iLinksView Network Management Platform

User's Manual

V1.0.0

ZHEJIANG DAHUA VISION TECHNOLOGY CO., LTD.

Foreword

General

This manual introduces the functions and operations of the iLinksView Network Management Platform (hereinafter referred to as "the Device").

Models

Name	Model
iLinksView Network Management Platform	DH-ILS1000

Safety Instructions

The following categorized signal words with defined meaning might appear in the manual.

Signal Words	Meaning
DANGER	Indicates a high potential hazard which, if not avoided, will result in death or serious injury.
WARNING	Indicates a medium or low potential hazard which, if not avoided, could result in slight or moderate injury.
CAUTION	Indicates a potential risk which, if not avoided, could result in property damage, data loss, lower performance, or unpredictable result.
TIPS	Provides methods to help you solve a problem or save you time.
NOTE	Provides additional information as the emphasis and supplement to the text.

Revision History

Version	Revision Content	Release Time
V1.0.0	First release.	November 2019

About the Manual

- The manual is for reference only. If there is inconsistency between the manual and the actual product, the actual product shall prevail.
- We are not liable for any loss caused by the operations that do not comply with the manual.
- The manual would be updated according to the latest laws and regulations of related regions. For detailed information, see the paper manual, CD-ROM, QR code or our official

website. If there is inconsistency between paper manual and the electronic version, the electronic version shall prevail.

- All the designs and software are subject to change without prior written notice. The product updates might cause some differences between the actual product and the manual. Please contact the customer service for the latest program and supplementary documentation.
- There still might be deviation in technical data, functions and operations description, or errors in print. If there is any doubt or dispute, please refer to our final explanation.
- Upgrade the reader software or try other mainstream reader software if the manual (in PDF format) cannot be opened.
- All trademarks, registered trademarks and the company names in the manual are the properties of their respective owners.
- Please visit our website, contact the supplier or customer service if there is any problem occurred when using the device.
- If there is any uncertainty or controversy, please refer to our final explanation.

Important Safeguards and Warnings

The manual helps you to use our product properly. To avoid danger and property damage, read the manual carefully before using the product, and we highly recommend you to keep it well for future reference.

Operating Requirements

- Do not expose the device directly to the sunlight, and keep it away from heat.
- Do not install the device in the damp environment, and avoid dust and soot.
- Make sure the device is in horizontal installation, and install the device on solid and flat surface to avoid falling down.
- Avoid liquid spattering on the device. Do not place object full of liquid on the device to avoid liquid flowing into the device.
- Install the device in the well-ventilated environment. Do not block the air vent of the device.
- Use the device at rated input and output voltage.
- Do not dissemble the device without professional instruction.
- Transport, use, and store the device in allowed ranges of humidity and temperature.

Power Supply Requirements

- Use the battery properly to avoid fire, explosion, and other dangers.
- Replace the battery with battery of the same type.
- Use locally recommended power cord in the limit of rated specifications.
- Use the standard power adapter. We will assume no responsibility for any problems caused by nonstandard power adapter.
- The power supply shall meet the SELV requirement. Use the power supply that conforms to Limited Power Source, according to IEC60950-1. Refer to the device label.
- Adopt GND protection for I-type device.
- The coupler is the disconnecting apparatus. Keep it at the angle for easy to operate.

Table of Contents

1 Introduction

1.1 Overview

iLinksView Network Management Platform is a product based on hardware platform and designed for network problem location, network fault detection, network operation and maintenance.

The product has a friendly operation interface and is easy to use. It supports Dahua switch and the most popular third-party switch products, provides real-time management of device information, and greatly improves the speed of network fault resolution. It can be widely used in security projects, and help project implementation and maintenance personnel quickly pinpoint network problems and ensure the safe operation of the network.

1.2 Functions

This Device mainly contains the following functions.

Device Discovery

- Support Dahua switch and the most popular third-party switch products.
- Support discovery of terminal devices such as IPC, NVR.

AI Analysis

- Status monitoring of switches and terminal devices.
- Alarm statistics and display.
- Statistics of port flow and total bandwidth.
- Statistics and display of switch operation time.

Dynamic View

- Automatic generation of network topology.
- Display connection relationship of devices in the network and details of link load.
- Display status and details of switches and terminal devices.

Device Management

- Support classified display and detailed information display of switches and terminal devices.
- Support export of terminal device information.
- Support direct access to a device by the IP address on the iLinksView platform.

Platform Management

- Support IP address configuration of the iLinksView platform, and view of software and hardware version information.
- Support configuration of alarm threshold.
- Support collection and display of the system logs.

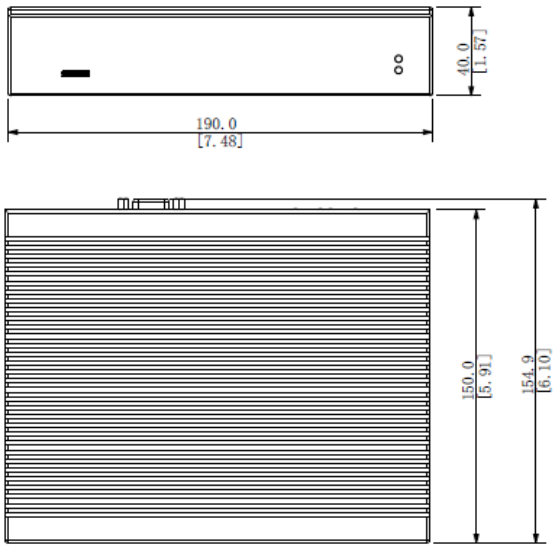
2 Device Structure

This chapter describes the product dimensions, specification and interfaces of the Device.

2.1 Product Dimensions

The appearance and dimensions of the Device are shown in Figure 2-1.

Figure 2-1 Product dimensions (mm[inch])



2.2 Specification

For the specification of the Device, see Table 2-1.

Table 2-1 Parameter list

Specification	Parameters
Dimensions	155 mm × 135 mm × 30 mm
Memory	2 GB
Storage	32 GB
Input/output port	● 4 USB ports ● 1 HDMI port ● 1 VGA port ● 2 RJ45 ports 📖 ● The two RJ45 ports are the same IP, and the default IP is 192.168.1.110. ● Only one RJ45 port is allowed for a device.
Ethernet port rate	10 M / 100 M / 1000 M
Power supply	12V / 4A
Static voltage	2 KV
Working temperature	-10℃ to 55℃
Humidity	0 – 90%
Power	15 W
Supported device	● 1000 switches ● 10,000 terminal devices

2.3 Port Description

Ports of the Device are shown in Figure 2-2. For details, see Table 2-2.

Power on the Device after it is connected to network and power.

Figure 2-2 Rear panel

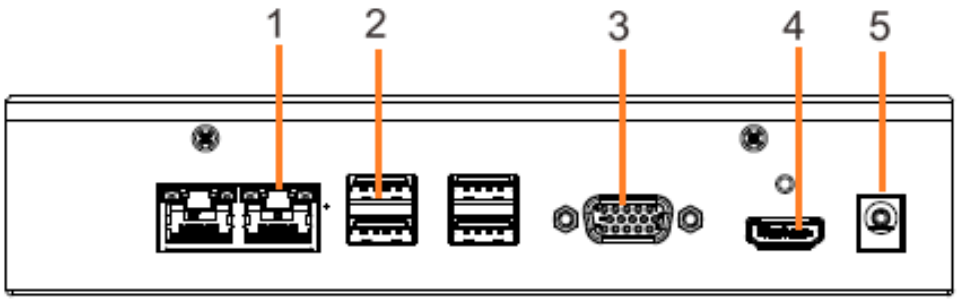


Table 2-2 Port description

No.	Name	Description
1	Ethernet port	RJ45 network port, one device can only connect to one RJ45 network port.
2	USB port	Connects to the external devices such as keyboard, mouse, and USB storage device. This port is only used for initializing the Device, and it cannot be used when the Device is running.
3	VGA port	Outputs analog video data to the connected display with VGA port. This port is only used for initializing the Device, and it cannot be used when the Device is running.
4	HDMI port	High definition audio and video signal output port. The port outputs the uncompressed high definition video and multi-channel audio data to the connected display with HDMI port. This port is only used for initializing the Device, and it cannot be used when the Device is running.
5	Power port	Connects to power source.

3 Web Configuration

After the Device connects to the network and power source, you can log in to the web interface.

Use the following browsers to log in to the web interface:

- Firefox (version 69.0.1 or later)
- Google (version 77.0.3865.120 or later)
- IE (version 11 or later)

3.1 Login

If it is your first time to log in to the web interface, you need to set password for admin and initialize the Device.

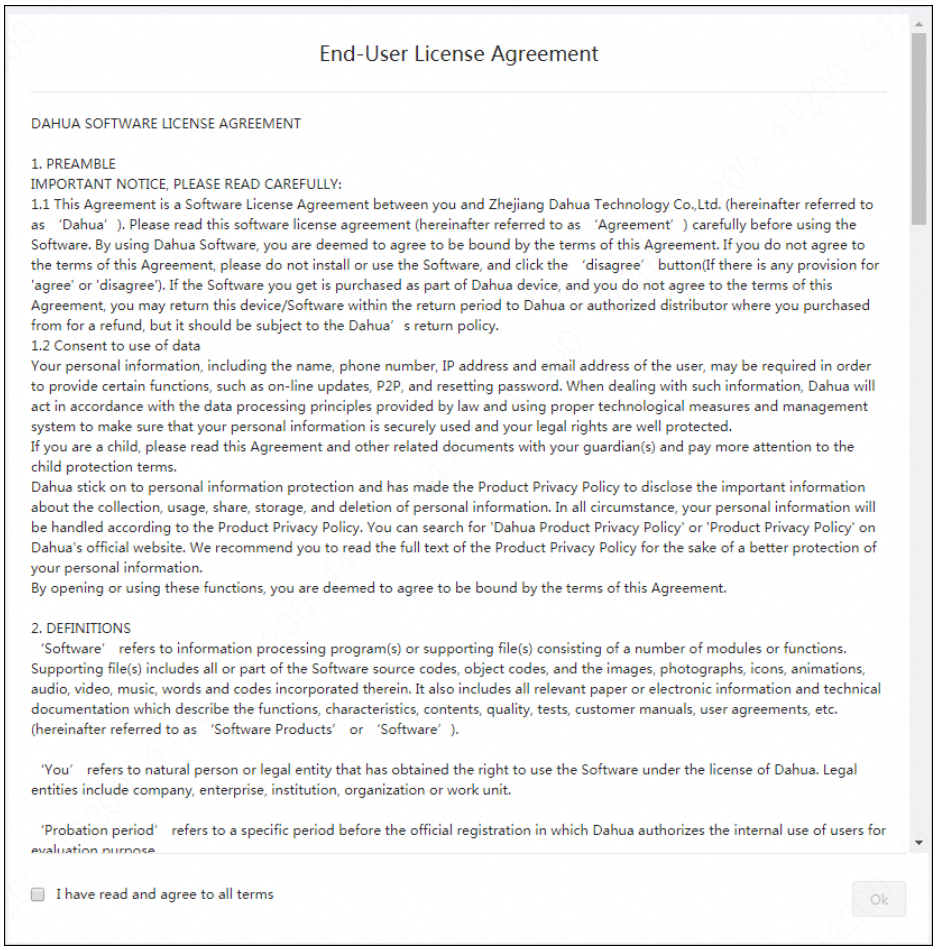
3.1.1 Setting Password for Admin

If it is your first time to use the Device after purchase or reset, you need to set a login password of the administrator user (admin by default).

