video viewing demand. In the

public safety and emergency response sectors, mission-critical data and video need to be displayed on the video wall to facilitate command and dispatch. With the VDC-D, you are able to integrate and distribute video information from different sources in a visualized manner, and efficiently controls and displays the information on the video wall using a custom manner.

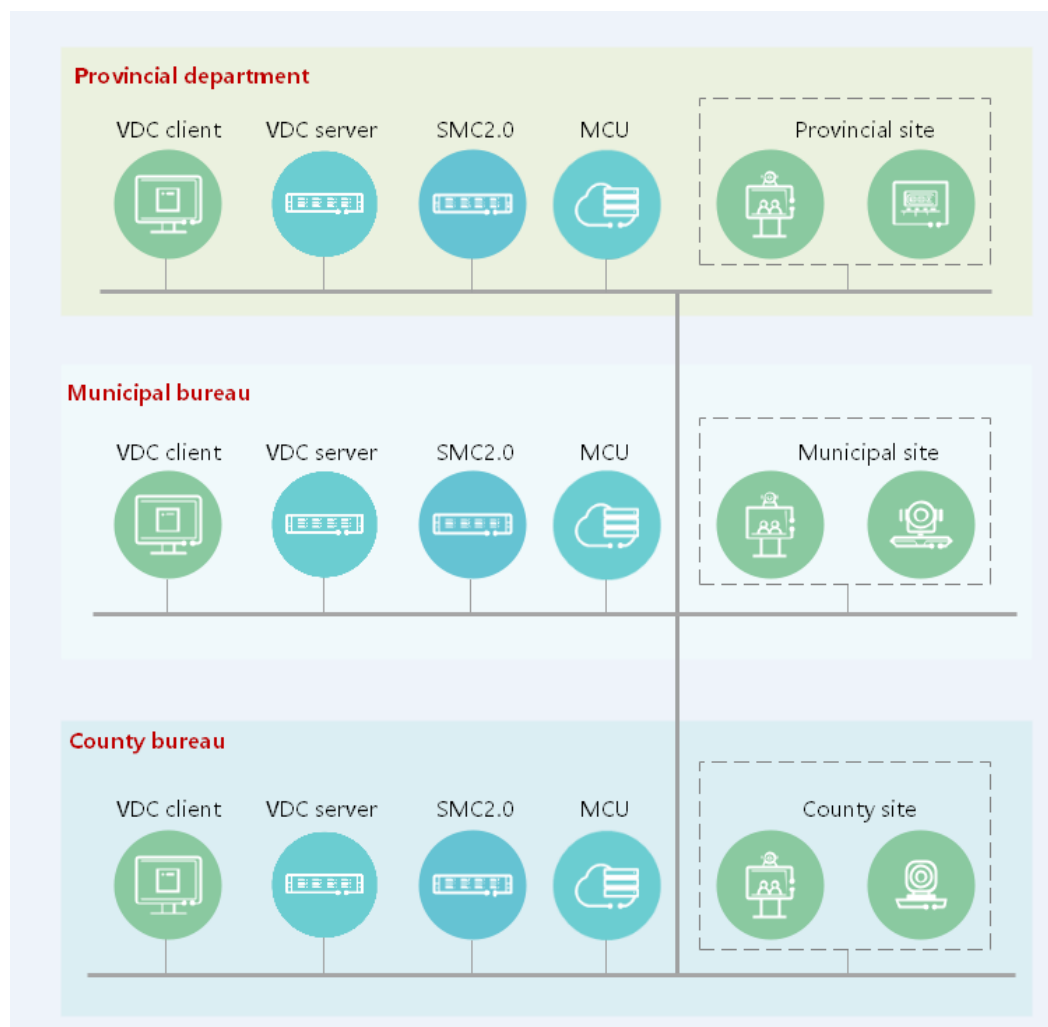
Figure 4-7 Unified video push to the video wall



Multi-level Cascading

The multi-level cascading service component of the VDC server can be used to implement multi-level cascading of the SMC2.0. Up to three levels of cascaded conferences, conference control, and conference monitoring are supported.

Figure 4-8 Multi-level VDC cascading

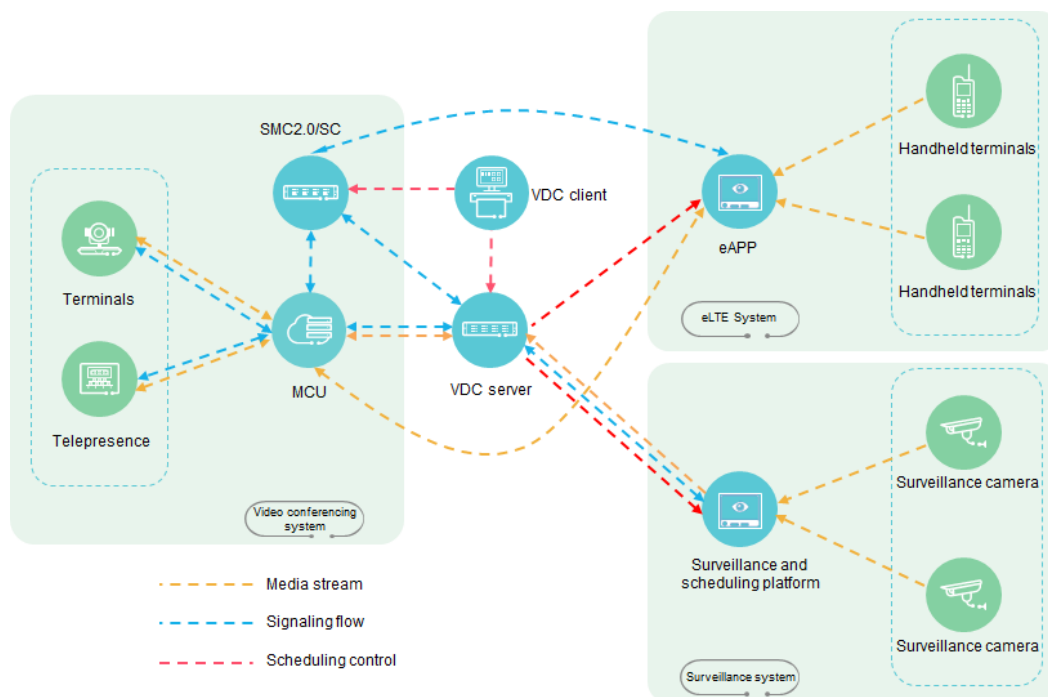


Video Conferencing and Surveillance Convergence

The VDC visual dispatching solution interconnects with the video conference system and surveillance scheduling platform (that is IVS and eLTE). In a video conference, you can dispatches, previews, and distributes surveillance videos using the VSD, implementing the integration of video conferencing and video surveillance.

VDC servers have the convergent gateway selection feature, to implement the conversion between the monitoring stream (PS) and conference stream (ES), and between the monitoring protocol (GB/T 28181) and communications protocol (SIP call). Up to 300,000 cameras and 400 Mbit/s media forwarding traffic are supported.

Figure 4-9 Video conferencing and surveillance convergence



4.1.12 AI Services

The video conferencing solution applies AI technologies in the conference system to provide capabilities such as voice recognition and facial recognition, improving conference experience and work efficiency.

AI services are mainly implemented through the Bar 500, Board, Box 500/700/900, and RoomPresence 65T.

- Voice commands: supported only by the Bar 500, Board, Box 300/500/600/700/900, and RoomPresence series.
- Facial recognition sign-in and on-screen name tag: supported only by the Bar 500, Board, Box 500/700/900, and RoomPresence 65T.

Voice Commands

You can say "Hey, Scotty" to the connected microphone to wake up "Scotty", the intelligent voice assistant, and then operate the endpoint using voice commands.

For example, after the intelligent voice assistant on HUAWEI Board wakes up, you will see the screen shown in [Figure 4-10](#).

Figure 4-10 Intelligent voice assistant wakes up



You can then perform the following operations using voice commands:

- Initiating or canceling a call
- Creating a conference
- Joining a scheduled conference
- Extending a conference
- Adding participants to a conference
- Viewing participants or continuous presence
- Sharing or stopping content sharing over a cable
- Opening the whiteboard
- Adjusting the speaker volume at your site
- Muting or unmuting the microphones of other sites
- Starting intelligent diagnostics

Facial Recognition Sign-In

In a conference that requires sign-in, the endpoint can automatically record sign-in information of users through facial recognition.

When scheduling a conference on the SMC, a user can specify whether the conference requires sign-in. If the user selects sign-in, sign-in is required in the conference. When participants arrive at the conference site at the sign-in time, use an endpoint to recognize participants' face information for sign-in. The user can view face sign-in details on the endpoint screen. After the conference ends, the SMC will send the conference sign-in result to the user's email box.

Figure 4-11 Facial recognition sign-in



On-Screen Name Tag

After the facial recognition function is enabled, the endpoint performs face detection in tracking mode during a conference. When a new face is detected and correctly matched on the facial recognition server, the server returns a name accordingly and adds the name tag to the face image. In this way, participants can view each other's name tag so that they can know each other.

Figure 4-12 On-screen name tag



4.2 Conference Control

4.2.1 Rich Conference Control Functions

Users can search conferences and view conference details. For active conferences, the SMC2.0 provides various conference controls.

Table 4-5 lists the available conference controls.

