HCP2.5

Self-developed IP Speaker

Business Delivery Solution

Software support department

2023.11

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2023.11	HCP 版本更新，翻译	胡南	V2.0	

Directory

1. Introduction

1.1 Background

The IP Speaker business introduces a new product, self-developed IP Speaker, to HCP in the baseline version 2.4.1. The self-developed Speaker has added support for TTS (Text to speech), Two way Audio (Ceiling and Horn support), and built-in eMMC storage functions, greatly enhancing market competitiveness.

1.2 Goal

lThrough the delivery manual of this solution, we fully understand the necessary conditions for the deployment process of self-developed IP Speaker, such as network, ports, and the implementation of business processes. There is evidence to follow during the delivery process.

1.3 Terminology and Abbreviations

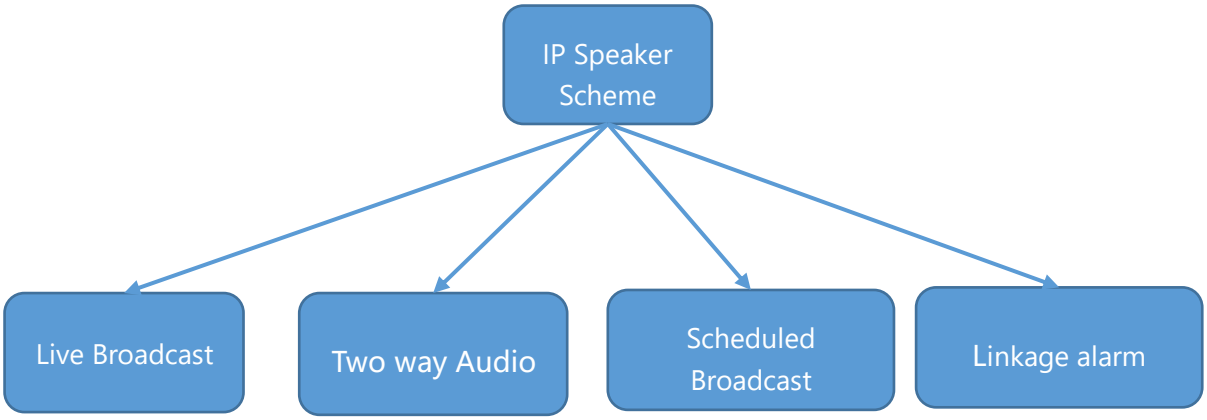
Terminology/Abbreviations	Meaning
HCP	Overseas HikCentral Platform, abbreviated as

	HikCentral Professional.

2. Overall architecture

2.1 system Topology

In the IP Spaeker business, we support real-time broadcast audio, real-time shouting, timed broadcast audio, linkage alarm broadcasting, and other business scenarios.



2.2 System Domain Scheme

2.2.1 LAN deployment

A pure LAN refers to the interconnection and interconnection of various links of the network, without any port restrictions or blockages.

The LAN environment is relatively simple and common, and there is no need for platform related port mapping. If the built-in firewall of the server operating system needs to be turned on, it is necessary to refer to the port dependency table and turn on the relevant platform ports. You can use the "telnet" command or Socket Tool to check if the port is open.

2.2.2 Multi domain deployment

When the server, device, and access end (browser, central client) belong to an isolated internal and external network segment, a WAN IP needs to be configured to map the corresponding ports. The ports in the port list need to be mapped and WAN IP configured based on the actual usage scenarios and functions of the customer.

Source Device	Destination Device	Destination Port Number (Listening)	Protocol	Port Description
Web Client, Control Client	SYS	80	TCP	Used for Web Client & Control Client access in HTTP protocol
Web Client, Control Client	SYS	443	TCP	Used for Web Client & Control Client access in HTTP protocol
ISUP Device	SYS	7660	TCP	Used for receiving registration from ISUP devices
ISUP Device	SYS	7332	TCP	Used for receiving alarm from ISUP devices
ISUP Device	SYS	7334	UDP	Used for receiving alarm from ISUP devices
Streaming Server	SYS	7661	TCP	Used for getting stream from ISUP device via Streaming Server
ISUP Device	SG/SMS	16001	TCP	ISUP Port for Two-Way Audio
ISUP Device	SG/SMS	16003	TCP	ISUP port for Broadcasting
ISUP Device	SYS	6123	TCP	Used for the picture storage of ISUP devices
Web Client, Control Client	SG/SMS	554	TCP	Used for getting stream for live view (real-time streaming port)
Web Client, Control Client	SG/SMS	559	TCP	Used for getting stream for Google Chrome, Firefox, or Safari
Web Client, Control Client	SG/SMS	10000	TCP	Used for getting stream for playback (video file streaming port)

ISUP Device	SG/SMS	16000	TCP	Used for getting stream from ISUP device via plugin
SYS	SG/SMS	6001	TCP	Used for getting the status of the Streaming Serve
SYS	SG/SMS	6678	TCP	Used for editing configuration for Streaming Server
SYS	SMS	8208	TCP	Listen port for Service Manager after encrypted transmission enabled

See HikCentral Professional V2.5.0 Communication Matrix for more details.

3. Project information collection

3.1 Basic information collection

Before delivery, it is necessary to obtain the overall information of the project to lay the groundwork for delivery implementation. The key content is as follows:

- Basic information of the project. Including project background, version, scale, etc.
- Product access situation. Including product model, quantity, etc.
- Server software and hardware. Including the number of software and hardware, performance, network cards, etc.
- Network environment. Including network topology and bandwidth.
- Other materials such as preliminary solutions.

3.2 Network environment confirmation

In general, regardless of the network situation, the following information needs to be confirmed in advance before project implementation and deployment:

- Confirm the network deployment between the monitoring center and all clients, and whether it includes security protection media such as firewall, routing mapping, etc.
- Confirm that the network between the device and the monitoring center server can be connected (for example, using tools such as Socket Tool for key port troubleshooting) to ensure that the device can be added to the platform normally.
- Confirm the network interconnection between various servers in the monitoring center, and it is recommended that the network port of the central switch be at least gigabit.
- Confirm the size of the exit bandwidth for customers to access the internet (if web and client access is required)
- Is the required port for the business open, such as TCP 7660

3.3 server hardware performance requirements

- The Control Client cannot be deployed in a virtual machine environment.
- If the HCP platform is to be deployed in a virtual machine environment, it is recommended to configure the virtual machine to 1.5 times the normal configuration. For example, if a normal server requires 8GB of memory, the configuration of the virtual machine is 8GB × 1.5=12GB of memory, and other performance can be calculated accordingly.
- If the virtual machine needs to change its hardware configuration or migrate to

another server, such as CPU and RAM hardware information changes, please deactivate the HCP license first and reactivate it after the update is completed.

The specific requirements for SYS Server are as follows:

SYS Configurations			
Feature	**Low-End**	**High-End**	
CPU	Intel® Core™ i5-8500 @ 3.00 GHz	Intel® Xeon® E-2124 @ 3.30 GHz	Intel® Xeon® Silver 4110 @ 2.10 GHz
RAM	8 GB	16 GB	16 GB
NIC	GbE Network Interface Card	GbE Network Interface Card	GbE Network Interface Card
HDD for OS	SATA-II 7200 RPM Enterprise Class HDD	SATA-II 7200 RPM Enterprise Class HDD	SATA-II 7200 RPM Enterprise Class HDD
HDD for Picture Storage	Surveillance-class HDD or high performance network HDD. It should support 10 MB/s writing and 10 MB/s reading.	Enterprise-class HDD or high performance network HDD. It should support 20 MB/s writing and 20 MB/s reading.	Enterprise-class HDD or high performance network HDD It should support 20 MB/s writing and 20 MB/s reading.
HDD Capacity	At least 650 GB	At least 650 GB	At least 650 GB
OS	Microsoft® Windows 8.1 64-bit	Microsoft® Windows Server 2012 (R2) 64-bit	Microsoft® Windows Server 2012 (R2) 64-bit
Virtual Machine	**Amazon AWS EC2** Instance: c5.xlarge CPU: Intel® Xeon® Cascade Lake @ 3.60 GHz vCPU Count: 4 RAM: 8 GB Storage: EBS NIC: 10 Gbps	**Amazon AWS EC2** Instance: m5.xlarge CPU: Intel® Xeon® Platinum 8175M @ 3.10 GHz vCPU Count: 4 RAM: 16 GB Storage: EBS NIC: 10 Gbps	-
	Microsoft Azure Instance: B4MS CPU: Intel Xeon® E5-2673 v4 @ 2.30 GHz vCPU Count: 4		-

Note: For updates on different configuration implementation functions and performance requirements, please refer to the 《HikCentral Professional V2.5 System Requirements&Performance》 document.