Step 1 Open the browser, enter IP address of the Device (the default IP is 192.168.1.110) and then press **Enter** key.
The **End-User License Agreement** interface is displayed.

Step 2 Confirm the license agreement, select **I have read and agree to all terms** check box after confirmation, and then click **Ok**.

Figure 3-1 End-user license agreement

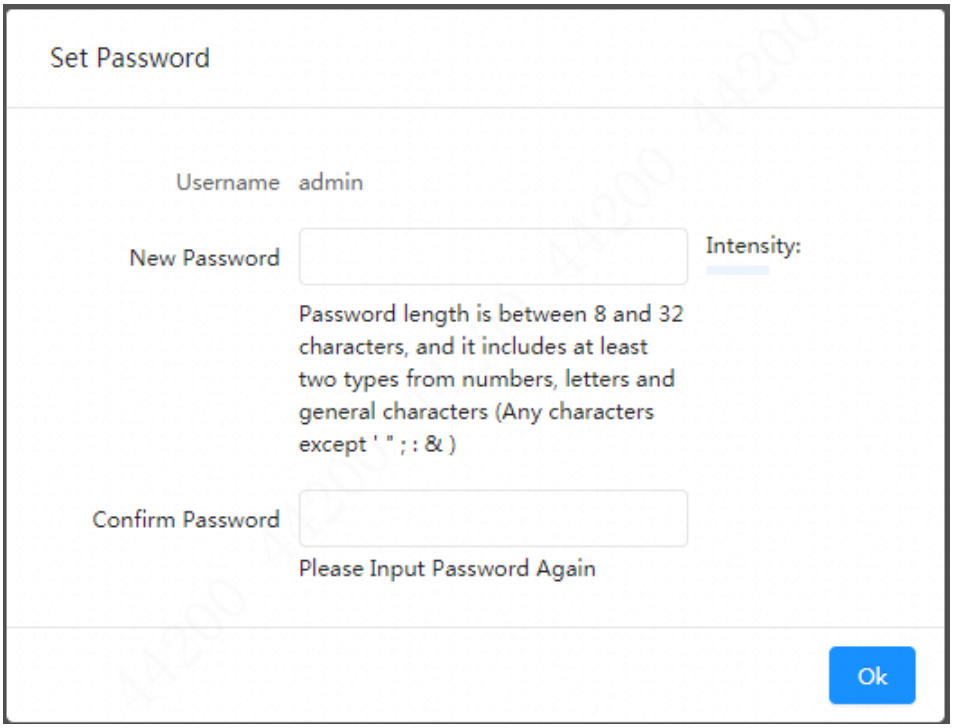


Step 3 Set the login password for admin.

The password must consist of 8 to 32 non-blank characters and contain at least two types of characters among upper case, lower case, number, and special character (excluding ' " ; : &).

Enter a strong password according to the password strength prompt.

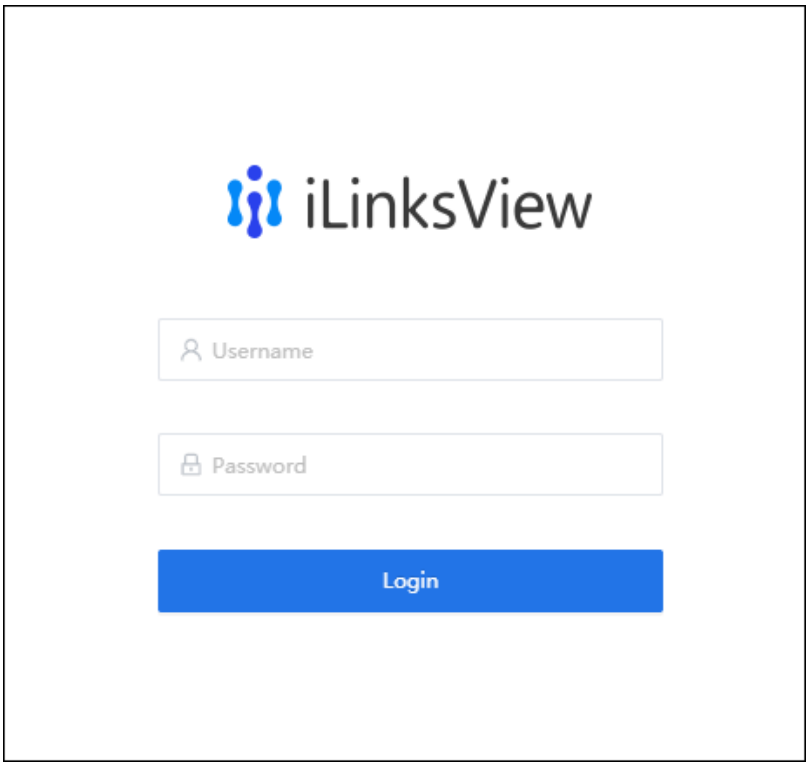
Figure 3-2 Set password



Step 4 Click **OK** to save the configuration.

The user login interface is displayed.

Figure 3-3 User login



3.1.2 Startup Wizard

If it is your first time to log in, you will enter the **Setup Wizard** interface, which can help you quickly configure network segment of the network devices and network settings of the system.

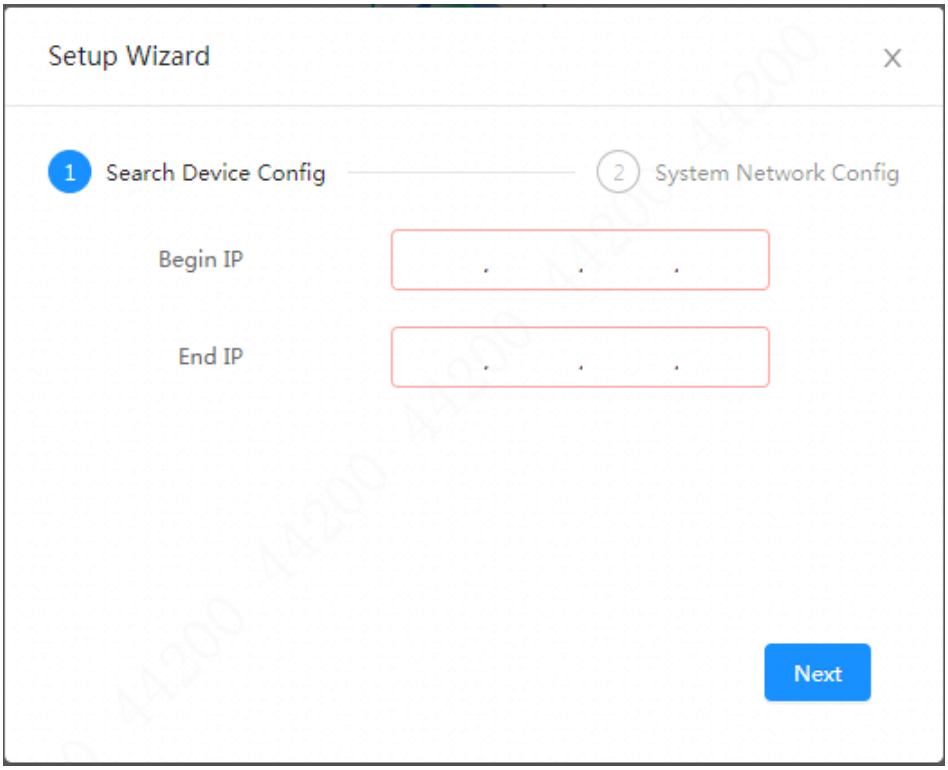
Step 1 Log in to iLinksView.

Figure 3-4 Web login

Step 2 Configure network segment of the network devices.

On the **Setup Wizard** interface, enter **Begin IP** and **End IP**, and then click **Next**. The system will search devices within the segment.

Figure 3-5 Configuring search IP address

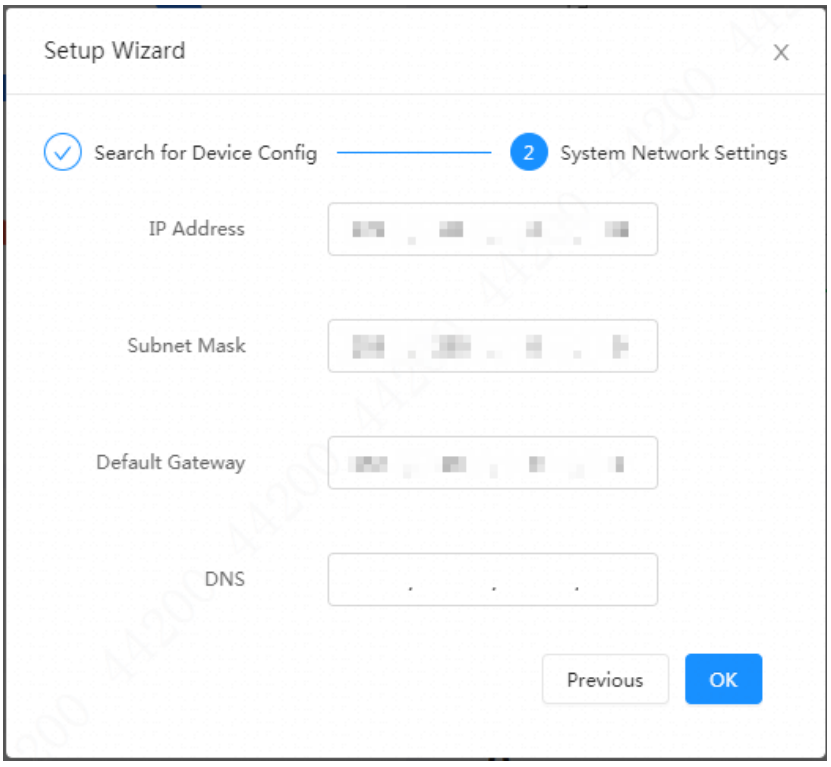


Step 3 Configure system network.