Table 4-5 Conference control functions on the SMC2.0

| Type | Operation |
|---------------------------------|---|
| Participant | Adding/Creating/Deleting a participant, setting advanced parameters, and adding cascaded participants |
| | Call, hang up, and call all |
| | Viewing anonymous participants, participant details, capabilities, network data, snapshots, and automatically cascaded participants |
| | Voice activation |
| | Setting/Canceling the participant sequence, starting/stopping participant captions, and configuring two-stage dialing |
| | Active and standby participant switchover |
| | Moving a participant |
| | Isolating a participant |
| Speaker, microphone, and volume | Turning on/off specific or all speakers |
| | Turning on/off specific or all microphones |
| | Discussion |
| Audio, video, and camera | Adjusting MCU audio mixing volume, adjusting the camera |
| | Displaying/Hiding local video, locking/unlock video sources |
| Content stream (presentation) | Sending/Stop sending content streams |
| | Locking/Unlocking conference/participant content streams |
| | Revoking presentation token |
| Broadcast | Enabling/Canceling participant broadcast |
| | Setting/Canceling scheduled broadcasting, starting/pausing scheduled broadcasting |
| Continuous presence | Customizing continuous presence |
| | Setting continuous presence and broadcasting in turn |
| | Enabling/Canceling continuous presence |

| Type | Operation |
|-----------------|---|
| | Starting/Pausing/Canceling broadcasting in turn for continuous presence |
| Chair | Setting/Canceling the chair |
| | Giving floor, notification before giving floor |
| | Viewing a participant exclusively |
| | Setting/Starting/Pausing/Canceling broadcasting in turn for the chair |
| Meeting | Setting conference live broadcast and recording |
| | Extending/Ending a conference |
| | Merging/Splitting conferences |
| | Locking/Unlocking a conference |
| Custom settings | Sending SMS messages to selected or all participants |
| | Setting/Stopping a conference banner |
| | Setting/Stopping a conference caption |

4.2.2 Preset Conference Functions

The SMC2.0 allows users to preset conference functions before a conference starts so those functions can be used during the conference.

Table 4-6 lists the preset functions that the SMC2.0 supports.

Table 4-6 Preset functions

| Preset Function | Description |
|---|---|
| Presetting Continuous Presence | Continuous presence indicates the combination of panes of multiple conference participants. This enables each participant to view multiple participants at the same time. |
| Presetting Broadcasting in Turn for Continuous Presence | After you broadcast participants in turn for continuous presence, selected participants are broadcast in selected panes at the specified intervals. |
| Presetting Scheduled Broadcasting | After you set scheduled broadcasting, selected participants are broadcast in the specified sequence and at the specified intervals. |

| Preset Function | Description |
|-------------------------------------|---|
| Presetting Broadcasting in Turn | After you set broadcasting in turn, the chair participant views the selected participants in turn at specified intervals. |
| Presetting Locked Video Sources | If you lock the video source for a participant, no conference controls except View Participant will affect the video source of the participant. |
| Presetting the Participant Sequence | The participant sequence is the order in which participants are placed in the participant list. You can adjust the participant sequence so that important participants are placed at the top of the participant list. |
| Setting a Conference Banner | A conference banner is displayed at the top of participants' screens. |
| Presetting a Conference Caption | A conference caption is displayed on the screens of participants. You can set the display position and effects on the participant endpoints. |
| Preset Remote SMC Administrator | After a remote SMC administrator is preset, the administrator can approve conference scheduling requests when the corresponding remote SMC receives the requests. |

4.3 Device Management

4.3.1 Various Devices

The SMC2.0 allows connections from various devices and provides a web interface for managing and maintaining those devices.

On the SMC2.0, devices are classified into manageable and unmanageable devices:

- Manageable devices: These devices support online configuration, online update, device alarm viewing, backup, and configuration restoration.
- Unmanageable devices: These devices are resources for conference scheduling but do not support online configuration, online update, device alarm viewing, backup, or configuration restoration.

 **NOTE**

- Adding manageable devices: After a static IP address and trap address are set on a device, search for the IP address of the device on the SMC2.0. The device can then be added to the SMC2.0 using a configuration template or by setting device parameters.
- Adding unmanageable devices: Add devices to the SMC2.0 in unmanageable mode.

Multiple Participant Endpoint Models

The SMC2.0 supports SIP and H.323 participants. [Table 4-7](#) lists the models of participant endpoints that can be added to the SMC2.0.

Table 4-7 Participant endpoint models and versions

| Categories | Model |
|--|--------------------------------|
| Lists of devices supported by manageable or non manageable add | TE10/TE20 |
| | TE30/TE40/TE50/TE60/TX50/DP300 |
| | Bar/Board/Box series |
| | RP100/200 |
| | RoomPresence series |
| Lists of devices supported only by non manageable add | TE Desktop&Mobile |
| | IP Phone eSpace 8950 |
| | TP3106/TP3206 |
| | IWB |

 **NOTE**

The **RP100/RP200** telepresence systems and **RoomPresence series** can only be regarded as HD video conferencing endpoints when they are added to the SMC2.0 as manageable devices.

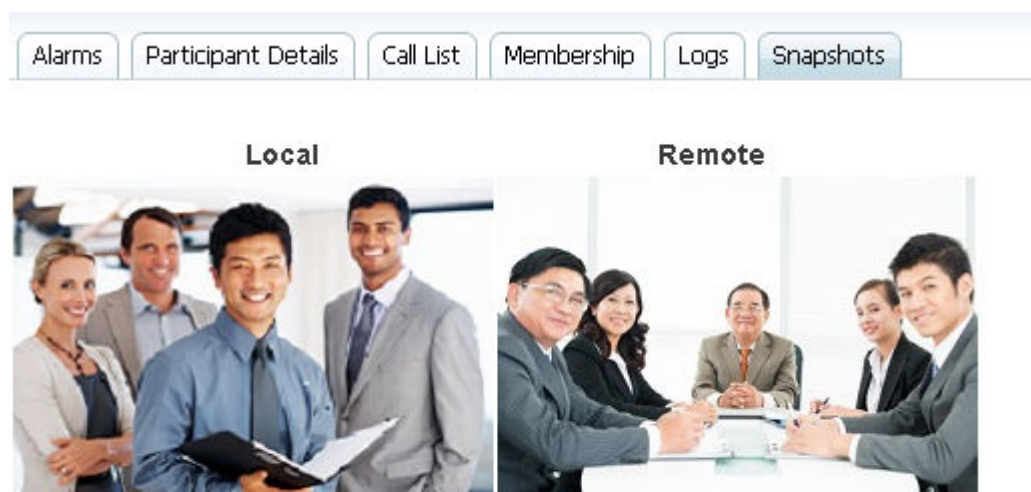
On the SMC2.0, users can view the call information about manageable participants, control their call bandwidth and protocol, and end the current calls for the participants.

Figure 4-13 Call list

| Alarms Participant Details Call List Membership Logs Snapshots | | | | | | | |
|---|-----------|---------------|-------------|-----------|-----------|-----------------------|------------|
| | | | | | | Call | Disconnect |
| Name | Number | Call Protocol | Rate | Call Type | Call Mode | Start Time | |
| 022910023 | 022910023 | H.323 | 1920 kbit/s | Received | - | 1/31/2013 11:49:16 PM | |
| 022910008 | 022910008 | H.323 | 512 kbit/s | Received | - | 1/31/2013 9:56:25 PM | |
| 022910008 | 022910008 | H.323 | 512 kbit/s | Received | - | 1/31/2013 9:55:58 PM | |
| 022910007 | 022910007 | H.323 | 768 kbit/s | Received | - | 1/31/2013 9:52:04 PM | |
| 022910006 | 022910006 | H.323 | 1152 kbit/s | Received | - | 1/31/2013 9:50:10 PM | |
| 022910005 | 022910005 | H.323 | 1920 kbit/s | Received | - | 1/31/2013 9:47:59 PM | |
| 022910001 | 022910001 | H.323 | 1920 kbit/s | Received | - | 1/31/2013 9:20:13 PM | |
| 022910001 | 022910001 | H.323 | 1920 kbit/s | Received | - | 1/31/2013 9:19:46 PM | |
| 075510031 | 075510031 | H.323 | 1920 kbit/s | Received | - | 1/31/2013 8:05:52 PM | |
| 022910022 | 022910022 | H.323 | 512 kbit/s | Received | - | 1/30/2013 8:13:09 AM | |
| 022910022 | 022910022 | H.323 | 512 kbit/s | Missed | - | 1/30/2013 8:13:01 AM | |
| 022910022 | 022910022 | H.323 | 512 kbit/s | Received | - | 1/30/2013 8:12:38 AM | |
| 022910021 | 022910021 | H.323 | 512 kbit/s | Received | - | 1/30/2013 8:12:12 AM | |
| 022910021 | 022910021 | H.323 | 512 kbit/s | Received | - | 1/30/2013 8:11:47 AM | |

The SMC2.0 web interface displays the local and remote screenshots of manageable participants in a conference.

Figure 4-14 Screenshots



Multiple MCU Models

Table 4-8 lists the models of MCUs that can be added to the SMC2.0.

Table 4-8 MCU models and versions

| Manageable or Not | Model |
|-------------------|----------------------------|
| Manageable | CloudMCU/VP9800 series MCU |

| Manageable or Not | Model |
|-------------------|---|
| | HUAWEI VP9660/VP9650/VP9630 |
| Unmanageable | All MCUs can be added to the SMC2.0 as unmanageable MCUs. |

4.3.2 Comprehensive SC Management Mechanism

From the SMC2.0 web interface, Switch Centers (SCs) can be configured, monitored, and maintained intuitively.

SCs come in two forms:

- Embedded SC: This type of SC is integrated into the SMC2.0 and provides media switching and network control.
- Standalone SC: This type of SC independently runs in Euler Linux and provides media switching and network control.

Users can find the following information about SCs on the SMC2.0: logs, alarms, zones, member rules, number conversion rules, search rules, network address books, bandwidth management, and route control. Users can also modify SC settings on the SMC2.0.