The PC hardware performance requirements for the client are as follows:

Configurations			
Feature	**Configuration 1**	**Configuration 2**	**Configuration 3**
CPU	Intel® Core™ i5-9400/F	Intel® Core™ i3-8100 @ 3.60 GHz	Intel® Core™ i7-8700k @ 3.70 GHz
RAM	8 GB	8 GB	16 GB
NIC	GbE Network Interface Card	GbE Network Interface Card	GbE Network Interface Card
Graphics Card	NVIDIA® GeForce GTX 1050Ti	Intel® UHD Graphics 630+GT1030	NVIDIA® GeForce RTX 2080
OS	Microsoft® Windows 10 (64-bit)	Microsoft® Windows 10 (64-bit)	Microsoft® Windows 10 (64-bit)

The server and client operating system requirements are as follows:

Feature	Description
OS for HikCentral Professional Server	Microsoft® Windows 7 SP1 (64-bit) Microsoft® Windows 8.1 (64-bit) Microsoft® Windows 10 (64-bit) Microsoft® Windows Server 2008 R2 SP1 (64-bit) Microsoft® Windows Server 2012 (64-bit) Microsoft® Windows Server 2012 R2 (64-bit) Microsoft® Windows Server 2016 (64-bit) Microsoft® Windows Server 2019 (64-bit) **For Windows 8.1 and Windows Server 2012 R2, make sure it is installed with the rollup (KB2919355) updated in April, 2014.*
OS for Control Client	Microsoft® Windows 7 SP1 (32/64-bit) Microsoft® Windows 8.1 (32/64-bit) Microsoft® Windows 10 (64-bit) Microsoft® Windows Server 2008 R2 SP1 (64-bit) Microsoft® Windows Server 2012 (64-bit) Microsoft® Windows Server 2012 R2 (64-bit) Microsoft® Windows Server 2016 (64-bit) Microsoft® Windows Server 2019 (64-bit) **For Windows 8.1 and Windows Server 2012 R2, make sure it is installed with the rollup (KB2919355) updated in April, 2014.*

Note: It is not recommended to install any other unnecessary software on the server side. If the system's firewall needs to be enabled, it needs to be opened according to the dependency table 《HikCentral Professional_V2.4.1 Communication Matrix_20230512》document.

3.4 Limit on the number of IP Speaker

Number of IP Speakers	128
Number of broadcast groups	128
Number of Speaker Units per Broadcast Group	128
Number of media libraries	100
Number of audio for a single media library	100
Number of scheduled broadcast plans	100
Audio size limit	<10Mb

4. IP Speaker Business Delivery Implementation

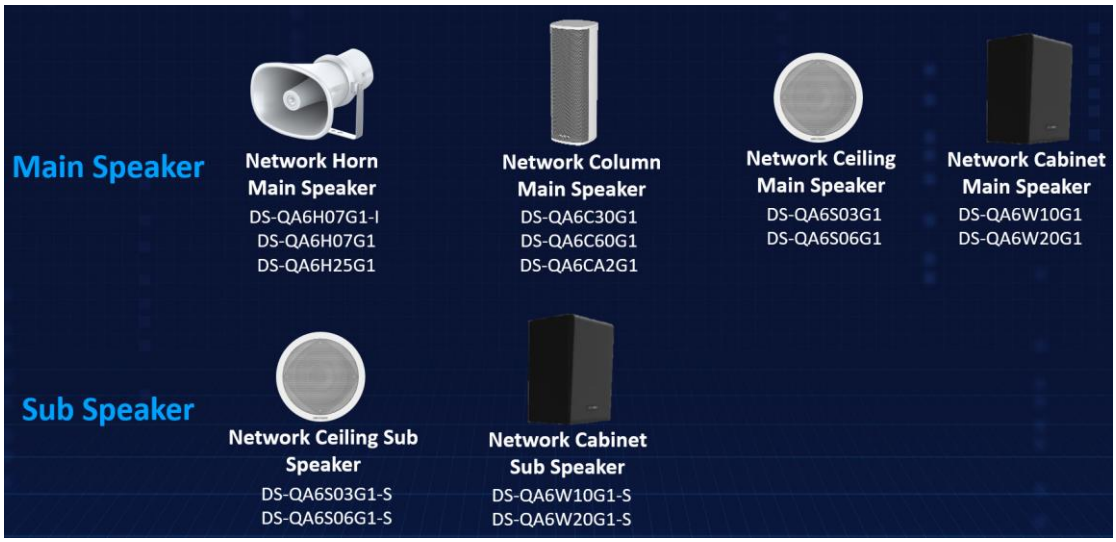
4.1 Product selection and basic function display

By combining HCP and IP Speaker devices, demonstrate the achievable functions, how to achieve them, and the results achieved.

4.1.1 Product Selection

HCP version: HikCentral_ Professional_ V2.4.1 and subsequent versions

IP Speaker Selection:



4.2 IP Speaker Configuration

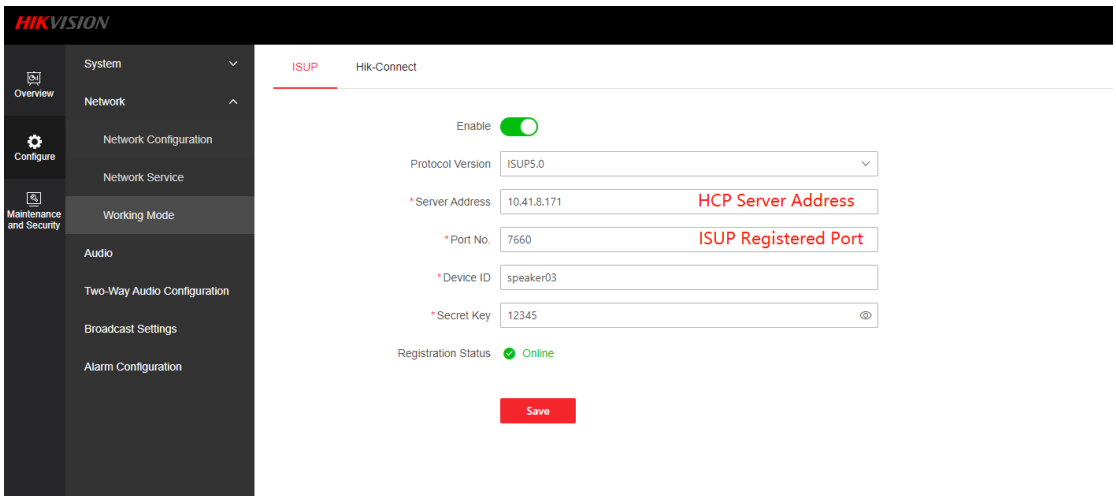
4.2.1 Add Device

A. Device Registration

Unlike the original OEM equipment, the self-developed IP Speaker is registered on the platform through the ISUP protocol.

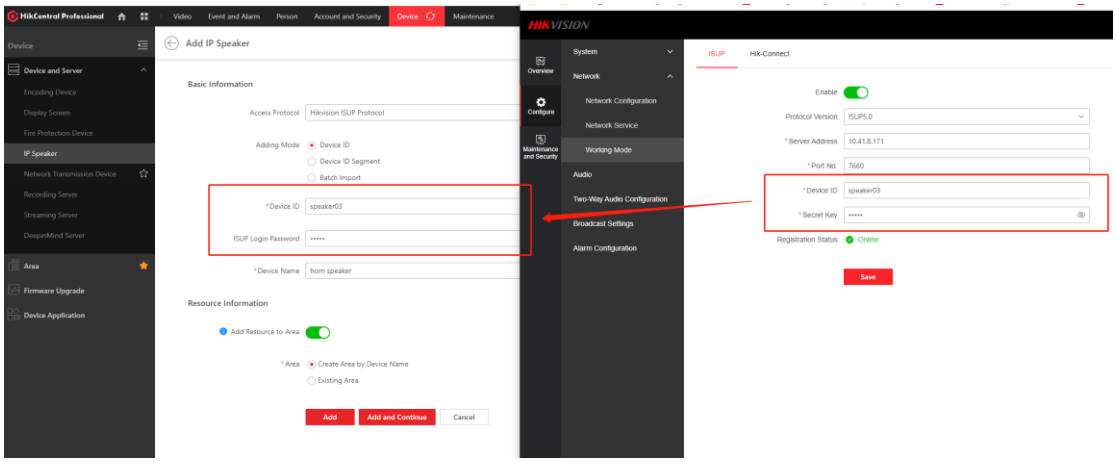
Log in to the device web end, enter Configure>Working Mode>ISUP, enter the HCP server address, ISUP registration port (default is 7660, please check the watchdog

settings), Device ID and Secret Key customization



B. Adding devices on HCP

On the HCP web side Device ->Device and Server ->IP Speaker, select the ISUP protocol, enter the Device ID and password, and add it.