On the **System Network Setting** interface, enter IP address, subnet mask, default gateway and DNS.

DNS is not required.

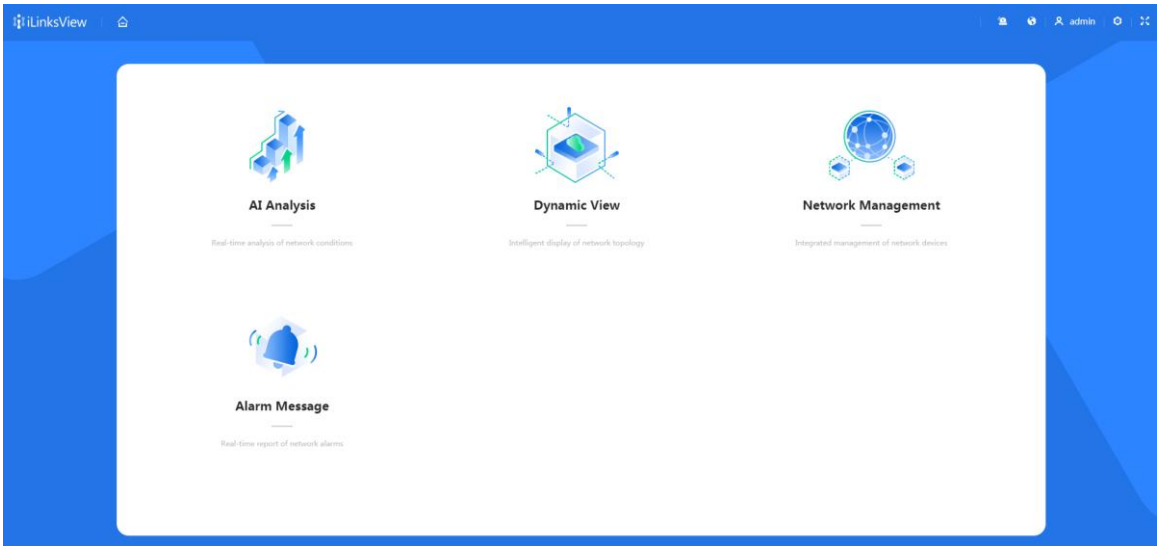
Figure 3-6 System network settings



Step 4 Click **OK** to complete the network configuration.

The homepage is displayed. See Figure 3-7.

Figure 3-7 Homepage



- After the initialization, you can just log in to the web interface with the username and password.
- You can click the module icons to go to the corresponding module interfaces.

3.2 Network Management

You can discover and view the detailed information of switches and terminal devices, such as IPC and NVR.

3.2.1 Discovering Device

You can discover, manage and analyze switches and terminal devices.

3.2.1.1 Setting Network Segment

You can set the network segment to search and add switches and terminal devices to the iLinksView platform.

Only the Dahua devices will be automatically discovered.

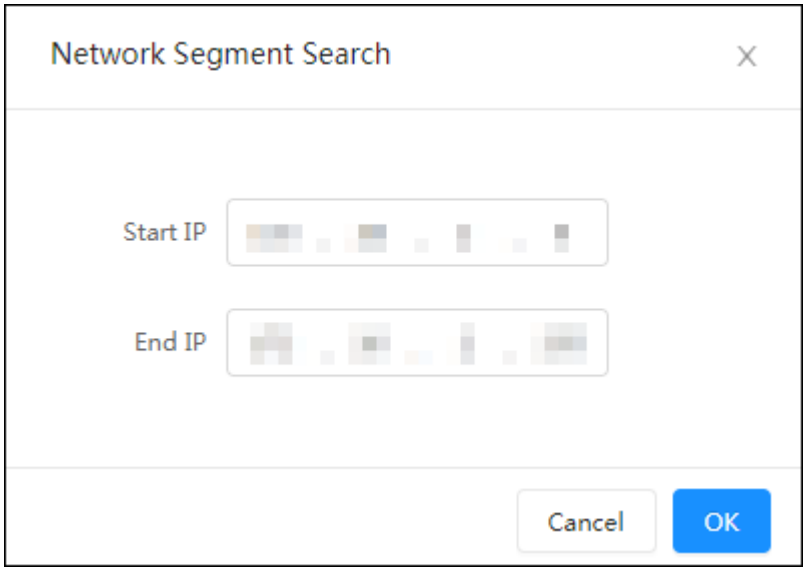
Step 1 Log in to iLinksView.

Step 2 Click **Network Management > Network Adding > Search Network Segment**.

Step 3 Click **Add**.

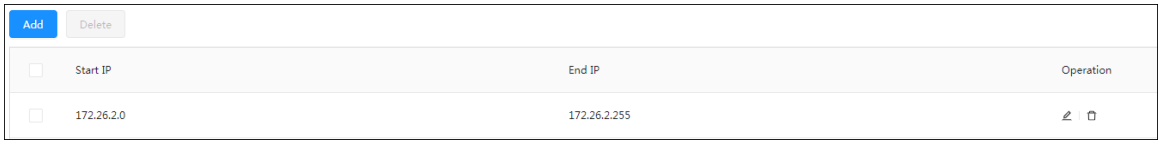
The **Network Segment Search** interface is displayed.

Figure 3-8 Network segment search



Step 4 Enter **Start IP** and **End IP**, and then click **OK**.

Figure 3-9 Search network segment



- Click to modify start IP and end IP.

- Click to delete the network segment.

3.2.1.2 Searching SNMP Switch

When the switch cannot be discovered in batch through the network segment search, you can add it manually.

- Confirm that SNMP of the switch is configured.
- Switches that meet the SNMP settings of the iLinksView platform can be discovered directly through the network segment search, and does not need to be added manually. For SNMP settings of the iLinksView platform, refer to 4.2.3 SNMP.

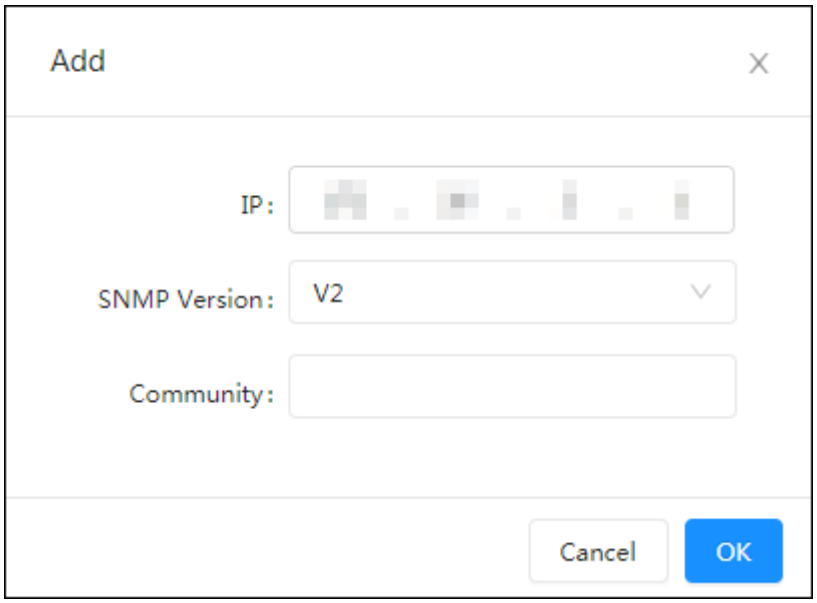
Step 1 Log in to iLinksView.

Step 2 Click **Network Management > Network Adding > SNMP Switch**.

Step 3 Click **Add**.

The **Add** interface is displayed. See Figure 3-10.

Figure 3-10 Add a switch.



Step 4 Enter **IP**, **SNMP Version** and **Community** of the switch.

IP, **SNMP Version** and **Community** should be the same as the switch setting.

Step 5 Click **OK**.

3.2.2 Device Management

3.2.2.1 Terminal Device

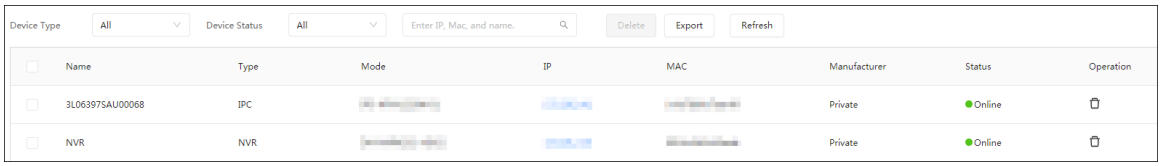
You can view the detailed information of IPCs, NVRs and other devices, such as name, type, mode, IP, MAC, manufacturer and status.

Step 1 Log in to iLinksView.

Step 2 Click **Network Management > Terminal Device**.

The **Terminal Device** interface is displayed. See Figure 3-11.

Figure 3-11 Terminal device



- Click the IP address to go to the login interface of the device.
- You can search devices by IP, MAC and name.
- Click to delete the switch.
- Click **Export** to export the device information as csv format.
- Select one or more devices, and then click **Delete** to delete the selected devices.

3.2.2.2 Switch Management

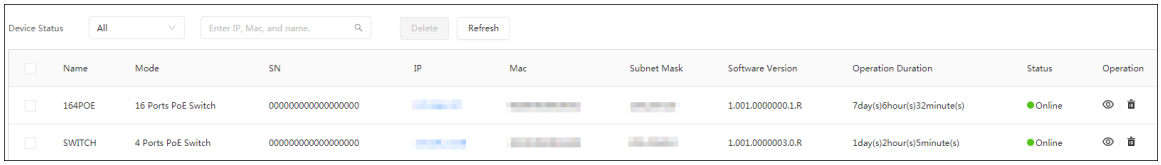
You can view the detailed information of switches, such as name, mode, SN, IP, MAC and status.

Step 1 Log in to iLinksView.

Step 2 Click **Network Management > Switch Management**.

The **Switch Management** interface is displayed. See Figure 3-12.