4.3.2.1 Zone Management

A zone is a geographically or virtually defined unit. Switch Center (SC) services are implemented by zone.

Background

Zones are divided into local zones and neighboring zones.

- Local zone: a zone that is created to restrict communication between nodes (including endpoints, MCUs, and gateways) registered with the local SC.
- Neighboring zone: a zone that is created to restrict communication between nodes (including endpoints, MCUs, and gateways) registered with a remote SC.

Zone Division

After zone division is implemented, the following video conferencing services can be managed by zone: node registration, node calling, bandwidth allocation, and call bandwidth control. [Figure 4-15](#) shows a zone division example.

Figure 4-15 Zone division

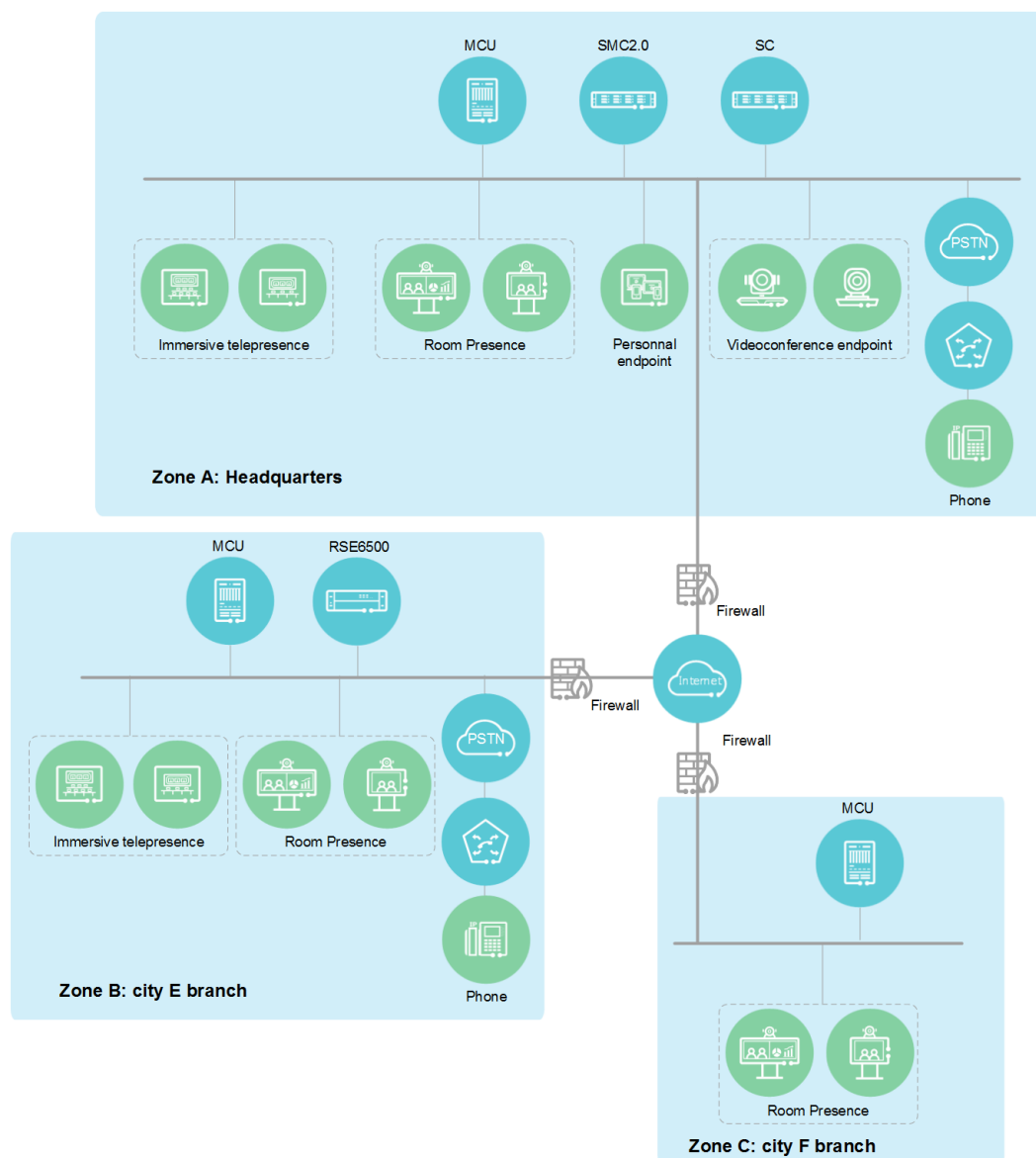


Table 4-9 describes the zone division example.

Table 4-9 Zone division description

| Zone | Prefix |
|--------|--------|
| Zone A | 0755 |
| Zone B | 0512 |
| Zone C | 025 |

NOTE

A zone prefix is similar to a zone ID. The SMC2.0 finds the corresponding zone for registration and calling services based on zone prefixes.

Zone Member Rules

A member rule is used to define criteria for matching a zone. Available matching modes are:

- Prefix
- Suffix
- Address
- Regular expression

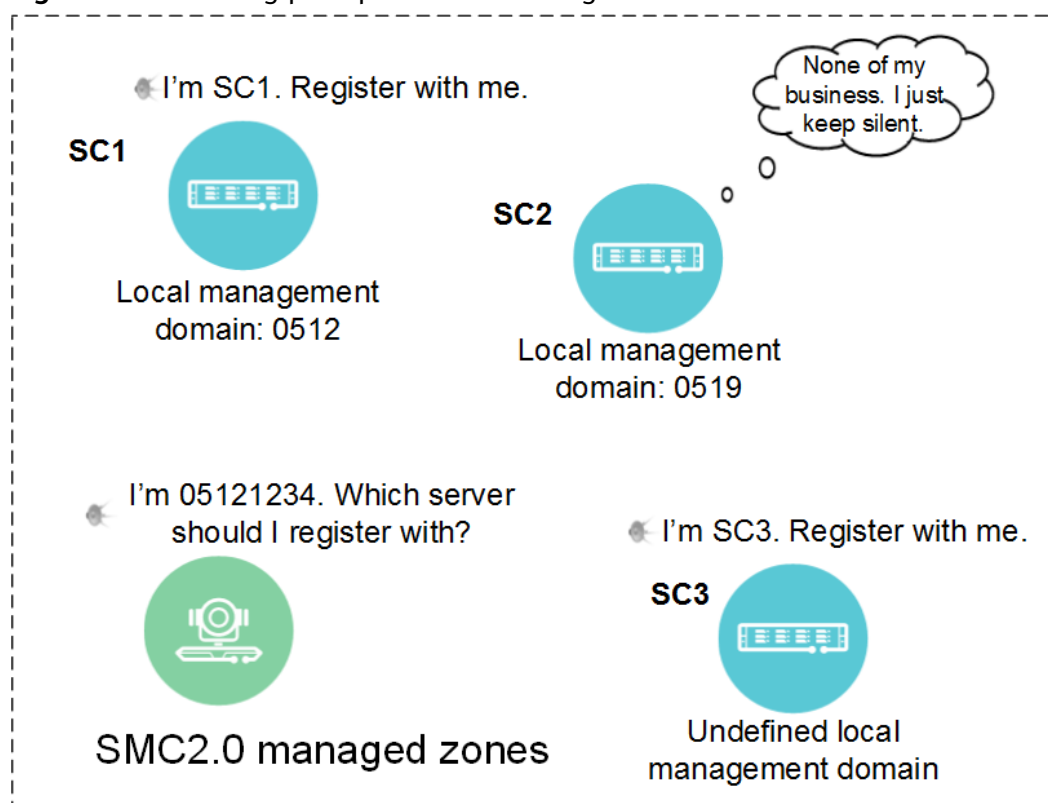
4.3.2.2 Registration Control

You can define local management domains, blacklist and whitelist to realize registration control and management.

Local Management Domains

When the SMC2.0 manages multiple SCs, the administrator may not be able to determine the SC with which each device must register. If the administrator adds local management domains for SCs, the SMC2.0 will match a device with a management domain based on the device's alias and determine the SC with which each device must register. [Figure 4-12](#) shows the working principle of local management domains.

Figure 4-16 Working principle of local management domains



- If no local management domain is defined for an SC, this SC allows registrations from all devices.
- After a local management domain is defined for an SC, this SC allows registrations from only devices covered by the domain. Multiple local management domains can be defined for one SC.

Blacklist And Whitelist

- When SC registration jurisdiction control for white list, then in any login request alias has one to satisfy the white list the scope, SC accepts this login request. Other dissatisfied white list scope login request will be rejected.
- When SC registration jurisdiction control for blacklist, then in any login request alias has one to satisfy the blacklist the scope, SC rejects this login request. Other dissatisfied blacklist scope login request will be accepted.

4.3.2.3 Call Control

Switch Centers (SCs) controls calls based on number conversion and search rules.

Background

An SC performs the following steps to control calls:

1. With the number conversion and search rules, the SC finds the zone where the called party is located.
2. The SC determines the restricted applications based on the location information of the calling and called parties.

Number Conversion

With a number conversion rule, the SMC2.0 converts numbers that match the specified aliases based on that rule, facilitating number searching.

Search Rule

A search rule helps an SC identify the zone to which a called party belongs.

4.3.2.4 Bandwidth Management

You can configure the inter-zone bandwidth to limit the bandwidth between two zones, achieving flexible call bandwidth management.

The inter-zone bandwidth management rule is used to limit the single call and total call bandwidth between any two zones of the SC. When devices in two zones configured with an inter-zone bandwidth management rule call each other, the SC checks the call, and disconnects the call that exceeds the specified bandwidth limit.