After completing the addition, try refreshing the add page several times, and sometimes the device's online status will not be immediately displayed.

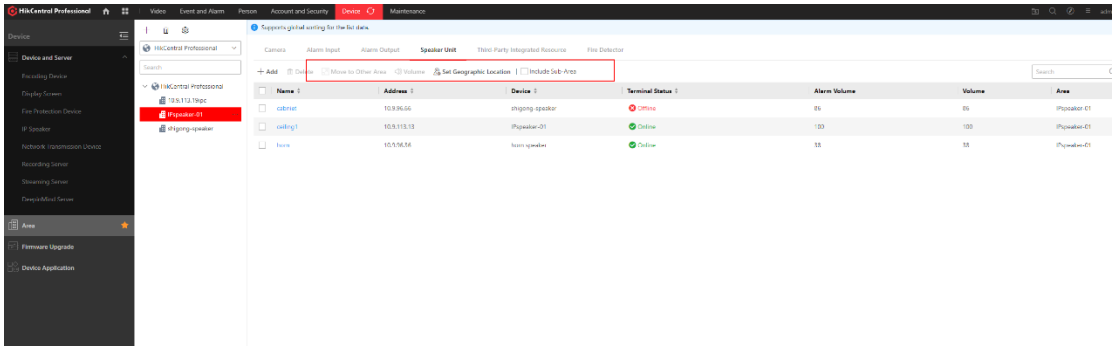
Note: Self developed IP Speaker does not require an SD card, so the platform cannot format operations.

Remote configuration: It is necessary to switch the platform to Https access from **System>Security>Transport Protocol.**

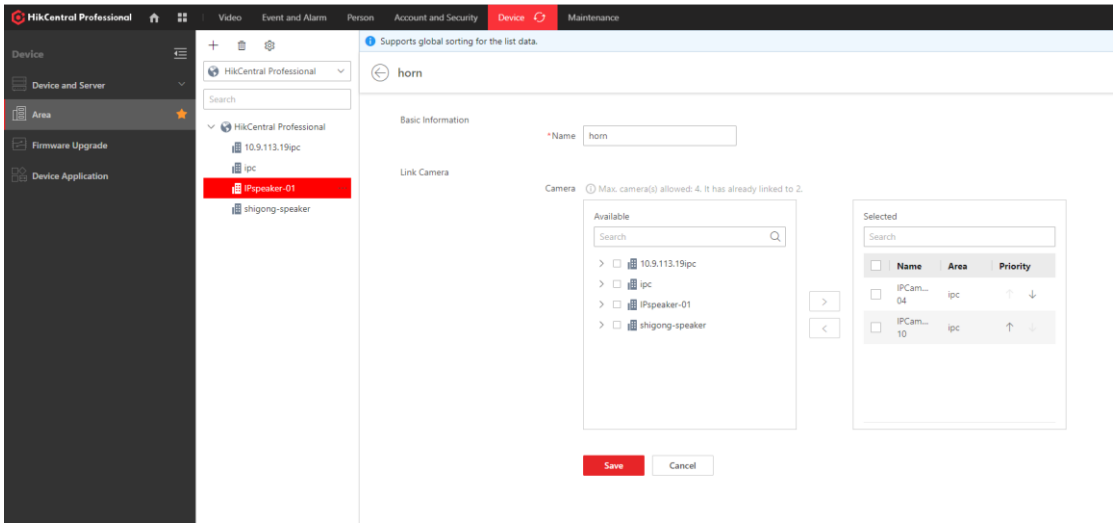
4.2.2 Basic configuration on the HCP platform

A. Camera channel for associated devices

Enter **Device>Area>Speaker Unit** to adjust the device volume and associate the IP Speaker with the ground.



Click on the resource point of the IP Speaker, select the camera channel to associate with that resource point, and the maximum number supported is 4.

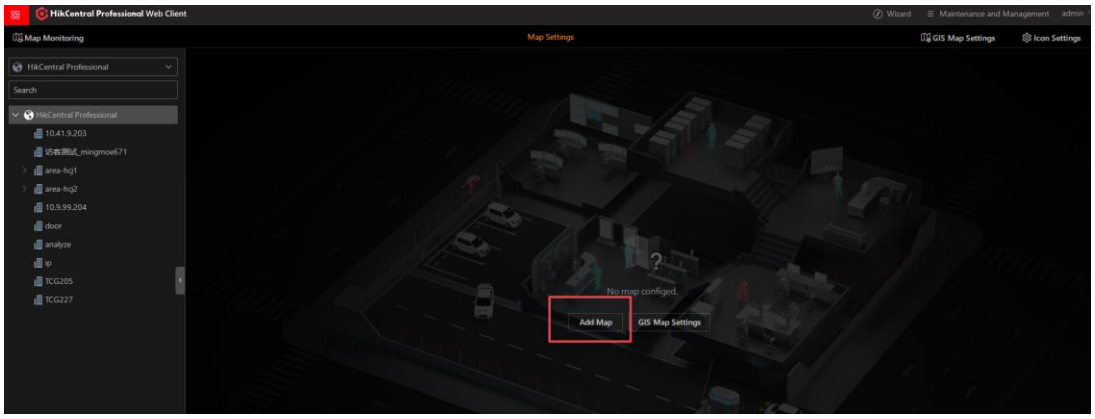


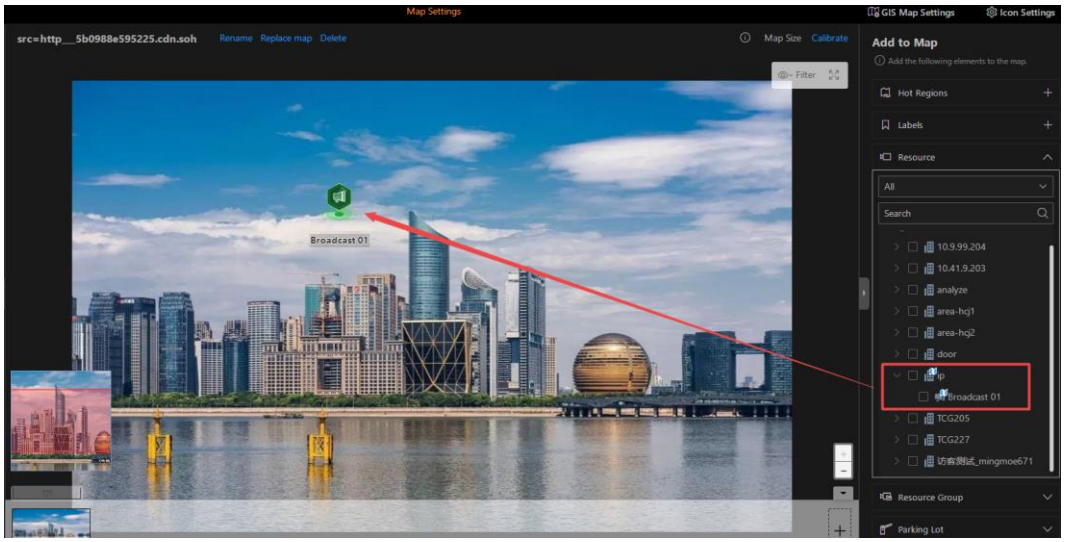
B. Associated resource points on the map

Enter **Visual Map ->Map settings ->Add map**, and drag the device resource point onto the map

Note: When the resource point alarm is triggered, it is not supported for the

resource point to turn red.





C. Configure the storage location for device events

(1) Enter Speaker Unit ->Basic Settings, select the presence of a local server or pstor server. Note: When using local storage, if the storage space is full, there is a risk of audio files being overwritten. It is recommended to use a microserver or configure the local storage resource pool separately

(2) Turn on 'Live Broadcasting Recording' to record real-time broadcast event recording and event audio.