Figure 3-12 Switch management



- Click the IP address to go to the login interface of the device.
- You can search devices by IP, MAC and name.
- Click to view the details of the switch port information.
- Click to delete the selected switch.
- Select one or more switches, and then click **Delete** to delete the selected switches.

3.2.2.3 PoE Management

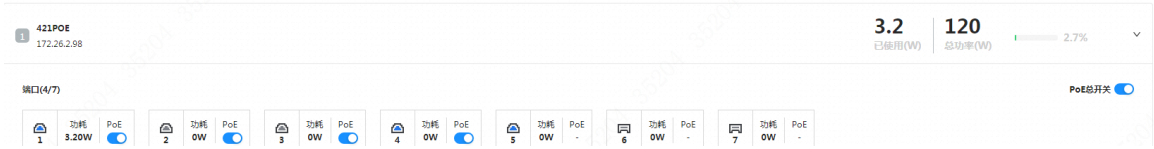
You can view the power consumption of switches, including total and used power consumption. And you can also remote control the PoE switch.

Step 1 Log in to iLinksView.

Step 2 Click **Network Management > PoE Management**.

The **PoE Management** interface is displayed. See Figure 3-13.

Figure 3-13 PoE Management



- Power consumption display of PoE switches: Display the total and used power consumption of the current switch.
  - ✧ When the used power consumption is blow 50% of the total power consumption, the status bar indicates green;
  - ✧ When the used power consumption is between 50% and 80% of the total power consumption, the status bar indicates yellow;
  - ✧ When the used power consumption is above 80% of the total power consumption, the status bar indicates red.
- PoE management: Recover terminal devices by remotely control the PoE switch.

3.3 AI Analysis

AI analysis is used for real-time analysis of network, which is convenient for troubleshooting and locating network problems.

In the homepage of the iLinksView platform, click **AI Analysis**, and the **AI Analysis** interface is displayed. See Figure 3-14. For AI analysis module description, see Table 3-1.

Figure 3-14 AI analysis

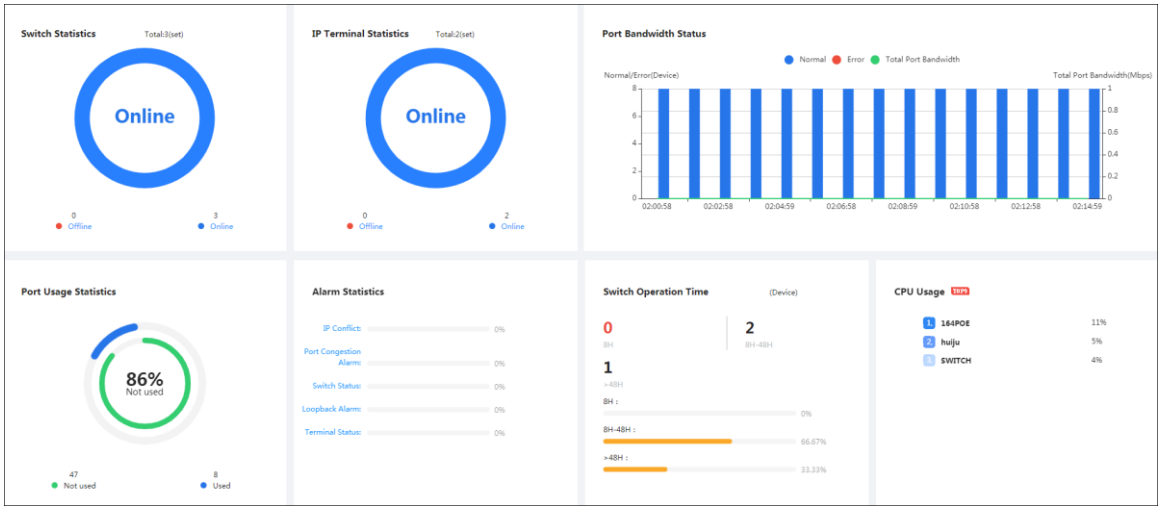


Table 3-1 AI analysis module description

No.	Module	Description
1	Switch Statistics	Display the number of online and offline switches. You can click **Online** or **Offline** to directly go to the **Switch Management** interface to view the details of the online or offline switches.
2	IP Terminal Statistics	Display the number of online and offline IP terminal devices. You can click **Online** or **Offline** to directly go to the **Terminal Device** interface to view the details of the online or offline terminal devices.
3	Port Bandwidth Status	Display the number of normal and abnormal ports and the total port bandwidth of the switch. ● The number of normal ports is displayed in blue; ● The number of abnormal ports is displayed in red; ● The total port bandwidth is displayed in green. Move the mouse over the histogram to view the specific value.
4	Port Usage Statistics	Display the number of used and unused ports of all switches.
5	Alarm Statistics	Alarm types include: IP Conflict, Port Congestion Alarm, Switch Status, Loopback Alarm and Terminal Status. You can click the alarm type to go to the **Alarm Message** interface to view the details.
6	Switch Operation Time	Switch operation time is classified as follows: less than 8 hours, 8–48 hours and more than 48 hours.
7	CPU Usage	Display the top 9 switches with most CPU usages.

3.4 Dynamic View

Display the connection relationship of devices in the current network, and devices include IPCs, NVRs, switches and the iLinksView platform. When a device is discovered and added to the platform, the platform will automatically draw a topology graph to visually display the connection relationship between the switch and the device. For the icon description of the topology graph, refer to Table 3-2.

In the homepage of the iLinksView platform, click **Dynamic View** to view the topology graph of the current devices. Move the mouse over the link to view the details.

Figure 3-15 Dynamic view

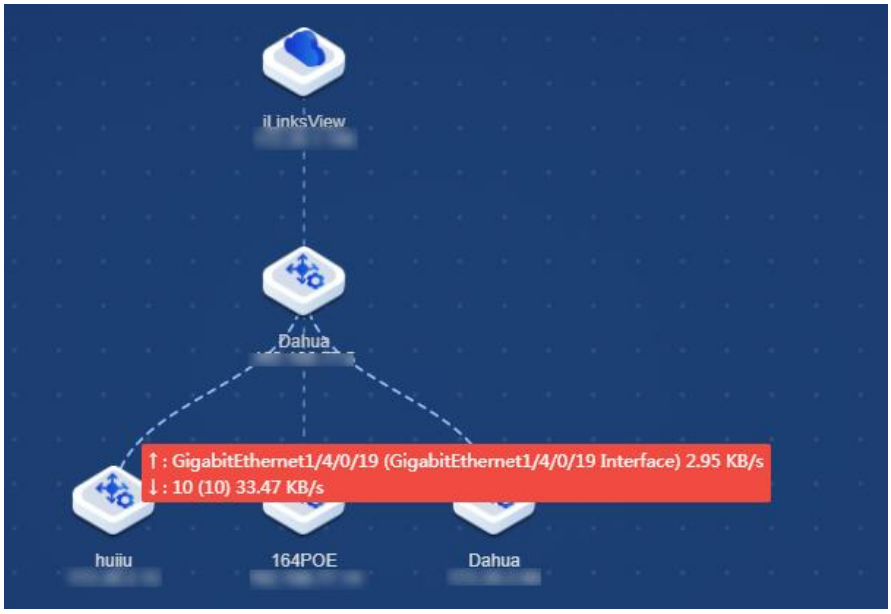


Table 3-2 Icons

Icons	Description	Icon	Description
	Unmanaged switch (online)		Unmanaged switch (offline)
	Managed switch (online)		Managed switch (offline)
	NVR (online)		NVR (offline)
	IPC (online)		IPC (offline)
	Unknown devices (online)		Unknown devices (offline)

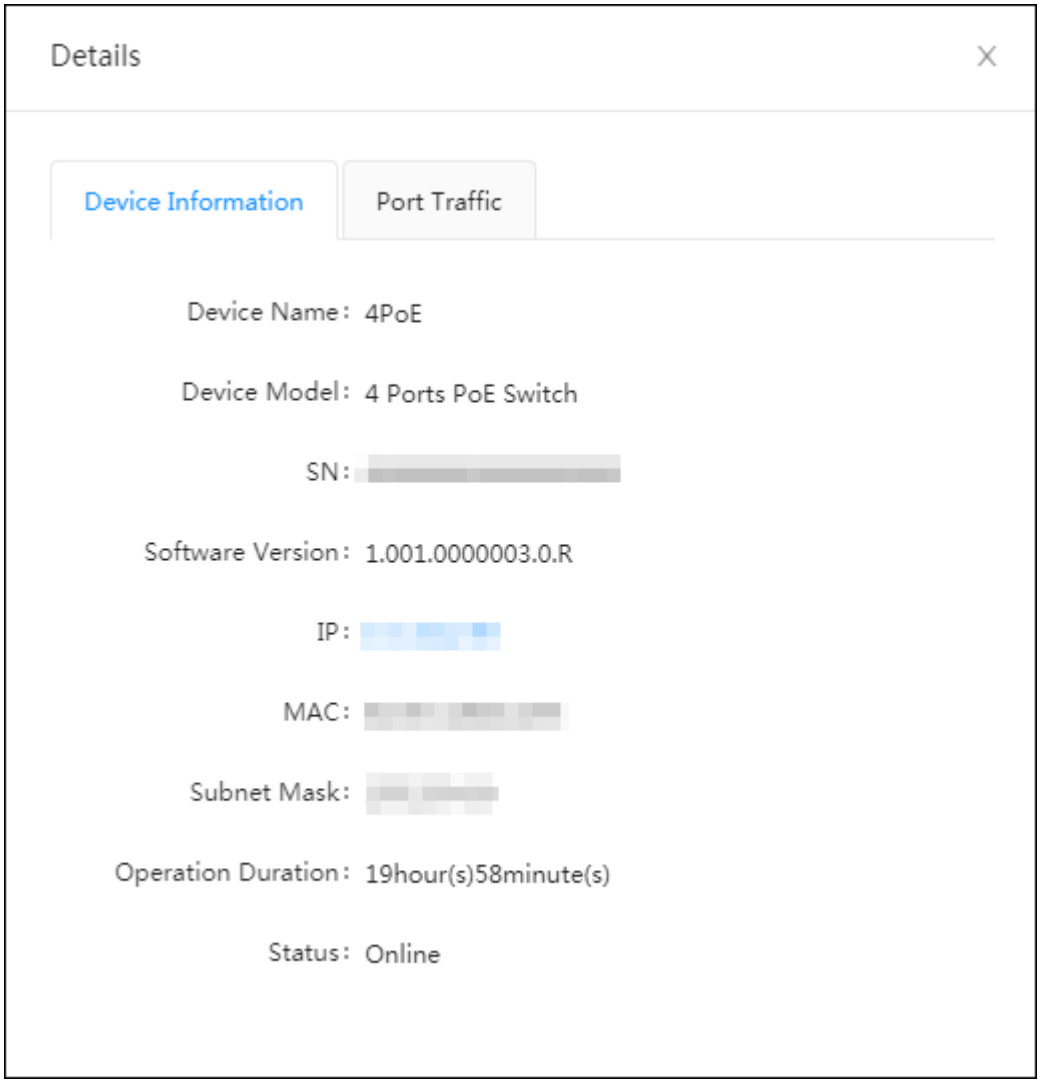
- Search a device

  At the top right corner of the **Dynamic View** interface, enter IP address or name of a device, click  , and you can search a specific device.