NOTE

The embedded SC and standalone SC support a maximum of 200 and 1000 bandwidth management rules respectively.

Different bandwidth management rules between different zones make differentiated call management possible.

Table 4-10 Example bandwidth

| Zone | Device Quantity | Bandwidth (Mbit/s) |
|------|-----------------|--------------------|
| A | 30 | 100 |
| B | 28 | 100 |
| C | 5 | 50 |

According to [Table 4-6](#):

- Zones A and B support a high bandwidth but contain many devices. You can set the total bandwidth between zone A and zone B to 100 Mbit/s, and set the single call bandwidth to 5 Mbit/s. This prevents the failure to set up calls due to the excessive bandwidth usage of a single call.
- Zone C supports a low bandwidth and contains few devices. You must set the total bandwidth between zone A and zone C to 50 Mbit/s. The single call bandwidth can be set to 10 Mbit/s.

4.3.2.5 Route Restriction

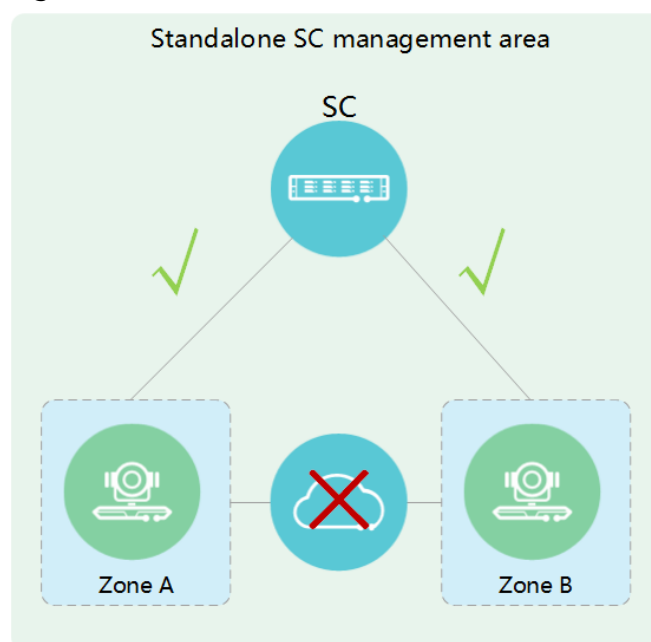
The media route function enables the SC to forward media (video and audio) data between two nodes that cannot exchange data.

If two nodes registering with the same SC belong to two different zones and the two zones cannot exchange data with each other due to network disconnection or firewall isolation, you can configure the media route between the two zones so that the SC can forward media data for them, as shown in [Figure 4-13](#).

NOTE

- The embedded SC supports a maximum of 60 Mbit/s media route bandwidth.
- The standalone SC supports a maximum of 400 Mbit/s media route bandwidth.

Figure 4-17 Route Restriction



4.3.3 Corporate Directory

After CloudUSM-EUA (USM-EUA for short) server is deployed. When a conference is being held on the SMC2.0, participants in the corporate directory can be directly selected to join the conference.

The USM-EUA uses the Lightweight Directory Access Protocol (LDAP) to provide address book services. The USM-EUA server is co-installed with the SC or SMC2.0 and is managed by the SMC2.0.

The SMC2.0 can synchronize the following information from the corporate directory:

- User information: information that is generated when a user is added, deleted, or modified or when a user's relationship is modified
- Organization information: information that is generated when an organization is added, deleted, or modified
- Participant information: information that is generated when a participant is added or deleted, when the relationship of a participant is modified, or when participant parameters (participant number, participant URI, IP address, participant name, or protocol) are modified
- Ad hoc conference information: information that is generated when an ad hoc conference is added or deleted or when parameters (conference access number or conference name) of an ad hoc conference are modified

4.3.4 Unified Resource Scheduling

The SMC2.0 manages MCUs as resources and provides different scheduling policies for them.

MCU Scheduling

The following types of MCUs can be added to the SMC2.0 for management:

- CloudMCU/VP9800 series MCUs: conference server in the form of software. It integrates voice, video, and data functions, and supports virtualized and cloud-based deployment. The CloudMCU/VP9800 series MCUs supports Scalable Video Coding (SVC). The CloudMCU/VP9800 series MCUs forwards video streams from a single participant in multiple resolutions. When receiving the video streams in different resolutions, an endpoint combines the streams and displays them in a continuous presence layout as required. In this process, the CloudMCU/VP9800 series MCUs does not need to provide encoding and decoding resources to transcode the streams.
- VP9600 series MCUs (V500R002C10): universal transcoding MCUs. The VP9600 series MCUs are added to the SMC2.0 by default. A universal transcoding MCU allows endpoints to join a conference with any protocol, format, or bandwidth. Their port resources can be flexibly allocated. You can run commands on an MCU server to convert a universal transcoding MCU to a universal transfer MCU.
- VP9600 series MCU (V600R019C10): Resources can be allocated based on conference type. The full adaption mode or forwarding mode can be used automatically.

Scheduling MCUs on the SMC2.0 on the SMC2.0 web interface, you can add, modify, or delete MCUs and view details, alarms, logs, node relationships, and usage of MCUs.

4.3.5 Device Template Predefinition

A device template is a collection of device settings that are stored in the SMC2.0. It can then be used to quickly add devices to the SMC2.0.

The SMC2.0 supports the following types of device templates:

- Participant
Parameters that can be predefined in this type of template: H.323, SIP, DNS, SNMP, time, call, and others.
- MCU
Parameters that can be predefined in this type of template: H.323, SIP, DNS, and SNMP.

4.3.6 Participant Predefinition

On the SMC2.0, users can predefine manageable participants.

Typical Scenario

Engineer A is deploying video conferencing devices for an enterprise. The SMC2.0 is available for use, but some endpoints in the enterprise have not been powered on. In this case, engineer A can predefine participants by configuring the participant endpoint settings (consistent with the endpoints not powered on). Then when the endpoints are powered on and pass the authentication by the SMC2.0, the endpoints automatically load the settings from the SMC2.0 and are added to the SMC2.0.

4.3.7 Device Auto-Detect

The SMC2.0 is able to auto-detect devices, and the administrator can add the detected devices to the SMC2.0.

Prerequisites

The trap address on the device is the SMC2.0 IP address.

Typical Scenario

The administrator wants to add a device to the SMC2.0, but forgets the device IP address. In this case, the administrator can use the SMC2.0's auto-detect function to obtain the list of devices that are connected but have not been added to the SMC2.0. The administrator can then check and modify the device information in the list and add the desired device to the SMC2.0.

Types of Devices That Can Be Auto-Detected

The SMC2.0 can auto-detect the following devices:

- Automatically detecting participants: A participant, whose trap address is set the SMC2.0's IP address, automatically sends a trap message to the SMC2.0 using Simple Network Management Protocol (SNMP). The SMC2.0 administrator can then add this participant to the SMC2.0.
- Automatically detecting MCUs: An MCU, whose trap address is set the SMC2.0's IP address, automatically sends a trap message to the SMC2.0 using SNMP. The SMC2.0 administrator can then add this MCU to the SMC2.0.

4.3.8 Batch Participant Processing

The SMC2.0 allows you to import and export unmanageable participant information to help add, modify, and delete unmanageable participants in batches.

- To add multiple unmanageable participants, download the Batch Import Template, fill in the unmanageable participant information, and upload the saved file to the SMC2.0 to import unmanageable participant information to the SMC2.0 in batches.
- If you want to modify or delete multiple unmanageable participants, export the participants. In the exported file, modify or deleted related information and upload the file to the SMC2.0 again.

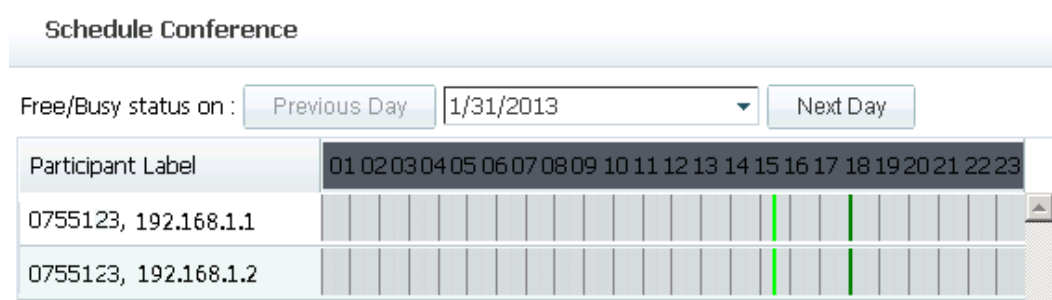
4.3.9 Real-Time Display of Device Status

On the SMC2.0, a user can check idle/busy status of participants and participant network statistics.

Viewing Participants' Idle/Busy Status

When scheduling a conference, a user can view participants' idle/busy status and select appropriate participants to join the conference accordingly.