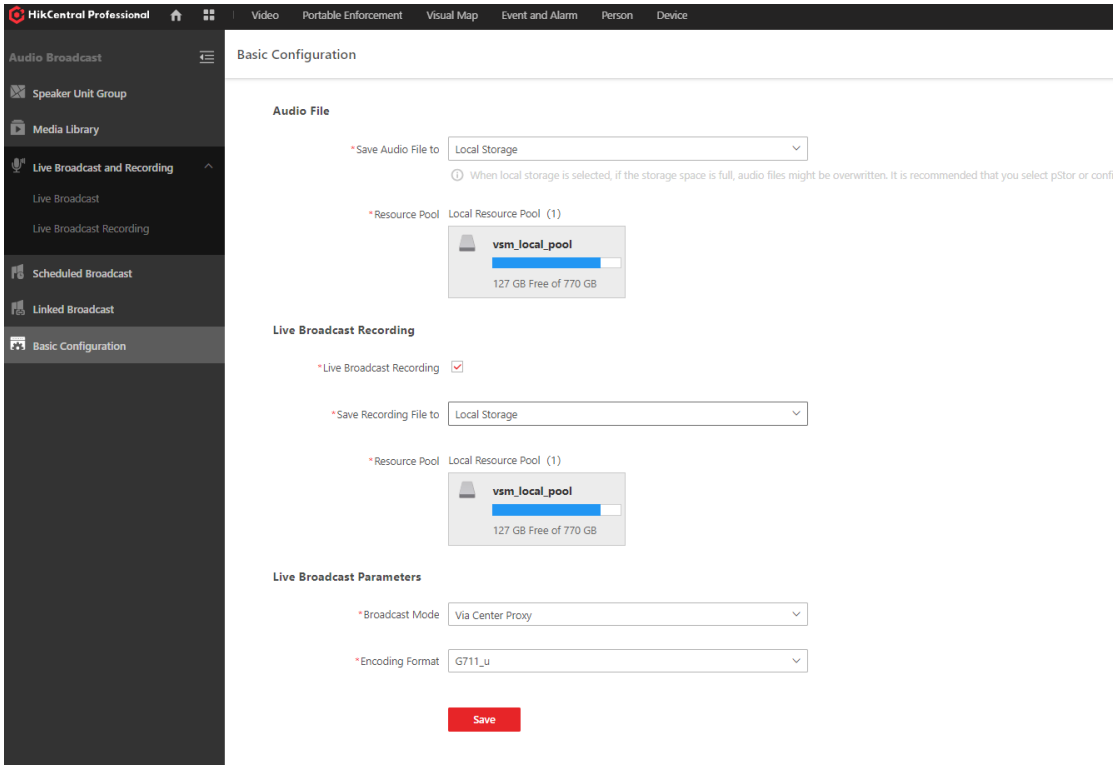
(3) Flow collection method:

✓ By default, direct connection or proxy will be selected based on the login

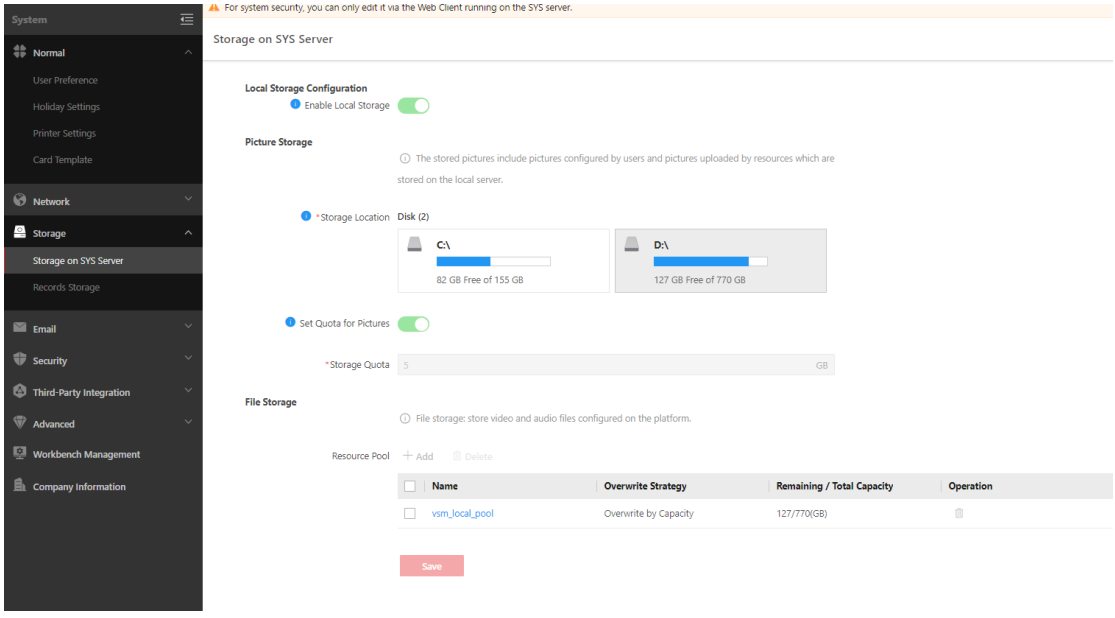
client on both internal and external networks.

✓ By default, passing through the center is through built-in streaming media

✓ If external streaming media is configured in this area, external streaming media will be used. If not, internal streaming media will be used.

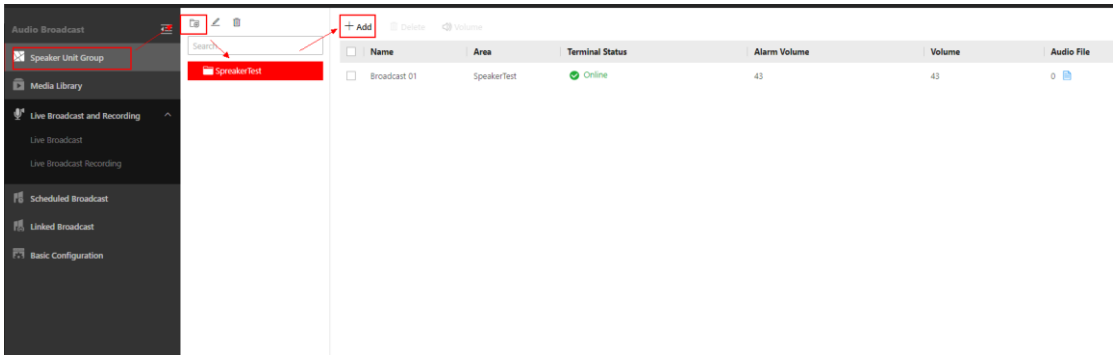


The location of local storage can be configured on **Storgae>Storage on SYS Server:**



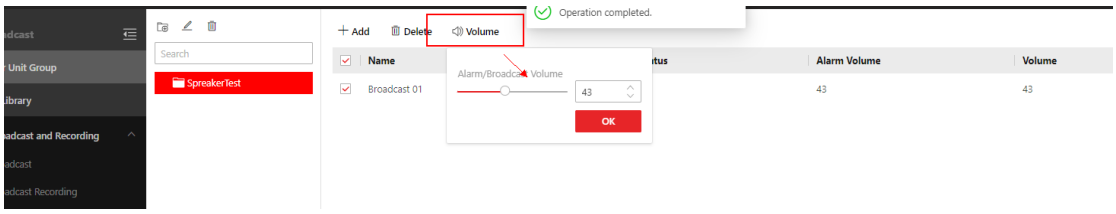
D. Configure broadcast group

Enter **Audio Broadcasts ->Speaker Unit Group** and click **Add Broadcast Group**.



After adding, simply add the resource point of the IP Speaker device.

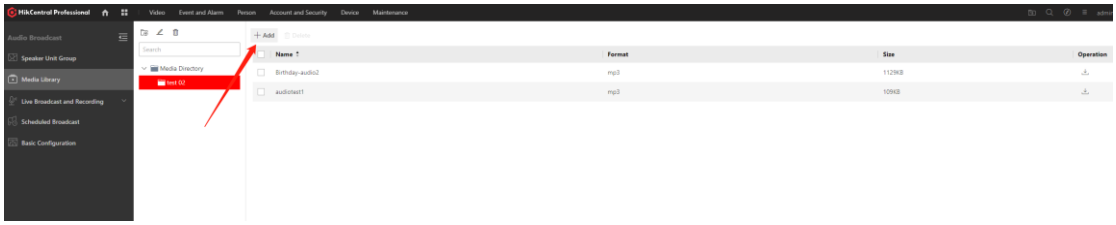
At the same time, batch set the volume of the broadcast group, with a range of 1-100.