- View detail information of a device

  Double-click the device icon to view the detail information of the device. See Figure 3-16.

Figure 3-16 Device details



- View traffic of a switch port
  Double-click the switch icon, click **Port Traffic**, and select a port. And you can view the bandwidth details. See Figure 3-17. For port description, refer to Table 3-3.
  To display the received and sent flow, move mouse to the specific location of the bandwidth graph.

Figure 3-17 Port traffic

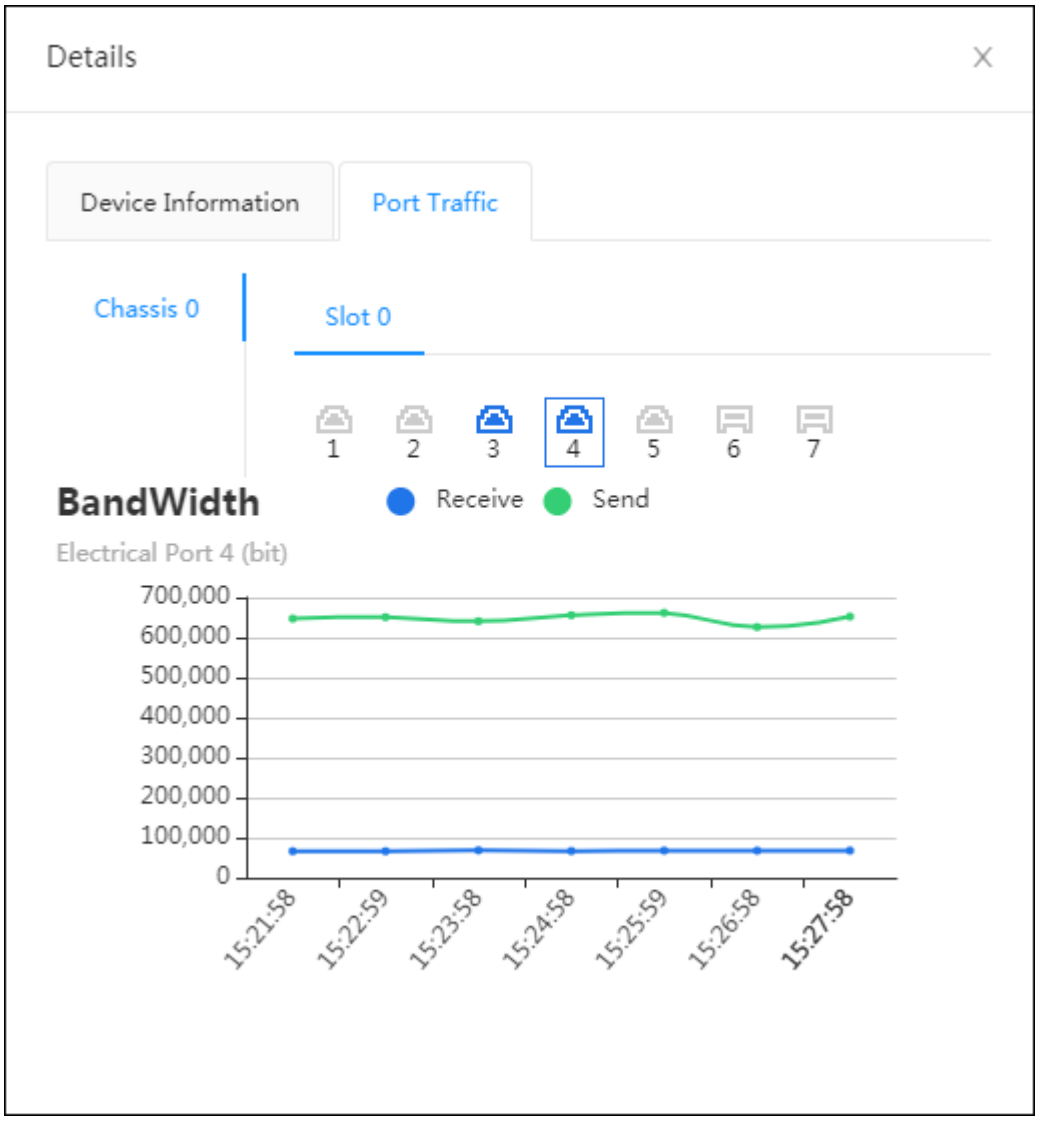


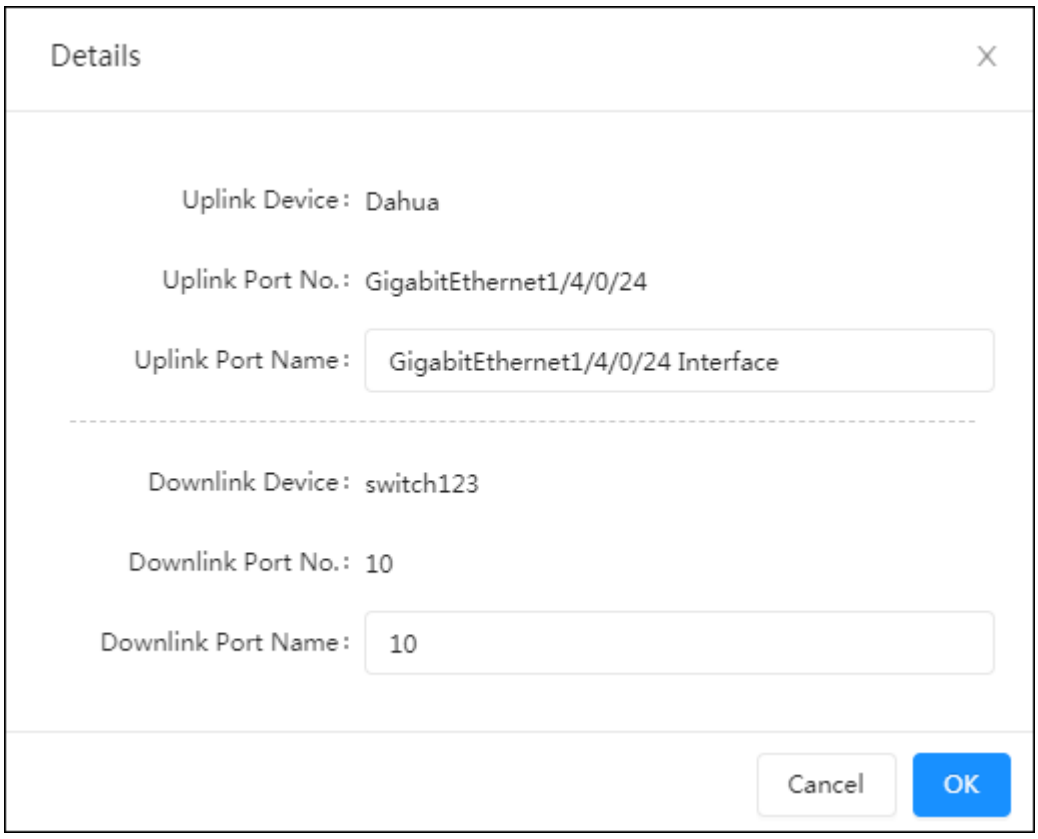
Table 3-3 Port description

Icon	Description	Icon	Description
	Ethernet port (online)		Ethernet port (offline)
	Fiber port (online)		Fiber port (offline)
	Unknown ports (online)		Unknown ports (offline)

- View link details and modify port name

  Double-click a link to view the link details and modify port name. See Figure 3-18.

Figure 3-18 Link details



- If the downlink device is a terminal device, modifying the port name will synchronously change the name of the terminal device.
- If the uplink device is the iLinksView platform, the port name cannot be modified.

- Device Collapse

  When there are nodes under the device, click the device icon to collapse the nodes, and only the number of nodes is shown. See Figure 3-19.

Figure 3-19 Device collapse

3.5 Alarm Message

The platform displays the alarm message when a switch alarm occurs.

You can configure types of alarm messages. For details, refer to 4.2.1 Alarm Management.

To help troubleshooting problems, you can click  at the upper right corner or **Alarm Message** in the homepage of the iLinksView platform to view details of the alarm message.

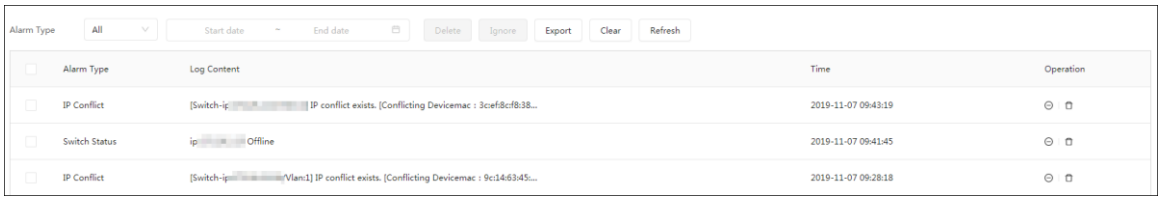
3.5.1 Real-time Message

Step 1 Log in to iLinksView.

Step 2 Click **Alarm Message > Real-time Message**.

Step 3 Set the filtering condition to view the alarm details. See Figure 3-20.

Figure 3-20 Real-time message



- Select an alarm message, and then click **Delete** or  to delete the message.
- Select an alarm message, and then click **Ignore** or  to ignore the message.

  Click **Alarm Message > Ignore Message** to view the ignored messages.
- Click **Export** to export the alarm messages as csv format.
- Click **Clear** to remove all messages.