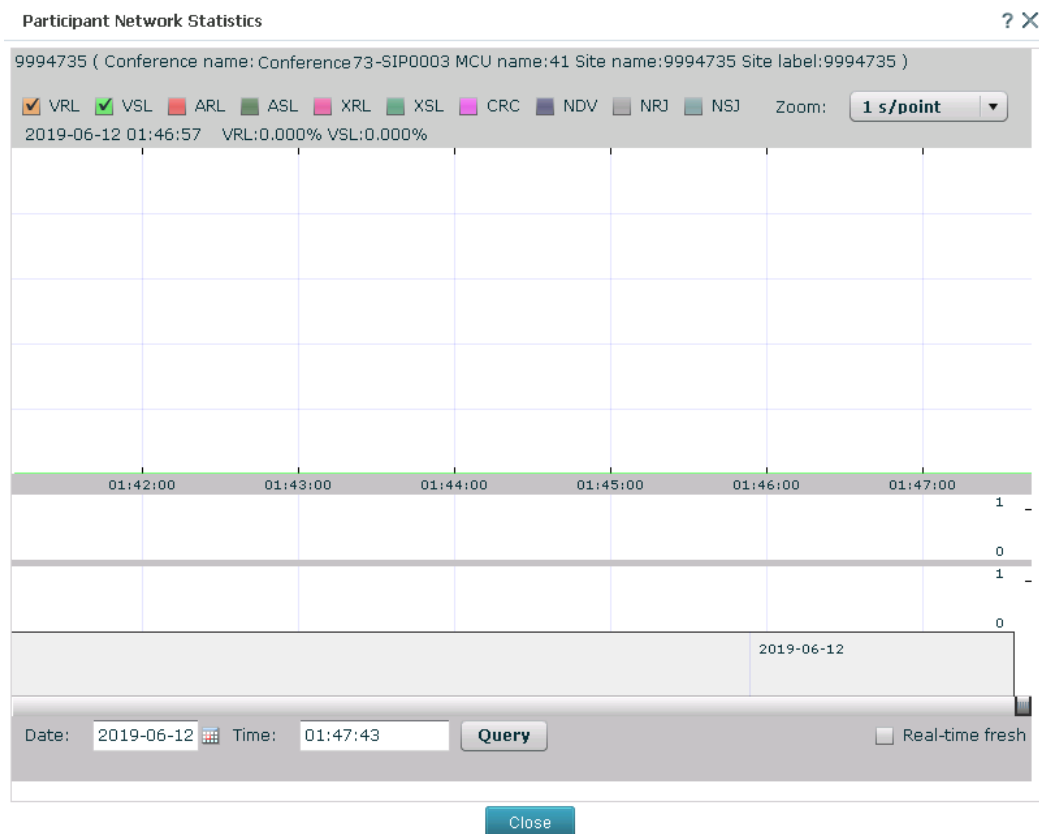
Figure 4-18 Idle/Busy status of participants



Viewing Participant Network Statistics

On the SMC2.0 web interface, view real-time network statistics of participants during conferences, as shown in [Figure 4-19](#).

Figure 4-19 Participant Network Statistics

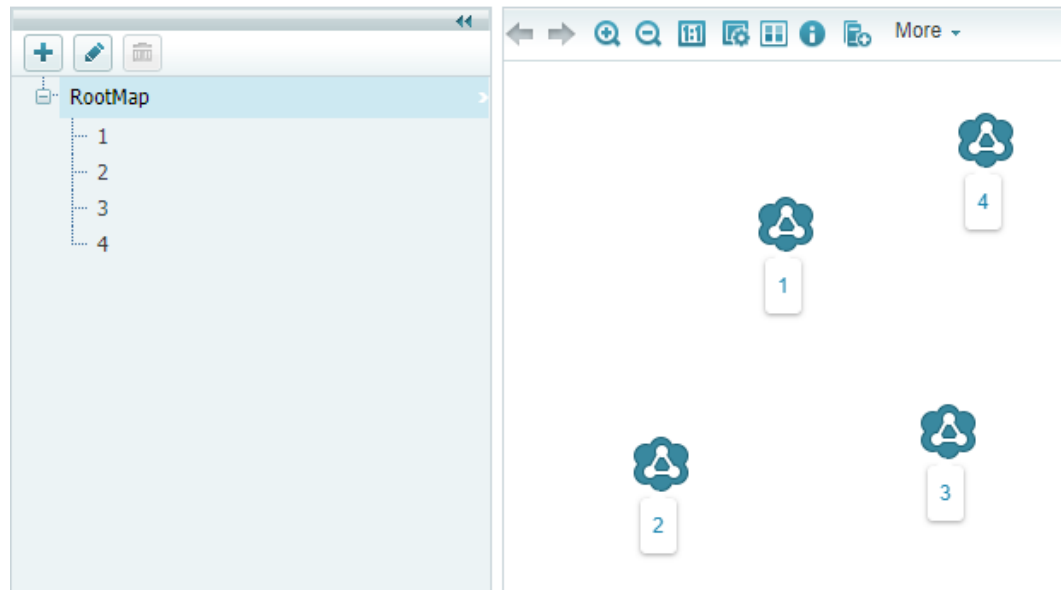


4.3.10 Intuitive Topology Management

A topology intuitively shows the location of devices on a network. Users can add and edit multi-level topologies on the SMC2.0.

For a topology, users can add, delete, modify, enlarge, and shrink a map, customize the background image, set device locations, and view alarms and call status of devices. [Figure 4-20](#) shows a topology.

Figure 4-20 Topology



- Alarm status: If a device icon is red, an alarm is generated on the device.
- Device status: Different icons are displayed to signify the device status (online, disconnected, calling, or offline).
- Device information: To view details about a device, click its name on the topology.

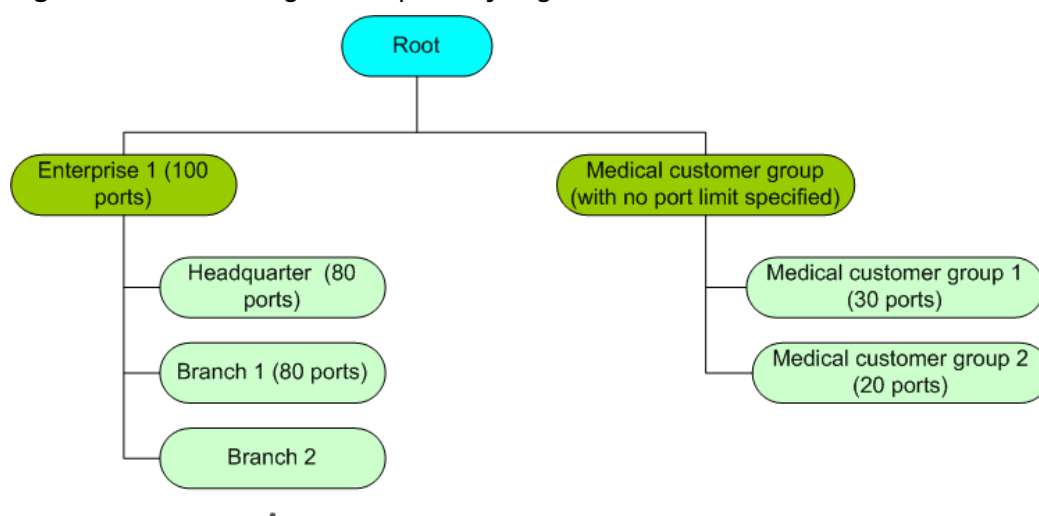
4.3.11 Allocating Virtual Ports

In an operation environment, a carrier can use the virtual port allocation function provided by the SMC2.0 to allocate devices' port resources to different enterprises to lease the ports to the enterprises.

When an MCU is used to hold a video conference, the MCU automatically allocates a port to each participant for the participant to connect to the conference. Virtual ports are a series of ports predefined on the SMC2.0, used to limit MCU resources that can be used by conferences initiated from each organization.

Figure 4-21 shows how virtual ports are allocated by organization. If the virtual port quantity is configured for an organization, the number of ports used by the organization and its children organizations cannot exceed this value.

Figure 4-21 Allocating virtual ports by organization



Description:

1. Enterprise 1 (100 ports)
 - The number of ports concurrently used by enterprise 1 and its children organizations cannot exceed 100.
 - The number of ports used by enterprise 1's headquarter and branch 1 cannot exceed 80, respectively.
 - The number of ports used by branch 2 cannot exceed 100.
2. Medical customer group (with no port limit is specified)
 - The number of ports concurrently used by the medical customer group and its children organizations is not limited.
 - The number of ports used by medical customer group 1 cannot exceed 30.
 - The number of ports used by medical customer group 2 cannot exceed 20.

4.4 Configuration Management

4.4.1 SMS and Email Notifications

The SMC2.0 can be used to send real-time notifications to users to notifying them of conference information, participant information, user information, and alarm information. The notifications can be sent through SMSs or emails.

The SMC2.0 can send the following types of information to related persons through SMSs or emails in real time:

- Conference information
 - Scheduled conference information
 - Conference modification or cancelation information
- Participant information

Participant addition or modification information about a scheduled conference

- User information
 - User information when a local user is added
 - Initial password when an administrator resets the password of a local user
- Alarm information
 - Information about alarms generated in the SMC2.0

4.4.2 Parameter Locking

The SMC2.0 allows parameters of manageable devices to be locked.

On the SMC2.0 web interface, users can modify the settings of manageable devices and lock certain parameters. The locked parameters are not editable. When settings are modified on a device, the SMC2.0 restores the locked parameter settings on the device.

Figure 4-22 Parameter locking

Register with gatekeeper :

H.323 ID : 05121234

Switch Center : None

User name : 05121234

Enable VOIP gateway :

Enable Huawei GK :

SiteCall authentication :

E.164 alias : 05121234

GK address : 192.168.1.5

Password :

VOIP gateway IP address : [Redacted]

HTTPS mode :

Registration status : Registered

4.4.3 Detailed Reports and Statistics

The SMC2.0 provides conference reports, device reports, alarm reports, return on investment (ROI) reports, and call detail record (CDR) statistics.