E. Configure Media Library

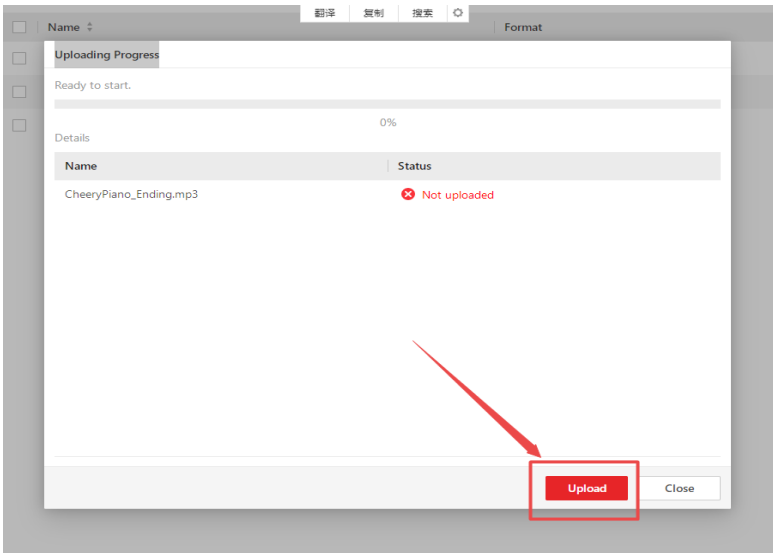
Enter **Speaker Unit ->Media Library** and create a media group.

Upload audio files in the already created media group.



Note:The IE browser currently does not support uploading audio files. Please operate on other browsers such as Chrome.

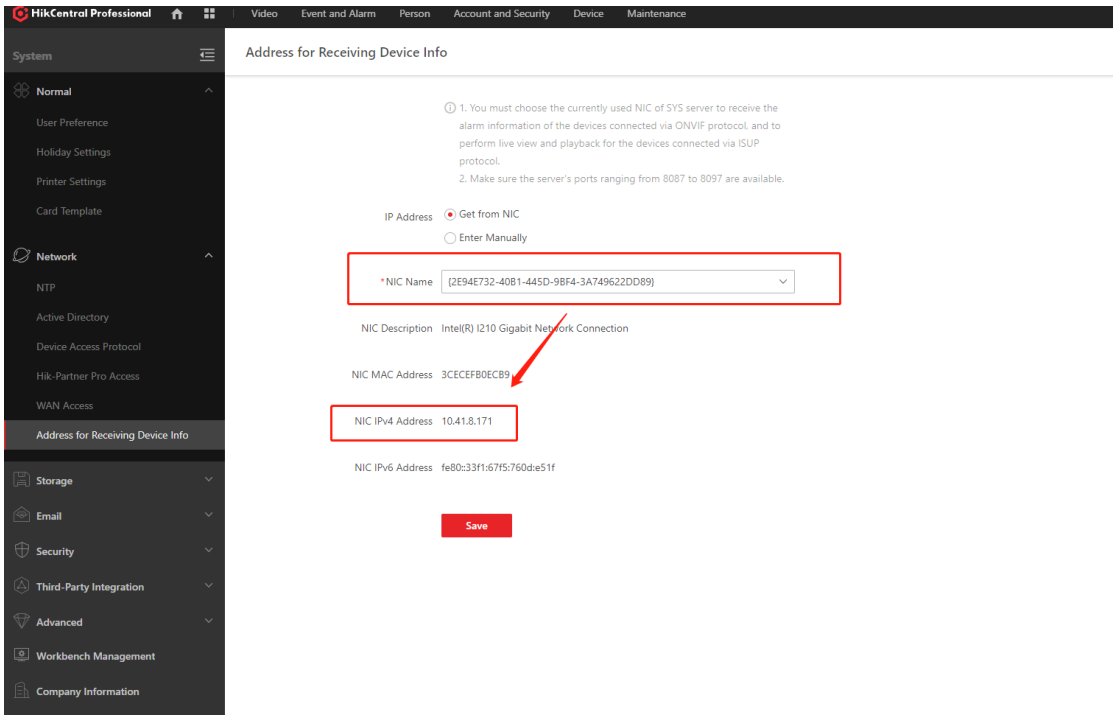
When uploading each time, clicking "upload" will ensure successful upload.



Note: The maximum number of audio is 100, and the supported formats are MP3 and WAV formats less than 10MB.

F. Configure NIC receiving address

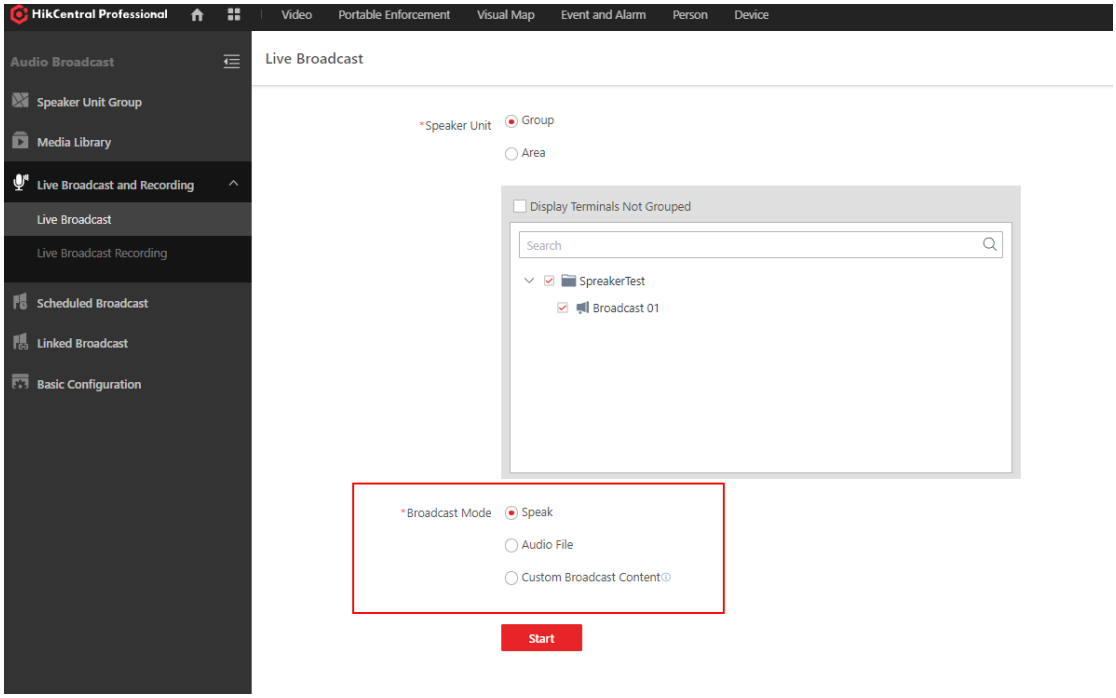
Please make sure to configure it as the local IP address of the server in System Configuration ->Address for Receiving Device info.



4.3 IP Speaker business function display

4.3.1 Live Broadcast

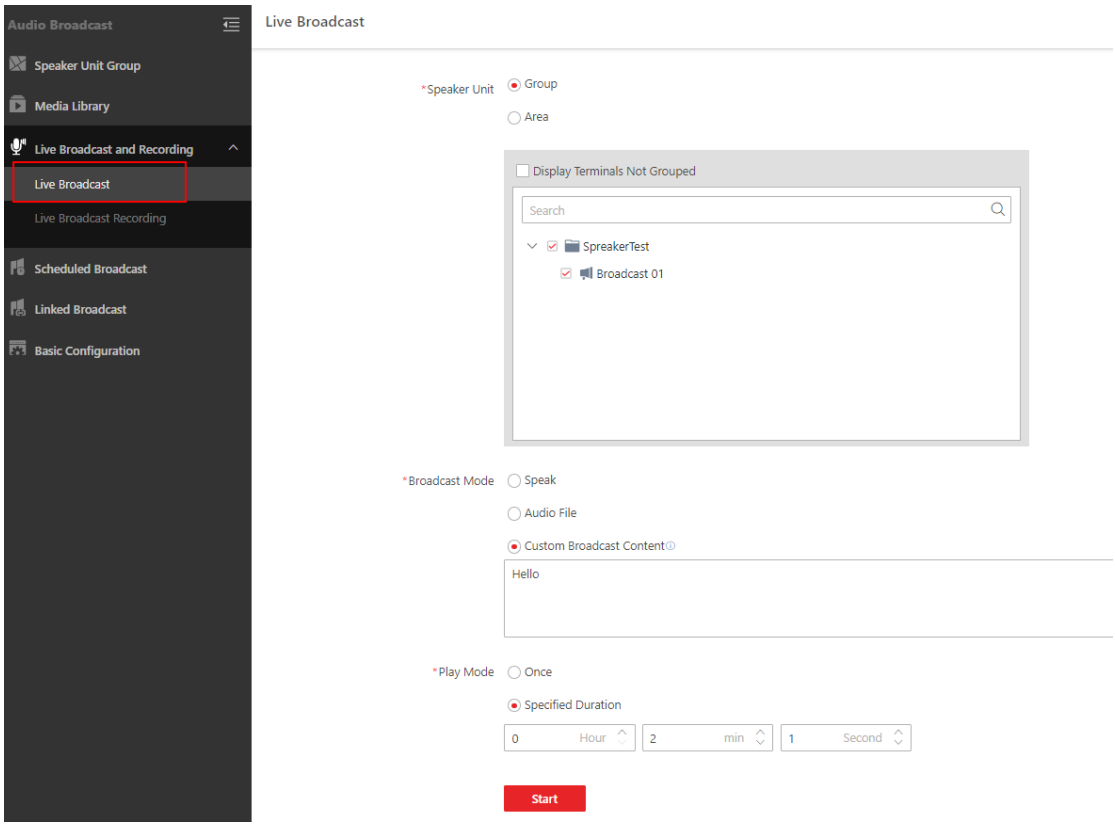
Enter Live Broadcast and Recording on the web side, select the configured broadcast group or resource point in the resource area, and you can choose "Speak" mode and "Audio file" mode. Speak corresponds to the real-time call function, and Audio file corresponds to the real-time broadcast function.