3.5.2 Ignore Message

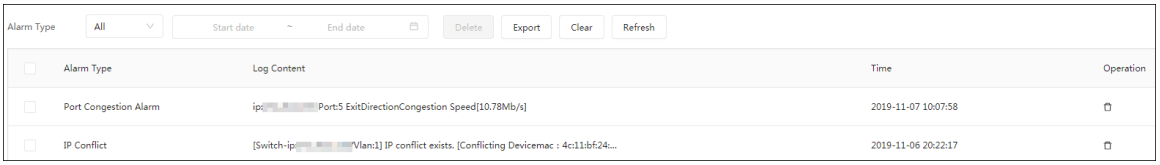
You can view the ignored message in the **Ignore Message** interface.

Step 1 Log in to iLinksView.

Step 2 Click **Alarm Message > Ignore Message**.

Step 3 Set the filtering condition to view the ignored messages. See Figure 3-21.

Figure 3-21 Ignore message



- Select a message, and then click **Delete** or  to delete the message.
- Click **Export** to export the ignored messages as csv format.
- Click **Clear** to remove all ignored messages.

4 System Settings

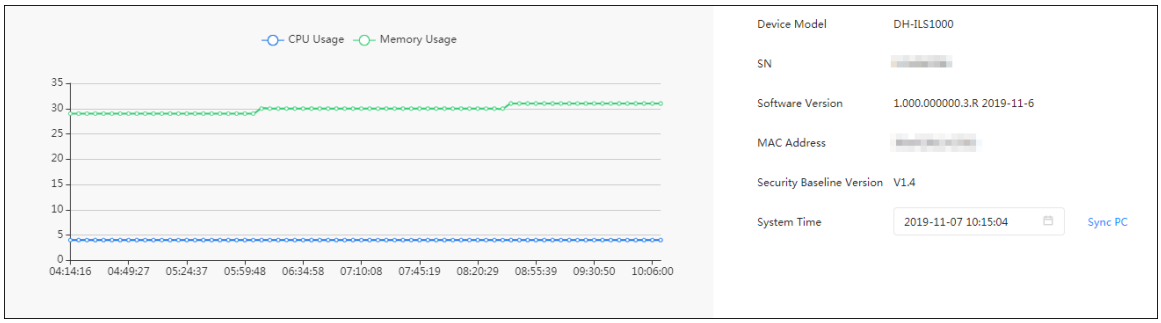
4.1 Basic Settings

4.1.1 Basic Information

You can view the basic information of the iLinksView platform, such as CPU usage, device model and SN.

Log in to iLinksView, and then click  at the upper right corner to view the basic information of the platform. See Figure 4-1.

Figure 4-1 Basic information



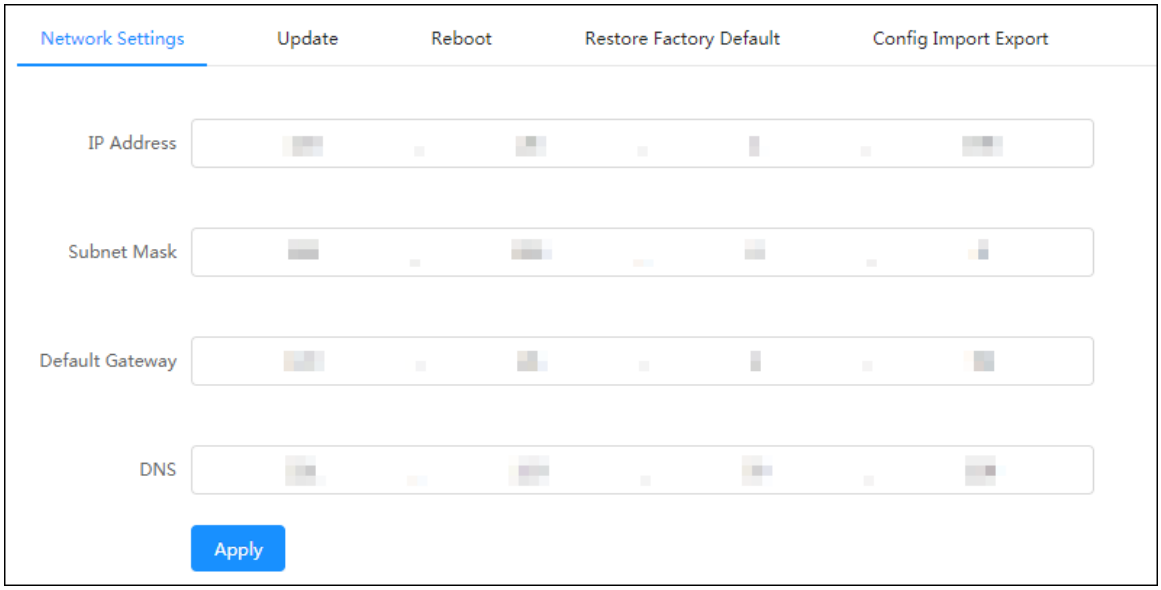
4.1.2 Network Settings

You can configure the network of the Platform, including IP address, subnet mask, default gateway and DNS.

Step 1 Log in to iLinksView, and then click  at the upper right corner.

Step 2 Click **Basic Settings > Network Settings**.
The **Network Settings** interface is displayed.

Figure 4-2 Network settings



Step 3 Configure network as needed, and then click **Apply**.

4.1.3 Updating the Device

Import the upgrading file to upgrade the Device. You can get the upgrading file from technical support.

- Export the configuration file for backup before upgrade, and then import it after the upgrade is completed. For details, refer to 4.1.6 Configuring Import and Export .
- Use the upgrading file with SDA, for example, General_IL_S1000_Chn_SDA_V1.000.0000000.1.R.190911.BIN.
- Do not disconnect the power or network, or reboot or shutdown the Device during upgrade.

Upgrading with the wrong version might cause unavailability of the Device and data loss. Please operate carefully.

Step 1 Log in to iLinksView, and then click at the upper right corner.

Step 2 Click **Basic Settings > Update**.

The **Update** interface is displayed.

Figure 4-3 Upgrade

Step 3 Click **Browse**, and then select the upgrading file.

Step 4 Click **Update now**.

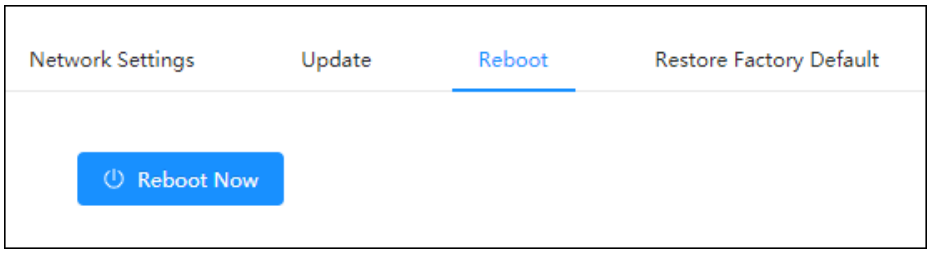
4.1.4 Rebooting the Device

Step 1 Log in to iLinksView.

Step 2 Click  on the upper right corner, and then select **Reboot**.

Step 3 Click **Reboot Now**.

Figure 4-4 Reboot



4.1.5 Resetting the Device

Refer to the following two ways to reset the Device.

On Web Interface

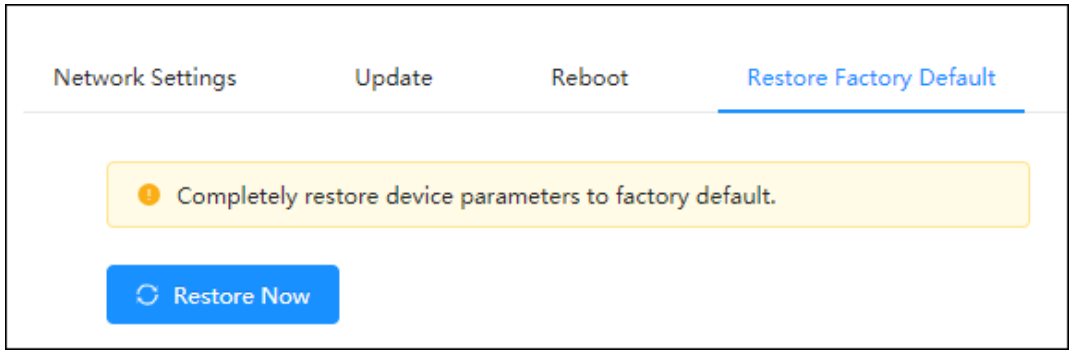
Step 1 Log in to iLinksView.

Step 2 Click  on the upper right corner, and then select **Restore Factory Default**.

Step 3 Click **Restore Now**.

IP address will not be changed when you reset the system on the Web interface.

Figure 4-5 System reset on web interface



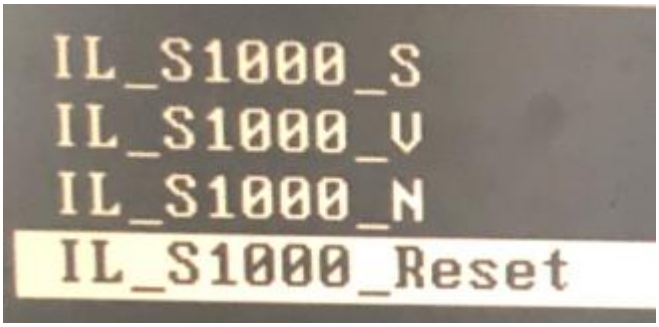
On the Device

Step 1 Connect the external monitor (VGA port) and keyboard (USB port) to the Device.

Step 2 Connect the power source, hold down keypad (↑), and go to the system reset interface.

Step 3 Select **IL_S1000_Reset**, and then press **Enter** key.

Figure 4-6 System reset on the Device



4.1.6 Configuring Import and Export

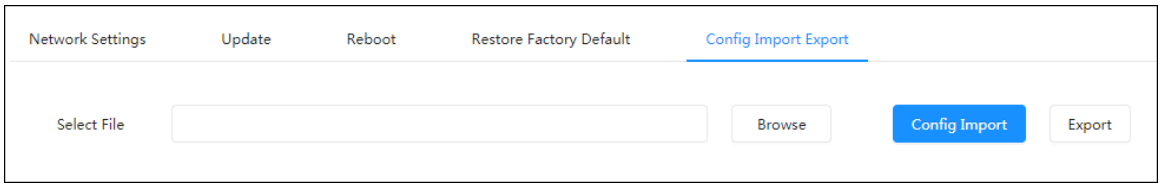
You can import the configuration from other devices to the current device or export the configuration of the current device to local.