Basic Reports

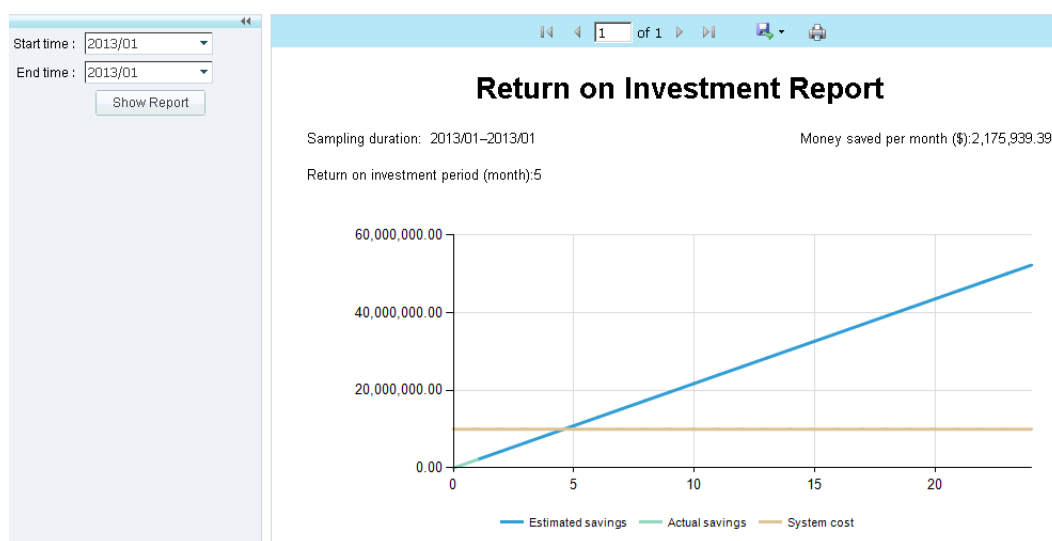
On the SMC2.0, users can set different conditions to display conferencing reports. For example, conferencing information can be displayed by scheduling source, billing code, or organization. In addition, the SMC2.0 supports reports of other types, such as device usage, alarm, and return on investment reports.

The following lists basic SMC2.0 reports:

- Conferencing reports
 - Conference statistics report
 - Statistics report based on scheduling sources
 - Statistics report based on billing codes
 - Statistics report based on organizations

- Statistics report based on conference participants
- Device reports
 - Device statistics report
 - Participant's conferencing report
 - Participant usage report
 - MCU usage report
- Alarm report
- Return on investment report

Figure 4-23 Return on investment



Exported reports can be directly printed or saved as Excel or PDF files.

CDR

When creating a conference template, you can set a billing code. After a conference ends, the SMC2.0 records conference information statistics based on the billing code and generates a call detail record (CDR) for third-party billing.

The SMC2.0 supports the following types of CDRs:

- Multipoint CDR
Includes **Conference Name, Participant Name, Endpoint Details, Device type, Calling Participant Type, Call Rate, Call Start Time, Call End Time, Call Duration, Exit Reason, Billing Code, Conference ID, and Conference Scheduler**. For details, see [Figure 4-24](#).
- Point-to-point CDR
Includes **Caller Label, Calling Protocol, Called Label, Called Protocol, Call Bandwidth, Call Start Time, Call End Time, Call Duration, and Exit Reason**. For details, see [Figure 4-25](#).

Exported CDRs can be directly opened or saved as .csv files.

Figure 4-24 Multipoint CDR

| Multipoint CDR | | | | | | | | | | | | | | | | | | | | | |
|------------------------------------|-----------|-------------|--------|-------|----------|--------------------|--------------------|--------------------|--------------------|------|------|-----|------|------|------|------|---------|------------|------------|-----------|--|
| Time frame:12/1/2017-12/31/2017 | | | | | | | | | | | | | | | | | | | | | |
| Time zone Chongqir Hong Kor Urumqi | | | | | | | | | | | | | | | | | | | | | |
| Conferenc | Particips | Endpoint | Device | Ty | Endpoint | Calling | FCall | Rate | Call | Star | Call | End | Call | Dura | Exit | Reas | Billing | CConferenc | Conference | Scheduler | |
| conferenc200.90.42200.90.42 | Ordinary | Soft | cli | SIP | 1920 | kbit | 12/30/20112/30/201 | 0:05:22 | The participant is | 8918 | wsh | | | | | | | | | | |
| conferencwsh_TE30.200.91.2 | Ordinary | Hardware | SIP | 1920 | kbit | 12/30/20112/30/201 | 0:05:21 | The participant is | 8918 | wsh | | | | | | | | | | | |
| conferenc200.90.42200.90.42 | Ordinary | Soft | cli | SIP | 1920 | kbit | 12/30/20112/30/201 | 0:05:21 | The participant is | 8918 | wsh | | | | | | | | | | |
| conferenc100010034 | 5.12E+11 | Upper-level | cascac | SIP | 1920 | kbit | 12/30/20112/30/201 | 0:05:24 | SMC ended the call | 8918 | wsh | | | | | | | | | | |
| conferenc100010035 | 5.12E+11 | Lower-level | cascac | SIP | 1920 | kbit | 12/30/20112/30/201 | 0:05:24 | The participant is | 8918 | wsh | | | | | | | | | | |
| conferenc**wsh_TE30.200.91.2 | Ordinary | Hardware | H.323 | 1920 | kbit | 12/30/20112/30/201 | 0:05:24 | The participant is | 8918 | wsh | | | | | | | | | | | |
| conferenc100010032 | 5.12E+11 | Upper-level | cascac | SIP | 1920 | kbit | 12/30/20112/30/201 | 0:00:38 | SMC ended the call | 8917 | wsh | | | | | | | | | | |
| conferenc100010031 | 5.12E+11 | Lower-level | cascac | SIP | 1920 | kbit | 12/30/20112/30/201 | 0:00:36 | The participant is | 8917 | wsh | | | | | | | | | | |
| conferenc**wsh_TE30.200.91.2 | Ordinary | Hardware | H.323 | 1920 | kbit | 12/30/20112/30/201 | 0:00:36 | The participant is | 8917 | wsh | | | | | | | | | | | |
| conferenc200.90.42200.90.42 | Ordinary | Soft | cli | H.323 | 1920 | kbit | 12/30/20112/30/201 | 0:00:35 | The participant is | 8917 | wsh | | | | | | | | | | |

Figure 4-25 Point-to-point CDR

| Point-to-Point CDR | | | | | | | | | | | | | |
|------------------------------------|----------|----------|----------|---------|----------|-----------------------------|----------|---|-----|------|------|------|--------|
| Time frame:12/1/2017-12/31/2017 | | | | | | | | | | | | | |
| Time zone Chongqir Hong Kor Urumqi | | | | | | | | | | | | | |
| Calling | LCalling | FCalling | ECalled | LCalled | PrCalled | ErCall | BancCall | StarCall | End | Call | Dura | Exit | Reason |
| 51210001 | SIP | Hardware | 51110000 | SIP | Hardware | 1920kbit/12/22/20112/22/201 | 0:02:20 | Disconnection cause: Disconnection initiated from the node. | | | | | |
| 51210024 | SIP | Hardware | 51110023 | SIP | Hardware | 1920kbit/12/22/20112/22/201 | 0:00:16 | Disconnection cause: Disconnection initiated from the node. | | | | | |
| 51210022 | SIP | Hardware | 51210021 | SIP | Hardware | 1920kbit/12/22/20112/22/201 | 0:02:37 | Disconnection response: Disconnection due to node deregistration. | | | | | |
| 51210018 | SIP | Hardware | 51110017 | SIP | Hardware | 1920kbit/12/21/20112/21/201 | 0:00:10 | Disconnection cause: Disconnection initiated from the node. | | | | | |
| 51110015 | SIP | Hardware | 51210014 | SIP | Hardware | 1920kbit/12/21/20112/21/201 | 0:06:11 | Disconnection cause: Disconnection initiated from the node. | | | | | |
| 51110013 | SIP | Hardware | 51210012 | SIP | Hardware | 1920kbit/12/21/20112/21/201 | 0:08:35 | Disconnection cause: Disconnection initiated from the node. | | | | | |
| 51110011 | SIP | Hardware | 51210010 | SIP | Hardware | 1920kbit/12/21/20112/21/201 | 0:01:31 | Disconnection cause: Disconnection initiated from the node. | | | | | |
| 51210009 | SIP | Hardware | 51210008 | SIP | Hardware | 1920kbit/12/21/20112/21/201 | 0:00:08 | Disconnection response: Disconnection due to node deregistration. | | | | | |
| 51210007 | SIP | Hardware | 51210006 | SIP | Hardware | 1920kbit/12/21/20112/21/201 | 0:01:41 | Disconnection response: Disconnection due to node deregistration. | | | | | |
| 51210005 | SIP | Hardware | 51210004 | SIP | Hardware | 1920kbit/12/21/20112/21/201 | 0:01:37 | Disconnection cause: Disconnection initiated from the node. | | | | | |

4.4.4 Flexible Permission Control

Permission on the SMC2.0 includes organization permission and user permission.

Organization Permission

The functions of the SMC2.0 are based on organizations. Each organization provides comprehensive services, including user rights, MCUs, participants, conference templates, conference scheduling, conference control, as well as statistics and reports.

- Users are managed based on organizations:
 - A user can log in to the system only after the user has been added to an organization.
 - When a user is added to multiple organizations, the user rights may vary with the organizations.
 - When the rights of a lower-level organization node are not specified, the node inherits the rights of its upper-level organization.
- Endpoints are managed based on organizations. An organization can have multiple endpoints, and an endpoint can belong to multiple organizations.
- Conferences are managed based on organizations.

User Permission

The SMC2.0 provides three default user types: system administrator, conference administrator, and conference operator. These default user types cannot be modified or deleted. Users can define user types of their own.

Users can control participants, MCUs, conference templates, and conferences at the current organizational level and below.