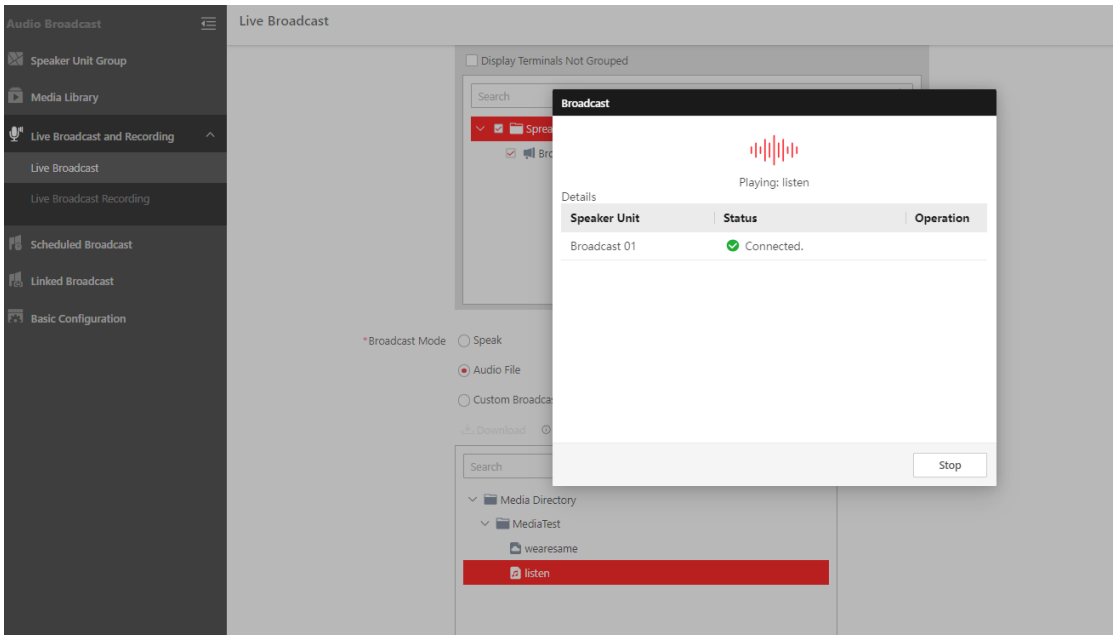
After selecting the Speak mode, real-time transmission is achieved through local audio devices such as microphones to the device end.

After selecting the Audio mode, first select the uploaded audio library files and prioritize downloading them to the local end to ensure the quality of audio transmission.

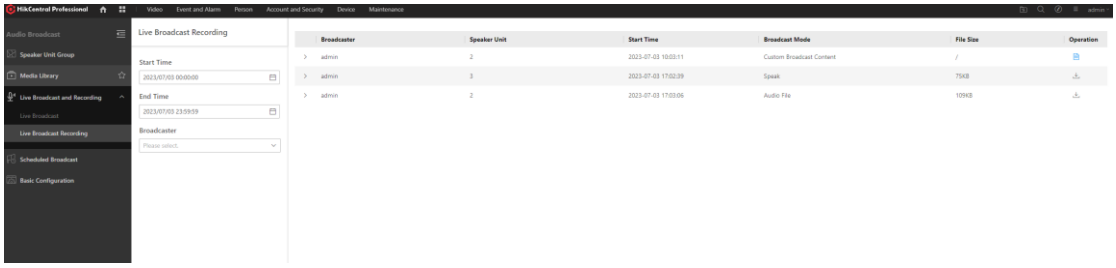
Select Custom Broadcast Content to play the input custom text (only supported in English), and you can choose to play it once or for a certain time period. Only self-developed Speakers support this feature.



Click "Start" to achieve real-time broadcasting.



Real time broadcasts and TTS content records can be found in 'live broadcast recording', and corresponding audio downloads are supported.

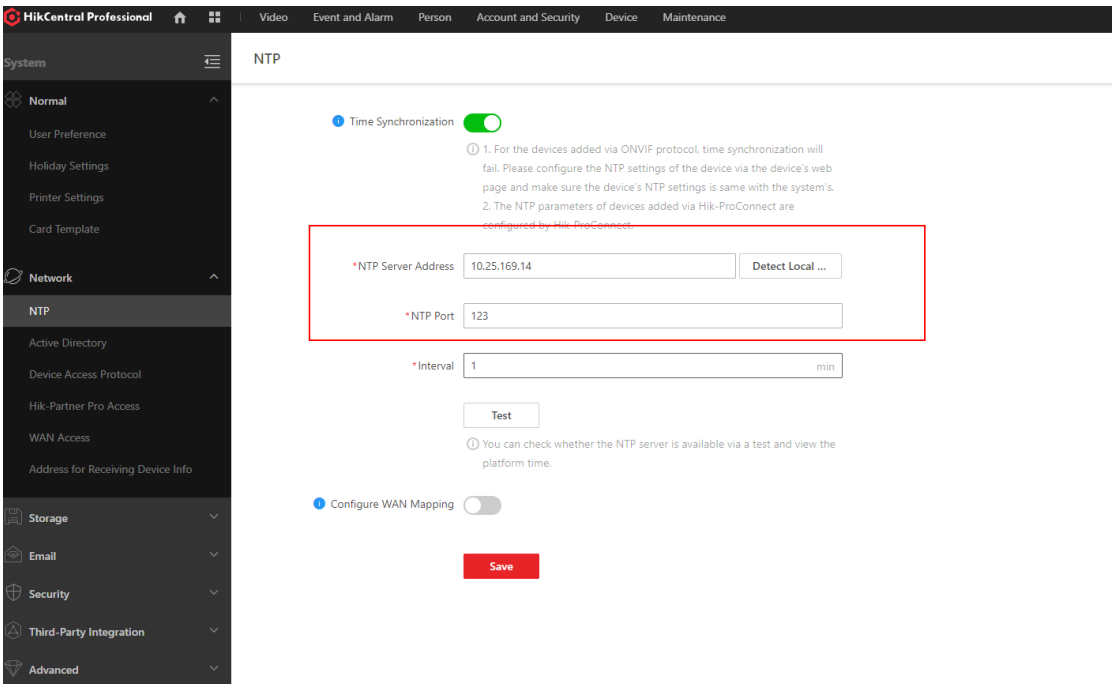


Note: Ensure that the current web control controls are running properly.

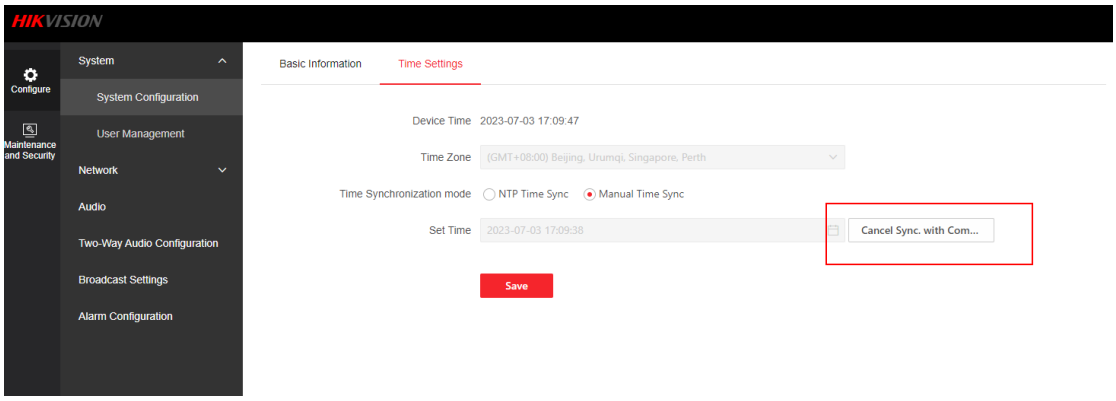
4.3.2 Scheduled Broadcast

Due to the fact that scheduled broadcasts distribute tasks to devices for playback based on device time, it is recommended to use NTP timing or manually adjust timing on the device end to prevent issues with inaccurate device time.