Step 1 Log in to iLinksView, and then click  at the upper right corner.

Step 2 Click **Basic Settings > Config Import and Export**.

The **Config Import and Export** interface is displayed.

Figure 4-7 Configure import and export



Step 3 Import or export configuration.

- Import configuration
  1. Click **Browse** to select the file you want to import.
  2. Click **Config Import**.
- Export configuration

  Click **Export** to export the configuration of the Device.

4.2 Global Configuration

4.2.1 Alarm Management

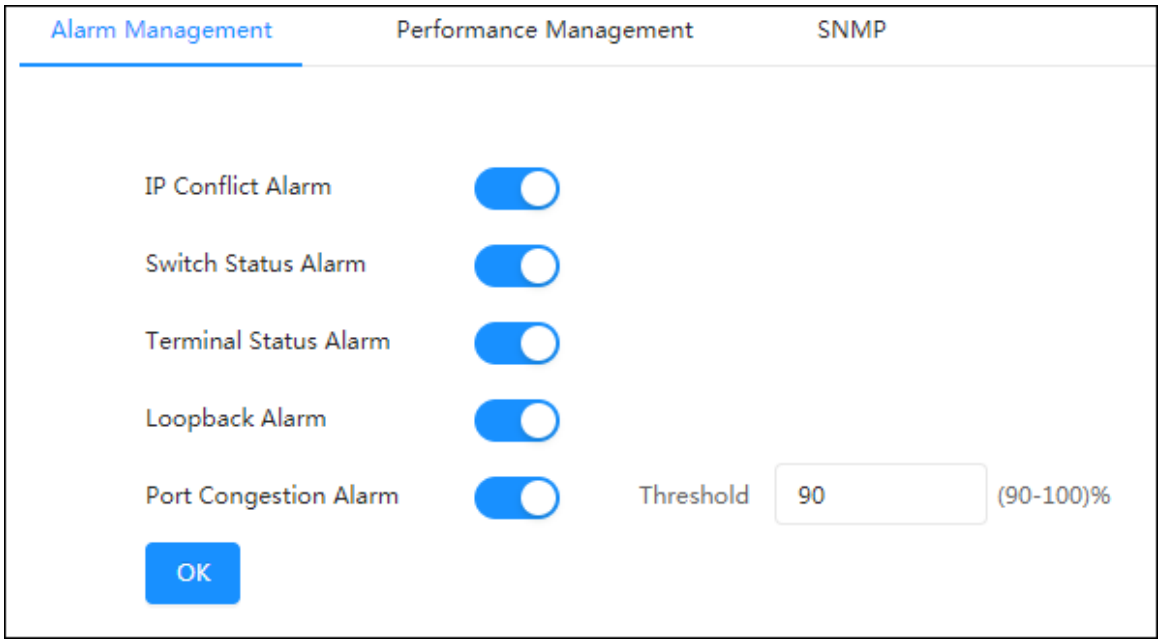
You can set the alarm types that the iLinksView platform can receive. If the alarm type is not enabled, the platform will not receive the corresponding alarm message even if this type of alarm occurs.

Step 1 Log in to iLinksView, and then click  at the upper right corner.

Step 2 Click **Global Config > Alarm Management**.

The **Alarm Management** interface is displayed. See Figure 4-8.

Figure 4-8 Alarm management



Step 3 Set alarm types that you want to enable and threshold, and then click **OK**.

Loopback Alarm is valid only when the loop protection of the switch is enabled.

4.2.2 Performance Management

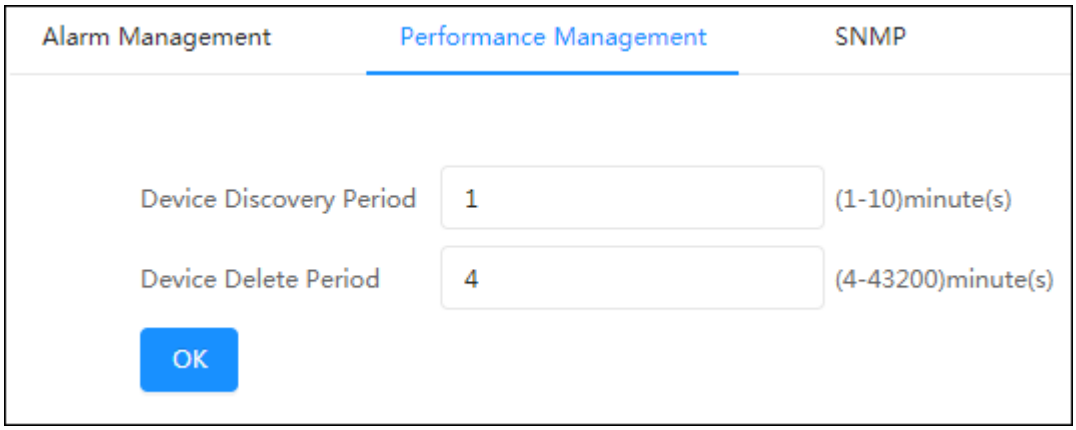
You can set the period of device discovery and deletion.

Step 1 Log in to iLinksView, and then click at the upper right corner.

Step 2 Click **Global Config > Performance Management**.

The **Performance Management** interface is displayed.

Figure 4-9 Performance management



Step 3 Set **Device Discovery Period** and **Device Delete Period**, and then click **OK**.

Device Delete Period must be set to 4 times or above of **Device Discovery Period**.

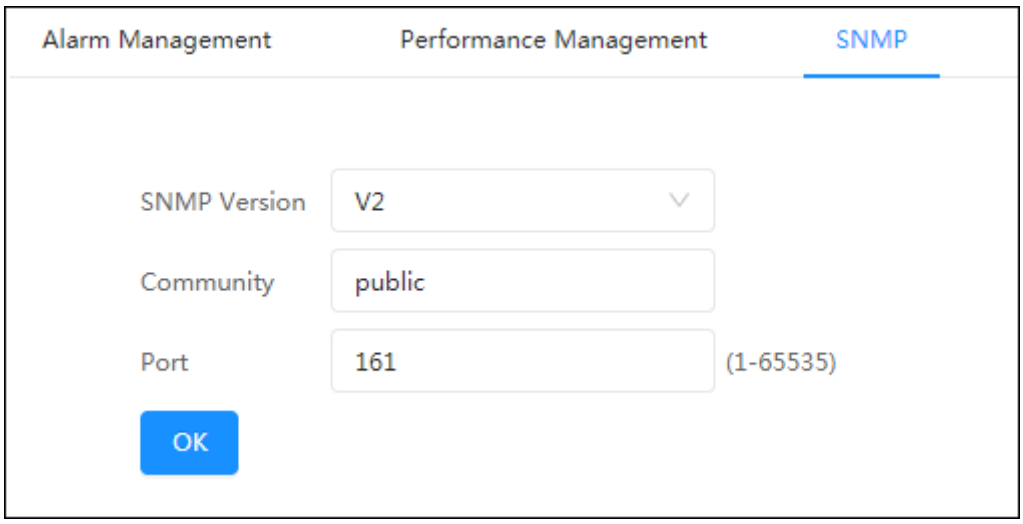
4.2.3 SNMP

SNMP is used to set the general switch protocol. After the setting is completed, the switches that match the protocol can be discovered and added directly to the iLinksView platform. And you do not need to search and add them separately.

Step 1 Log in to iLinksView, and then click  at the upper right corner.

Step 2 Click **Global Config > SNMP**.
The **SNMP** interface is displayed.

Figure 4-10 SNMP



Step 3 Enter **SNMP Version**, **Community** and **Port**, and then click **OK**.

4.3 Safety Management

4.3.1 HTTPS

You can log in to the web interface of iLinksView by HTTPS, which ensures the security of communication data, and guards the user information and device security.

- If it is your first time to use HTTPS or after you change the IP address of the Device, you need to create the server certificate and then download and install the root certificate.
- If you want to log in to the web interface of iLinksView on a new PC by HTTPS, please ensure that the root certificate is installed on the new PC.
- The HTTPS setting takes effect after the iLinksView platform restarts.

Step 1 Log in to iLinksView, and then click  at the upper right corner.

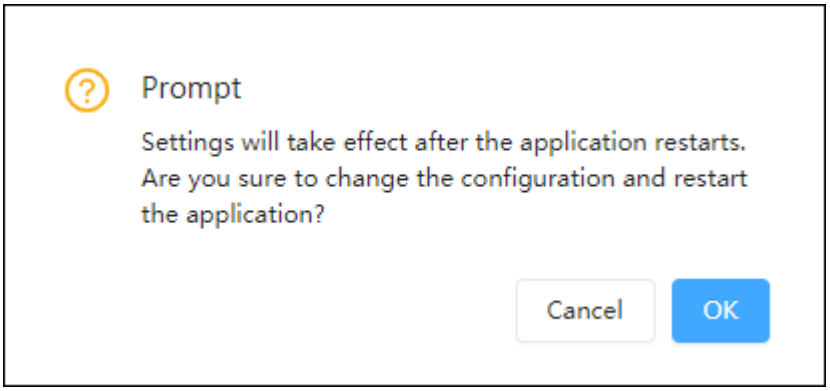
Step 2 Click **Safety Management**.

Figure 4-11 Safety management

Step 3 Enable **HTTPS**.

Step 4 The confirmation dialog box is prompted, and then click **OK**.

Figure 4-12 Confirm to restart



4.3.2 SSH

After SSH is enabled, you can access the iLinksView platform background through SSH connection tool, which facilitates remote debugging by technical personnel.

Step 1 Log in to iLinksView, and then click  at the upper right corner.

Step 2 Click **Safety Management**.

Step 3 Enable **SSH** as needed.

4.4 Firewall

You can set the white list and black list of the platform by adding IPs or IP segments.

Step 1 Log in to iLinksView, and then click  at the upper right corner.

Step 2 Click **Firewall**.