- System administrator:
 - Has all administrator rights, including management of devices (participants, MCUs and SCs), conferences, and system settings.

- Conference administrator:
Has administrator rights for the own organization, including management of devices (participants and MCUs) and conferences.
- Conference operator:
Has participant query and conference template operation rights for its own organization.
- Customized user type:
Has all administrator rights, including management of devices (participants, MCUs and SCs), users, organizations, conferences, third-party interfaces, and system settings.

4.4.5 SMC2.0 Floating License

The SMC2.0 centrally manages floating licenses and records the usage of license resources.

If you have applied for the SMC2.0 floating license, you do not need to apply for a fixed SC license.

The policy for using SMC2.0 floating license resources is as follows:

- If you have applied for the SMC2.0 floating license only, the SC uses the SMC2.0 floating license resources. In the SC two-node cluster scenario, the active and standby SCs share one set of SMC2.0 floating license resources.
- If you have applied for both the SC fixed license and the SMC2.0 floating license, the SC uses the local license resources first. If the local license resources are used up, the SC requests floating license resources from the SMC2.0.

5 Reliability

The SMC2.0 adopts multiple backup mechanisms so services of a network carrier are not interrupted by the failure of any single device.

The SMC2.0 adopts hierarchical backup mechanisms to achieve high reliability.

- Two-node cluster
The SMC2.0 supports two-node cluster deployment. When the active server is faulty, all services are automatically switched to the standby server without interrupting the ongoing conferences.
- SC backup
The SMC2.0 supports SC backup. When the active SC is faulty, all services are automatically switched to the standby SC to ensure reliable communications.
- Resource Pool
If an MCU fails, the SMC2.0 automatically switches services to an available MCU in the same or standby service area. This helps ensure that conferences run smoothly.
- Device configuration backup
On the SMC2.0, users can back up the current configuration of a manageable device to the server and restore the device to the backup configuration when required.
- IP Participant Backup
The SMC2.0 allows users to add backup participants. When the main participant fails to join a conference or is offline abnormally during the conference, the SMC2.0 re-calls the main participant. If the main participant still fails to join the conference, the SMC2.0 starts to call the backup participant, ensuring conference continuity.
- DR
The SMC2.0 supports geographic redundancy. Each place involved has one SMC2.0 deployed. When the SMC2.0 in a place is abnormal due to factors such as natural disasters, the SMC2.0 in another place takes over the services.
Each of the active and standby sites has an SMC2.0 deployed. The two SMC2.0s also work in active/standby mode and have heartbeat connections and data synchronizations between them. In normal cases, only the active

SMC2.0 provides conference management and device management. When the active SMC2.0 is faulty, the standby SMC2.0 takes over services.

6 Unparalleled Security

The SMC2.0 takes security measures at the application, system, network, and management layers, better securing user services.

Application Layer

At the application layer, the security solution protects SMC2.0 applications using the following measures:

- The authentication method PBKDF2, a Secure Hash Algorithm (SHA) is used to ensure the security of the user login password
- If a user enters an incorrect password for three consecutive times, a graphical verification code is required for the fourth login attempt. By default, after entering an incorrect password for ten consecutive times, the user is locked out and must be unlocked by a higher-level administrator.
- Prompts users to change their passwords after the administrator resets the passwords.
- Enforces password complexity.
- Uses PBKDF2, to encrypt passwords before saving them to the database.
- Provides HTTPS for enhanced data transmission security. The SMC2.0 uses HTTPS for functions with high security requirements. For example, HTTPS is used during password change to prevent the current and new passwords from being transmitted in plaintext.
- Provides comprehensive logging to record and track user operations.

Network Layer

- Implements security on routers and switches, helping ensure transmission security for the SMC2.0 database.
- Uses firewalls for security check, preventing the SMC2.0 from being attacked by malware.

Management Layer

The security solution at the management layer implements logging and patch installation to ensure that the SMC2.0 runs properly.

7 Openness

The SMC2.0 provides a SOAP-based third-party interface for developers to query and control the conferences on the SMC2.0.

The third-party interface of the SMC2.0 supports SOAP 1.1, SOAP 1.2, HTTP access, and HTTPS access. The interface uses the session management mode that is compatible with ASP.NET.

To use this interface, third-party developers need to purchase a license of the SMC2.0, enable the third-party interface function, and add their user accounts.

8 Operation and Maintenance

This topic describes the operation and maintenance of SMC2.0

8.1 Web Interface

The SMC2.0 supports conference scheduling and control from its web interface, and concurrent logins by 100 users.

After logging in to the web interface, a user can view the system running information, such as alarms and the CPU and memory usage rates of the SMC2.0 server. On the home page, a user can access the participant list and MCU list, process alarms, and solve system issues.

Figure 8-1 Home page

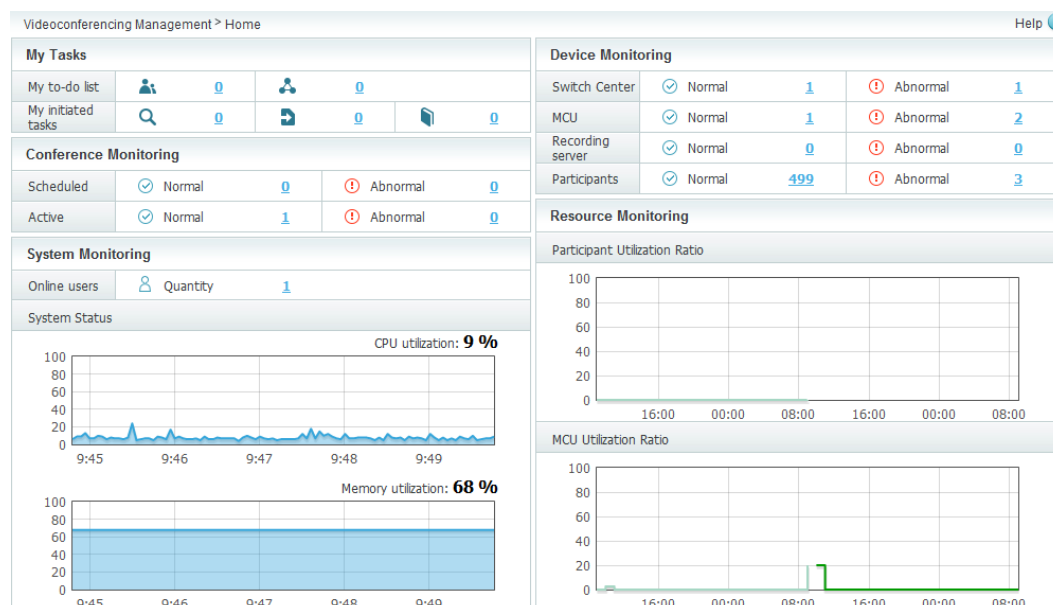


Table 8-1 lists the functions on the SMC2.0 web interface.

Table 8-1 Functions on the web interface

| Function | Description |
|-----------------------|---|
| Conference management | <p>Users can manage conferences and conference templates. They can:</p> <ul style="list-style-type: none"> ● Create a conference. ● Add, edit, and delete a conference template. ● Initiate a conference using a conference template. ● Edit or cancel a scheduled conference. ● Control an ongoing conference. ● View the conference history and save a conference as a conference template. |
| Device management | <p>Users can manage devices including participants, MCUs, SCs, corporate directory servers. They can:</p> <ul style="list-style-type: none"> ● Add, edit, and delete a device. ● Modify connection parameters. ● Manage the organizations that a device belongs to. ● Change the management mode of a device. ● Add, edit, and delete a device configuration template. ● Automatically detect devices and add them to the SMC2.0. ● Predefine participants. ● Manage device software versions and remotely upgrade devices. ● Backup and restore the configuration of a manageable device. ● Query and unregister endpoints on the GK. ● Add voice gateways to or remove gateways from the GK. ● Inspect devices. |
| Report management | <p>Users can view the reports on the SMC2.0 and export a report in a specific format.</p> |
| My tasks | <p>Users with different administrative rights can process tasks that they initiate and pending tasks for them on the My Tasks page. They can also view task progress and details as well as delete and suspend tasks. The tasks are classified into conference convening tasks, device inspection tasks, batch participant import tasks, corporate directory synchronization tasks.</p> |

| Function | Description |
|--------------------|--|
| System management | <p>Users can query or configure the SMC2.0 system settings, logs, and alarms. They can:</p> <ul style="list-style-type: none"> • Set system parameters. • Add, edit, and delete an organization. • Add, edit, and delete a user type. • Add, edit, delete, and manage the users in an organization. • View logs and alarms. |
| License management | Users can view, import, or invalidate licenses. |

8.2 Logs and Alarms

This topic describes logs and alarms on the SMC2.0 web interface.

Logs

Users can view logs on the SMC2.0 web interface. The SMC2.0 logs the following information:

System logs content includes:

- System alarms
- Web user logins and logouts
- Conference operations
- Conference scheduling operations
- Videoconference endpoints in conferences
- Device trap alarms
- Operations of adding, editing, and deleting devices

Figure 8-2 System Logs

| Time | Level | Source | Operation ID | Description |
|-----------------------|-------------|--------|--------------------------------------|---|
| 11/19/2015 8:33:38 AM | Information | admin | 30d1c36c-38f6-49ff-bcbe-86b003a4d346 | User "admin" was edited. |
| 11/19/2015 8:33:37 AM | Information | admin | ab979c37-765d-401c-8194-69739d43d7a9 | User "admin" was edited. |
| 11/19/2015 8:32:36 AM | Information | admin | 0b7a010e-ac0a-4ba7-b21a-378eaa7b58f3 | User [admin] logged in. IP address: 200.69.63.74. Login mode: WEB |
| 11/19/2015 1:00:36 AM | Information | System | | Service "IisService" was registered. |
| 11/19/2015 1:00:06 AM | Information | System | | Service "FileService" was registered. |

Debug logs content includes problem location.