(1) Unified distribution through the platform: enter System>Network>NTP, enter the NTP service address, click save, and it will be distributed to the device. Ensure that the device is connected to the NTP service network.



(2) Device web proofreading time:

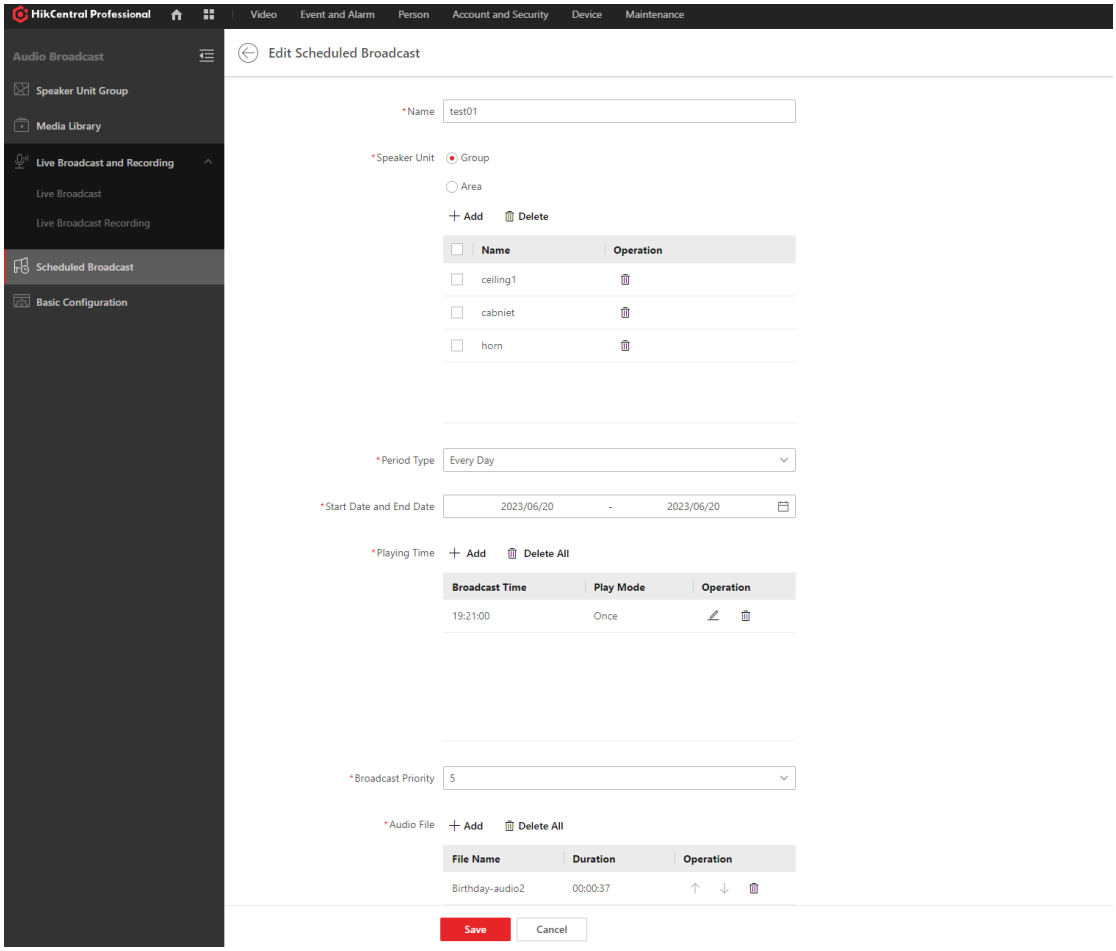


Enter the "Scheduled Broadcast" on the web side and add a scheduled broadcast plan.

Define a plan name and select resource points, define the frequency of scheduled broadcasts as daily, weekly, or custom time points, the date and time period of the broadcast plan, and the exact time point of playback.

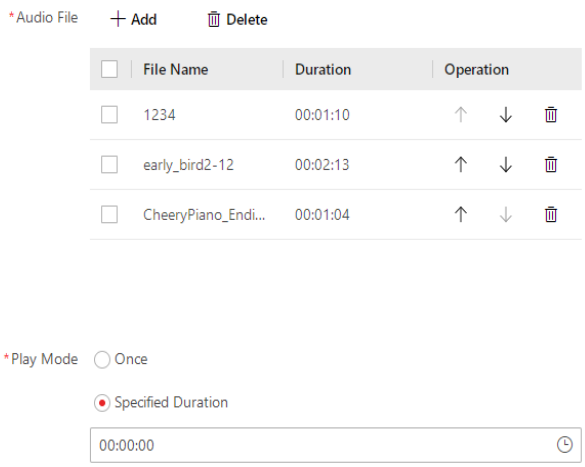
For example, if a daily broadcast schedule is set from July 18th to 30th, 2023, with a time point of 8am, then starting from July 18th, the broadcast schedule will be executed every day at 8am.

The larger the number of plan priorities, the higher the priority level; In the event of a conflict between two plans, priority should be given to broadcasting plans with higher levels.



A broadcast plan can set multiple audio, and the audio can be dragged up and down to set the playback order.

The playback mode can be set to play at once or for a fixed duration.



IP Speaker Priority:

When Bluetooth is turned on, if the priority of timed audio is lower than 3, there may be no sound. Therefore, it is recommended to start setting the priority of timed broadcasting from 4.

Attached IP Speaker Priority Policy:

表1：设备不同音频通道混音/打断规则

	实时广播	定时广播	蓝牙	3.5mm音频输入
实时广播	打断，优先级高打断优先级低，优先级相同不打断	混音，优先级高音量高于优先级低	混音，优先级高音量高于优先级低	混音，优先级高音量高于优先级低
定时广播	混音，优先级高音量高于优先级低	打断，优先级高打断优先级低，优先级相同不打断	混音，优先级高音量高于优先级低	混音，优先级高音量高于优先级低
蓝牙	混音，优先级高音量高于优先级低	混音，优先级高音量高于优先级低	NA	混音，优先级高音量高于优先级低
3.5mm音频输入	混音，优先级高音量高于优先级低	混音，优先级高音量高于优先级低	混音，优先级高音量高于优先级低	NA

表2：设备不同音频通道优先级

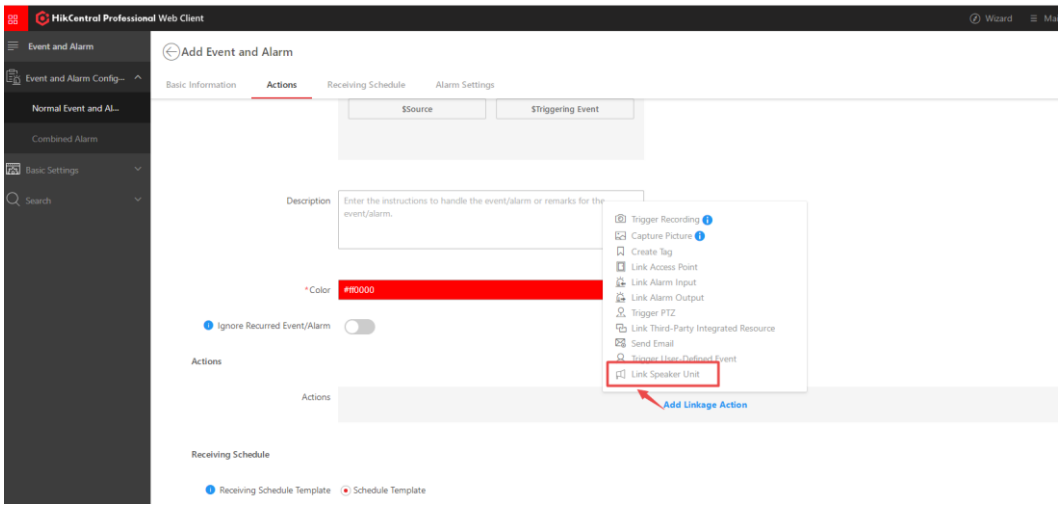
音频类型（IP Speaker默认）	优先级	备注
喊话（实时广播）	7	
实时播放音频（实时广播）	7	
播报TTS（实时广播）	7	
报警联动音频（定时广播）	12	
定时播放音频（定时广播）	5	
蓝牙	3	
3.5mm音频输入	3	