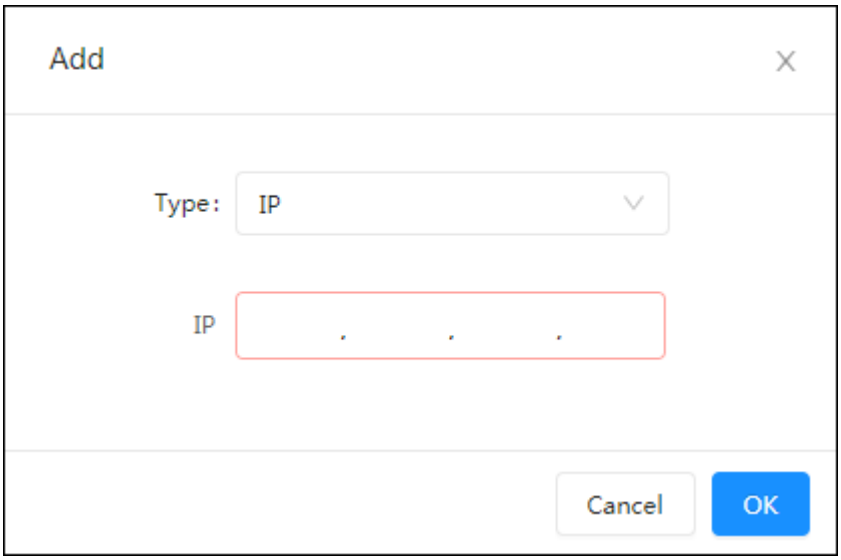
Step 3 Enable **Firewall**.

Figure 4-13 Enable firewall

Step 4 Select **White List** or **Black List**.

Step 5 Click **Add**.

Figure 4-14 Add IP



Step 6 Enter the IP or IP segment.

Step 7 Click **OK**.

4.5 Language Setting

Step 1 Log in to iLinksView, and then click  at the upper right corner.

Step 2 Select **English**.

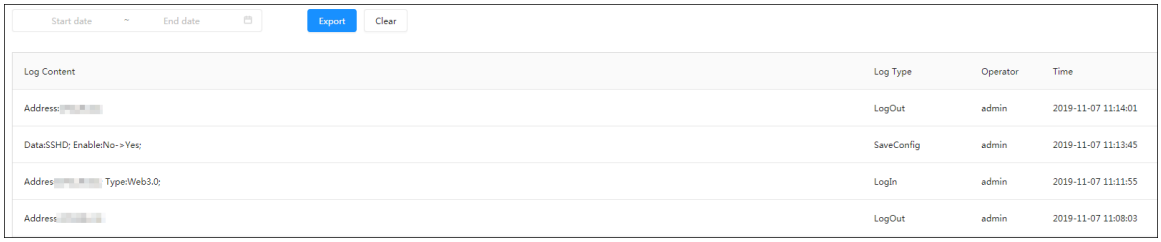
4.6 System Log

You can view details of user operation, such as login and logout.

Step 1 Log in to iLinksView, and then click  at the upper right corner.

Step 2 Click **System Log**.

Figure 4-15 System log



- You can filter logs according to start date and end date.
- Click **Export** to export logs as csv format.
- Click **Clear** to remove all logs.

4.7 Modifying Password

There are two ways to change the user password.

By User Management

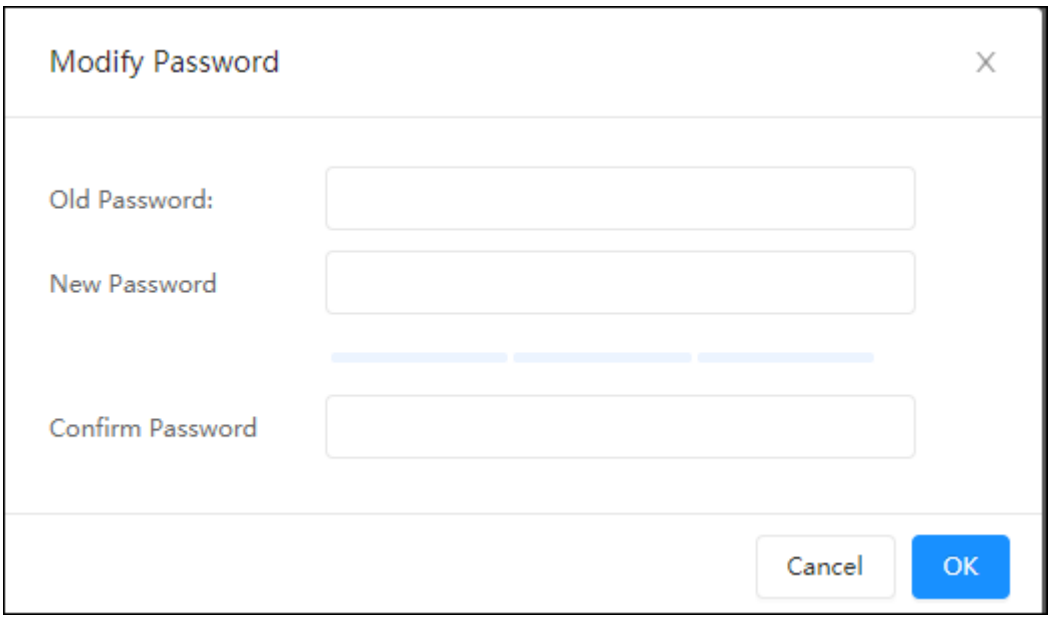
Step 1 Log in to iLinksView, and then click  at the upper right corner.

Step 2 Click **User Management**.

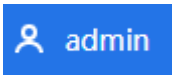
Step 3 Click  .

Step 4 Enter the old password and new password, confirm the new password, and then click **OK**. See Figure 4-16.

Figure 4-16 Modify password

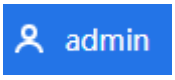


By Admin Icon

Step 1 Log in to iLinksView, and then click 

at the upper right corner.
Step 2 Select **Modify password**.
Step 3 Enter old password and new password, confirm the new password, and then click **OK**.

4.8 Logout

Step 1 Log in to iLinksView, and then click 

at the upper right corner.
Step 2 Select **Logout**, and the system redirects to the login interface.

Appendix 1 Cybersecurity Recommendations

Cybersecurity is more than just a buzzword: it's something that pertains to every device that is connected to the internet. IP video surveillance is not immune to cyber risks, but taking basic steps toward protecting and strengthening networks and networked appliances will make them less susceptible to attacks. Below are some tips and recommendations on how to create a more secured security system.

Mandatory actions to be taken for basic equipment network security:

1. **Use Strong Passwords**

   Please refer to the following suggestions to set passwords:

   - The length should not be less than 8 characters;
   - Include at least two types of characters; character types include upper and lower case letters, numbers and symbols;
   - Do not contain the account name or the account name in reverse order;
   - Do not use continuous characters, such as 123, abc, etc.;
   - Do not use overlapped characters, such as 111, aaa, etc.;

2. **Update Firmware and Client Software in Time**

   - According to the standard procedure in Tech-industry, we recommend to keep your equipment (such as NVR, DVR, IP camera, etc.) firmware up-to-date to ensure the system is equipped with the latest security patches and fixes. When the equipment is connected to the public network, it is recommended to enable the "auto-check for updates" function to obtain timely information of firmware updates released by the manufacturer.
   - We suggest that you download and use the latest version of client software.

"Nice to have" recommendations to improve your equipment network security:

1. **Physical Protection**

   We suggest that you perform physical protection to equipment, especially storage devices. For example, place the equipment in a special computer room and cabinet, and implement well-done access control permission and key management to prevent unauthorized personnel from carrying out physical contacts such as damaging hardware, unauthorized connection of removable equipment (such as USB flash disk, serial port), etc.

2. **Change Passwords Regularly**

   We suggest that you change passwords regularly to reduce the risk of being guessed or cracked.

3. **Set and Update Passwords Reset Information Timely**

   The equipment supports password reset function. Please set up related information for password reset in time, including the end user's mailbox and password protection questions. If the information changes, please modify it in time. When setting password protection questions, it is suggested not to use those that can be easily guessed.

4. **Enable Account Lock**

   The account lock feature is enabled by default, and we recommend you to keep it on to guarantee the account security. If an attacker attempts to log in with the wrong password several times, the corresponding account and the source IP address will be locked.

5. **Change Default HTTP and Other Service Ports**

   We suggest you to change default HTTP and other service ports into any set of numbers between 1024~65535, reducing the risk of outsiders being able to guess which ports you are using.

6. **Enable HTTPS**

   We suggest you to enable HTTPS, so that you visit Web service through a secure communication channel.

7. **Enable Whitelist**

   We suggest you to enable whitelist function to prevent everyone, except those with specified IP addresses, from accessing the system. Therefore, please be sure to add your computer's IP address and the accompanying equipment's IP address to the whitelist.

8. **MAC Address Binding**

   We recommend you to bind the IP and MAC address of the gateway to the equipment, thus reducing the risk of ARP spoofing.

9. **Assign Accounts and Privileges Reasonably**

   According to business and management requirements, reasonably add users and assign a minimum set of permissions to them.

10. **Disable Unnecessary Services and Choose Secure Modes**

    If not needed, it is recommended to turn off some services such as SNMP, SMTP, UPnP, etc., to reduce risks.

    If necessary, it is highly recommended that you use safe modes, including but not limited to the following services:

    - SNMP: Choose SNMP v3, and set up strong encryption passwords and authentication passwords.
    - SMTP: Choose TLS to access mailbox server.
    - FTP: Choose SFTP, and set up strong passwords.
    - AP hotspot: Choose WPA2-PSK encryption mode, and set up strong passwords.

11. **Audio and Video Encrypted Transmission**

    If your audio and video data contents are very important or sensitive, we recommend that you use encrypted transmission function, to reduce the risk of audio and video data being stolen during transmission.

    Reminder: encrypted transmission will cause some loss in transmission efficiency.

12. **Secure Auditing**

    - Check online users: we suggest that you check online users regularly to see if the device is logged in without authorization.
    - Check equipment log: By viewing the logs, you can know the IP addresses that were used to log in to your devices and their key operations.

13. **Network Log**

    Due to the limited storage capacity of the equipment, the stored log is limited. If you need to save the log for a long time, it is recommended that you enable the network log function to ensure that the critical logs are synchronized to the network log server for tracing.

14. **Construct a Safe Network Environment**

    In order to better ensure the safety of equipment and reduce potential cyber risks, we recommend:

    - Disable the port mapping function of the router to avoid direct access to the intranet devices from external network.

- The network should be partitioned and isolated according to the actual network needs. If there are no communication requirements between two sub networks, it is suggested to use VLAN, network GAP and other technologies to partition the network, so as to achieve the network isolation effect.
- Establish the 802.1x access authentication system to reduce the risk of unauthorized access to private networks.

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