Figure 8-3 Debug Logs

| Export Time | Filter Criteria | Record Name | Remarks |
|--------------------|-------------------------|---------------------------|---------|
| 2018/1/31 16:08:18 | 2018/01/01 16:08_2018/C | Smc20_Log_20180131160818. | |
| 2018/1/31 15:46:26 | 2018/01/02 15:46_2018/C | Smc20_Log_20180131154626. | |

Alarms

On the SMC2.0 web interface, users can view alarms and customize severities and notification modes for alarms in each scenario.

- Viewing alarms
 - While viewing alarms, users can acknowledge or clear ongoing alarms.

Figure 8-4 Viewing alarms

| Current alarms | | Alarm history | | Acknowledge | Clear | |
|---------------------------------|----------|---------------|----------|---------------|------------------------|-------------------|
| Name | Severity | Type | Source | Status | Time of Occurrence | Acknowledged Time |
| Connection failure. | ⚠ | Device alarm | MCU5102 | Not processed | 12/14/2015 3:54:32 PM | |
| GK registration failure. | ⚠ | Device alarm | MCU5102 | Not processed | 12/14/2015 3:54:17 PM | |
| Device offline. | ⚠ | Device alarm | eua | Not processed | 12/14/2015 2:57:37 PM | |
| GK registration failure. | ⚠ | Device alarm | site11 | Not processed | 12/14/2015 11:17:19 AM | |
| GK registration failure. | ⚠ | Device alarm | site1 | Not processed | 12/14/2015 11:17:04 AM | |
| SIP registration failure. | ⚠ | Device alarm | SIP_Site | Not processed | 12/14/2015 10:33:33 AM | |
| The SMC's license is to expire. | ⚠ | System alarm | SMC | Not processed | 12/14/2015 10:28:23 AM | |

- Setting alarms
 - The SMC2.0 has typical alarm scenarios. You can set the severity, notification methods, and alarm sound for alarms in these scenarios.

Figure 8-5 Setting alarms

| Alarm Name | Alarm type | Severity | Enable Report | Unmute |
|---------------------------|---------------|----------|---------------|--------|
| Initialization started. | VP9000 series | ⚠ | Enable Report | Unmute |
| Restart | VP9000 series | ⚠ | Enable Report | Unmute |
| CPU temperature too high. | VP9000 series | ⚠ | Enable Report | Unmute |
| E1 line disconnected. | VP9000 series | ⚠ | Enable Report | Unmute |
| Packet loss occurred. | VP9000 series | ⚠ | Enable Report | Unmute |

8.3 Device Upgrades

From the SMC2.0, users can upgrade manageable HUAWEI devices.

The following devices can be upgraded from the SMC2.0:

- VP9000 series MCUs: VP9630, VP9650, and VP9660
- CloudMCU/VP9800 series MCUs
- TE10 series/TX50/DP300 video conferencing endpoint
- ViewPoint 9600 series video conferencing endpoints
- Bar/Board/Box series video conferencing endpoints
- TP series telepresence systems
- RP100/200 video conferencing endpoints
- RoomPresence series video conferencing endpoints
- Switch Centers (SCs)

Before upgrading a device, a user needs to upload the version file to the SMC2.0. The SMC2.0 can then remotely upgrade the device. Batch upgrades are also supported.

8.4 Device Inspection

The SMC2.0 supports inspection for manageable devices.

The inspection is available to the following devices:

- SMC2.0
- SC: embedded SC and standalone SC
- MCU: VP9600 series MCUs
- Endpoint: TE series endpoints (TE10, TE20, TE30, TE40, TE50, and TE60), TX50, Bar 500, Board and Box series endpoint.

To inspect a device inspection, download the inspection template, modify the inspection items as required, upload the saved file to the SMC2.0, and start the inspect.

9 Technical Specification

This topic describes environmental specifications, performance and standards compliance of SMC2.0.

9.1 Performance and Capacity

This topic describes the performance and capacity of the SMC2.0.

[Table 9-1](#) lists the performance and capacity specifications of the SMC2.0. [Table 9-2](#) lists the performance and capacity specifications of the SC.

Table 9-1 SMC2.0 Performance and Capacity

| Specification Type | Specification | Specifications |
|--------------------|--|----------------|
| Device | Maximum number of manageable users | 5000 |
| | Maximum number of online users | 100 |
| | Maximum number of manageable SCs | 50 |
| | Maximum number of manageable MCUs | 160 |
| | Maximum number of unmanageable participants | 5000 |
| | Maximum number of manageable and unmanageable participants | 10000 |
| | Maximum number of device configuration templates | 50 |

| Specification Type | Specification | Specifications |
|--------------------|--|----------------|
| | Maximum number of upgrade packages | 30 |
| | Maximum number of devices that can be upgraded concurrently | 30 |
| Conference | Maximum number of participants in a conference | 3000 |
| | Maximum number of manageable conference templates | 1000 |
| | Maximum number of active participants | 8000 |
| | Maximum number of scheduled conferences | 10000 |
| | Maximum number of active conferences | 2000 |
| | Maximum quantity of VMR numbers allocated at a time | 8000 |
| Organization | Maximum number of organization levels | 4 |
| | Maximum number of sub-organizations allowed for an organization node | 20 |
| | Maximum number of organization nodes | 100 |
| Topology view | Maximum number of supported topology levels | 4 |
| | Maximum number of sub topologies allowed for a topology | 20 |
| | Maximum number of supported topologies | 100 |
| | Maximum number of devices allowed in a topology | 100 |

| Specification Type | Specification | Specifications |
|--|---|----------------|
| Co-installation of the USM-EUA and SC | Number of VC participants by the Standalone SC | > 1000 |
| | Number of users supported by the USM-EUA | 1000-6000 |
| | Maximum number of concurrent connections to the USM-EUA | 20 |
| Co-installation of the SMC2.0, SC, and USM-EUA | Number of VC participants by the Embedded SC | <1000 |
| | Number of users supported by the USM-EUA | 0-1000 |
| | Maximum number of concurrent connections to the USM-EUA | 10 |

Table 9-2 SC Performance and Capacity

| Specification Type | Specification | Single-node System | Two-node Tluster |
|--------------------|------------------------------------|---|------------------|
| Embedded SC | Maximum number of registered nodes | 1000 | - |
| | Maximum number of calls | 1000 | - |
| | Maximum media traversal bandwidth | 60Mbit/s | - |
| Standalone SC | Maximum number of registered nodes | 10000 | |
| | Maximum number of calls | 6000 | |
| | Maximum media traversal bandwidth | single network port: 400 Mbit/s dual network ports: 600 Mbit/s | |

 **NOTE**

The following indicators are limited by the license:

- Maximum number of manageable users
- Maximum number of manageable devices (SC, MCU, and participant)
- Maximum number of nodes that can be registered with the embedded SC (including HUAWEI software clients and non-HUAWEI software clients)
- Media traversal bandwidth

9.2 Standards and Protocols Compliance

This topic describes the standards and protocols compliance of SMC2.0.

Table 9-3 lists the standards and protocols that the SMC2.0 complies with.

Table 9-3 Standards and protocols compliance

| Item | Standard and Protocol | Involved Specifications |
|-------------------------------|-----------------------|--|
| Multimedia frame protocol | ITU-T H.323 | - |
| | IETF SIP | RFC3261 and extensions |
| Other standards and protocols | H.460 | - |
| | H.239 | - |
| | BFCP | RFC4582 |
| | TCP/IP | RFC793 |
| | FTP/FTPS | <ul style="list-style-type: none"> • RFC0959 • File Transfer Protocol (FTP) • Secure Shell Protocol (SSH) |
| | RTP | RFC3551, RFC3853, RFC3711, RFC4568 |
| | RTCP | RFC3550 |
| | HTTP | RFC1945, RFC2616, RFC2818 |
| | HTTPS | RFC2818 |
| | SOAP | W3C (World Wide Web Consortium) SOAP1.2 |

| Item | Standard and Protocol | Involved Specifications |
|------|-----------------------|---|
| | SNMP | <ul style="list-style-type: none"> • RFC1065-1067, RFC1155-1157, RFC1214 • RFC1441-1452, RFC1901-1910 • RFC3411-3418 |
| | Telnet | RFC793 |
| | SSH | RFC4250-4256, RFC4335, RFC4344, RFC4345 |
| | DNS/DDNS | RFC1034, RFC1035 |
| | LDAP | RFC4511-RFC4519, RFC4370, RFC2696, RFC2891, RFC2830 |
| | H.235 | - |
| | AES | RFC3268, RFC3962, RFC3686, RFC3602 |
| | TLS | - |
| | SRTP | - |
| | H.245 | - |
| | Q.931 | - |

10 Acronyms and Abbreviations

| Acronym or Abbreviation | Full Name |
|-------------------------|---------------------------------------|
| CDR | Call Detail Record |
| CPU | Central Processing Unit |
| DMZ | Demilitarized Zone |
| SC | Switch Center |
| GK | Gatekeeper |
| HTTP | Hypertext Transfer Protocol |
| HTTPS | Hypertext Transfer Protocol Secure |
| ISDN | Integrated Services Digital Network |
| IVR | Interactive Voice Response |
| LDAP | Lightweight Directory Access Protocol |
| MCU | Multipoint Control Unit |
| OA | Office Automation |
| SIP | Session Initiation Protocol |
| SMC2.0 | Service Management Center |
| SOAP | Simple Object Access Protocol |
| XML | Extensible Markup Language |