表3：HCP下发音频优先级

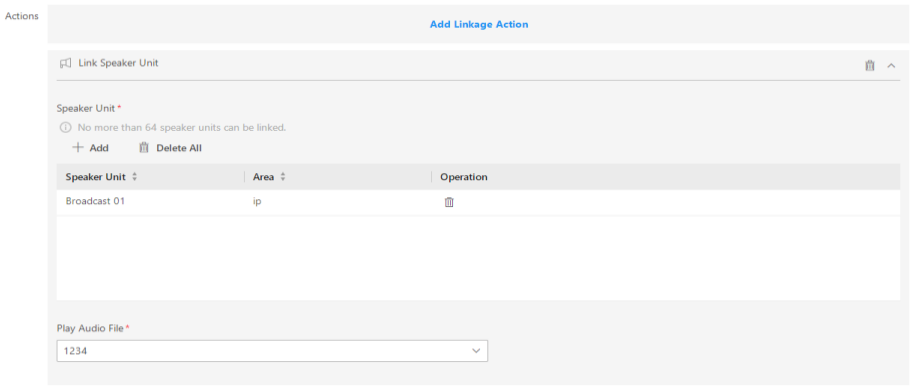
音频类型（HCP下发）	优先级	备注
实时广播模块	15	HCP下发音频的优先级，每项模块中的不同音频下发方式，优先级都与模块优先级相同。
定时广播模块	用户自定义	
报警联动模块	13	紧急避险和报警联动，下发播放命令前会先下发停止音频文件播放，因此表1规则不适用。
紧急避险模块	14	急避险和报警联动，下发播放命令前会先下发停止音频文件播放，因此表1规则不适用。
TTS	优先级随业务模块变化。如是实时广播下发TTS，优先级就是15。	

4.3.3 Alarm linkage broadcasting function

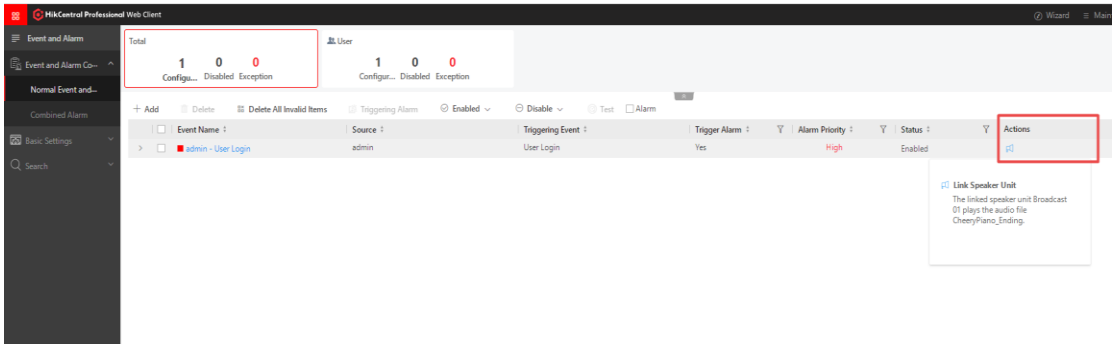
Enter **Event and Alarm -> Normal Event and Alarm-> Actions-> Add linkage Action** Click **link Speaker Unit**.



Select the device that needs to be linked to play audio files or TTS.



Check if the audio is sent to the device normally. If it fails, a prompt will appear in the actions column of the alarm.



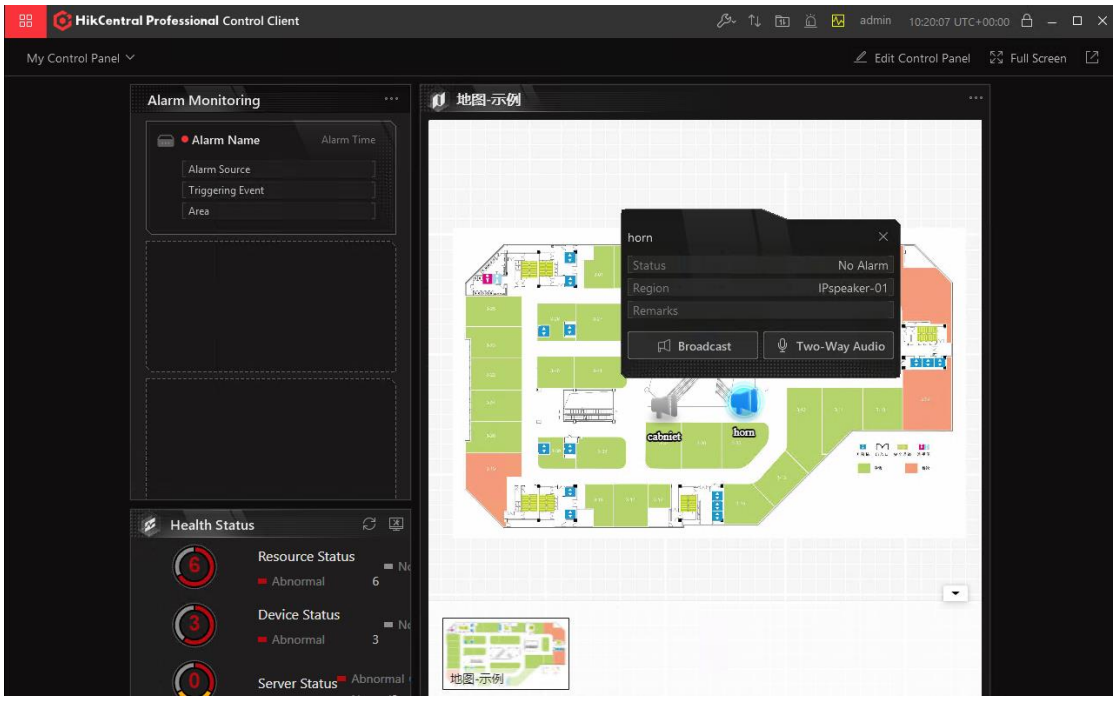
4.3.4 Client business function display

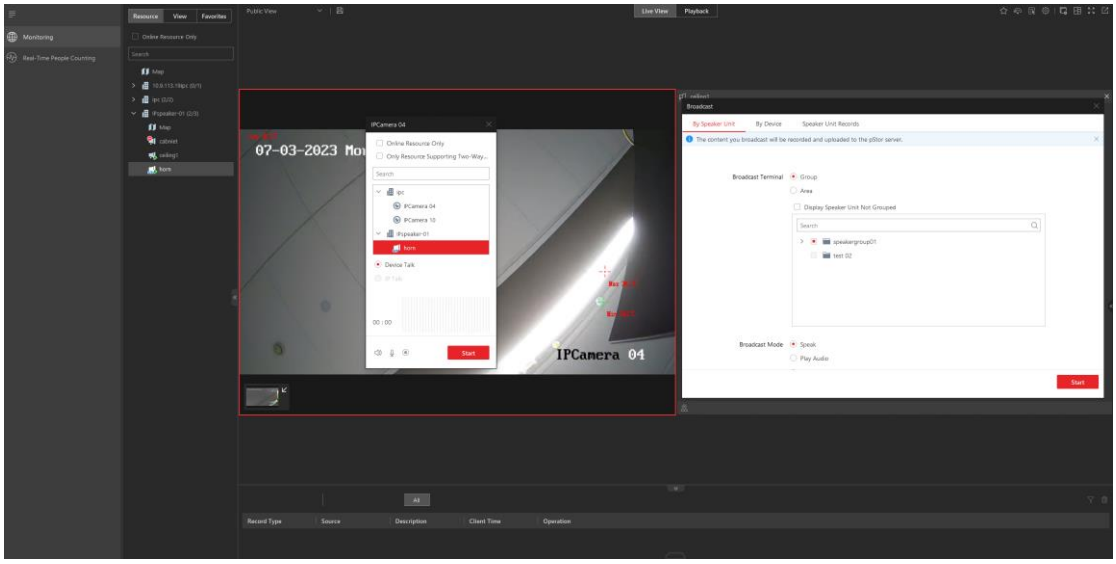
A. Implement resource point linkage preview

Enter the client ->Monitoring, click on the broadcast device resource point, and you can see the linked video preview and playback.

B. Broadcasting and two-way intercom

Enter the client monitoring or Tool>Broadcast or Map, select the resource point, and perform real-time audio broadcasting, real-time calling, TTS, and two-way intercom (device supported) functions.





If an alarm event is triggered, it can also be broadcasted or two-way intercom to the Alarm Center.